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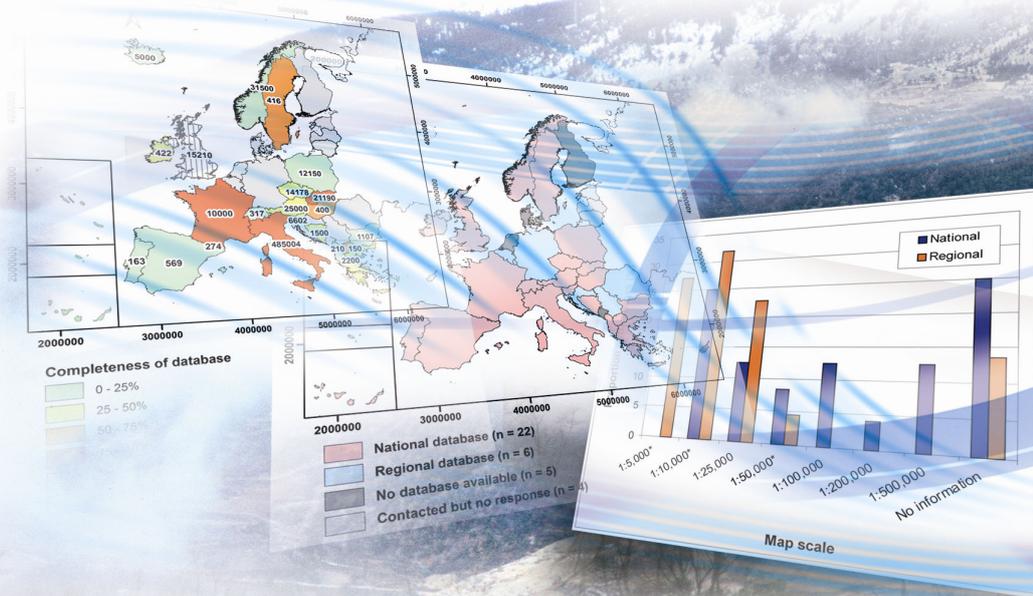
JRC SCIENTIFIC AND POLICY REPORTS

Landslide inventories in Europe and policy recommendations for their interoperability and harmonisation

*A JRC contribution to the
EU-FP7 SafeLand project*

Miet Van Den Eeckhaut and Javier Hervás

2012



Report EUR 25666 EN

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Joint Research Centre

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Cover image by Ramón Sánchez and Javier Hervás

JRC74132

EUR 25666 EN

ISBN 978-92-79-27994-2

ISSN 1831-9424

doi 10.2788/75587

Luxembourg: Publications Office of the European Union, 2012

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Printed in Italy

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Foreword

Landslides are a major natural hazard in most mountainous and hilly regions as well as in steep river banks and coastlines. In EU's Thematic Strategy for Soil Protection (2006a) landslides are mainly recognized as a soil threat for which areas where they are likely to occur in the future have to be delineated, and measures to reduce their impact have to be designed. Thus the Strategy implies that landslide susceptibility, hazard and risk assessments are needed for appropriate risk management in Europe. To enable such assessments landslide databases, usually including landslide inventory maps and linked alphanumeric information, are a key infrastructure. They should mainly contain information on the location of landslide phenomena, types, history, state of activity, magnitude or size, lithology involved, failure mechanisms, causal factors and the damage caused. Yet, it was not known which national (or regional) landslide databases contain all this information, and thus allow risk assessment. Therefore, this report makes a detailed review of national landslide databases in EU member states, EU official candidate and potential candidate countries and EFTA countries together with a number of regional databases, and proposes improvements for delineating areas at risk in agreement with the EU Soil Thematic Strategy (2006a) and its associated Proposal for a Soil Framework Directive (2006b), and for achieving interoperability and harmonisation in agreement with INSPIRE Directive, which aims at establishing an Infrastructure for Spatial Information in the European Community (2007a). The report is based on the analysis of replies to a detailed questionnaire sent out to the competent persons and organisations in 37 European countries in spring 2010 and a review of literature, websites and main European legislation on the subject, carried out in the framework of the EU-FP7 SafeLand project. In total, information has been collected and analysed for 24 national databases in 22 countries (Albania, Andorra, Austria, Bosnia and Herzegovina, Bulgaria, Czech Republic, Former Yugoslav Republic of Macedonia, France, Greece, Hungary, Iceland, Ireland, Italy, Norway, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden, Switzerland and UK) and 22 regional databases in 10 countries. At the moment, over 633,000 landslides are recorded in national databases, representing on average less than 50% of the estimated landslides occurred in these countries. The sample of regional databases included over 103,000 landslides, with an estimated completeness substantially higher than that of national databases, as more attention can be paid for data collection over smaller regions. Both for national and regional coverage, information on landslide magnitude, geometrical characteristics, triggering factors, age and impact (damage and casualties) reported in national and regional databases greatly differs, as it strongly depends on the objectives of the database, the data collection methods used, the resources employed and the remaining landslide expression. In particular, information on landslide initiation and/or reactivation dates is generally included for less than 25% of records, thus making hazard and hence risk assessment difficult. In most databases, scarce information on landslide impact further hinders risk assessment at regional and national scales. About half of national and regional agencies provide free web-GIS visualisation services. Yet, the potential of existing landslide databases is often not fully exploited as, in many cases, access by the general public and external researchers is restricted. Additionally, the information is generally only available in the national or local language, thus hampering consultation for most foreigners.

Based on these results, suggestions for a minimum set of attributes, i.e. those required for landslide risk assessments, to be collected and made available by European countries in support of EU policies are also presented.

Acknowledgements

Special thanks go to all the contact persons and organisations that took the effort to complete our questionnaire: M. Jusufati (Albanian Geological Survey), M. Mases Coberó (Andorran Research Institute), X. Planas Batlle (Government of Andorra), A. Kociu (Geological Survey of Austria), F. Goldschmidt (Geology and Soil Department, Carinthian Provincial Government, Austria), L. Vandekerckhove (Environment, Nature and Energy, Flemish Government, Belgium), H. Hrvatovic (Federal Geology Survey, Bosnia and Herzegovina), N.D. Dobrev (Geological Institute, Bulgarian Academy of Sciences), K. Anguelov (Bondys Ltd, Bulgaria), Z. Miklin (Croatian Geological Survey), M. Efthymiou (Geological Survey Department of Cyprus), Z. Krejčí (Czech Geological Survey), M. Kohv (Department of Geology, University of Tartu, Estonia), R. Sutnen (Geological Survey of Finland), J.P. Malet (CNRS – School and Observatory of Earth Sciences, France), C. Starke (Saxon State Office for Environment, Agriculture and Geology, Germany), A. von Poschinger (Bavarian Environment Agency, Germany), C. Ruch (Regional Office for Geology, Raw Materials and Mining, Freiburg Regional Council, Germany), M. Rogall (Regional Office for Geology, Raw Materials and Mining, Rheinland-Pfalz, Germany), E. Poyiadji (Institute of Geology and Mineral Exploration, Greece), T. Oszvald (Hungarian Office for Mining and Geology), J. Kristinn Helgason (Icelandic Meteorological Office), R. Creighton (Geological Survey of Ireland), A. Trigila (Institute for Environmental Protection and Research, Italy), F. Guzzetti (Research Institute for Hydrogeological Protection, National Research Council, Italy), F. Agliardi (University of Milano-Bicocca, Italy), V. Tofani (University of Florence, Italy), F. Baistrocchi (Sarno River Basin Authority, Italy), V. Corbelli (National Basin Authority of Liri-Garigliano and Volturno Rivers, Italy), M. Vita (National Basin Authority of Basilicata, Italy), A.R. Di Santo (Apulian Basin Authority, Italy), M. Jovanovski (University Sts. Cyril and Methodius, Macedonia), C. van Westen (University of Twente, The Netherlands), R. Hermanns and T. Oppikofer (Geological Survey of Norway), D. Grabowski (Polish Geological Institute), J.L. Zêzere (Centre of Geographical Studies, University of Lisbon, Portugal), R. Maftai (Geological Institute of Romania), M. Micu and D. Balteanu (Institute of Geography, Romania), M. Tatu (Institute of Geodynamics Sabba S. Stefanescu, Romanian Academy), D. Trbojevic (Geological Institute of Serbia), B. Trivić (University of Belgrade, Serbia), P. Liščák (Geological Survey of the Slovak Republic), M. Komac (Geological Survey of Slovenia), J.C. García López-Davalillo and M. Ferrer Gijón (Geological Survey of Spain), J. Corominas (Technical University of Catalonia, Spain), J.D. Jiménez Perálvarez (University of Granada, Spain), M. Johansson (Swedish Civil Contingencies Agency), C. Cederbom and A.C. Hågeryd (Swedish Geotechnical Institute), H. Raetzo and B. Loup (Federal Environmental Office, Switzerland) and C. Dashwood (British Geological Survey) (Annex B and C).

This study has been carried out in the framework of the EU-FP7 project SafeLand: Living with landslide risk in Europe: Assessment, effects of global change, and risk management strategies (Grant Agreement 226479; <http://www.safeland-fp7.eu/>), and the authors thank all the project partners that have contributed to the distribution of the questionnaire to the responsible organisations in their country: R. Supper (Geological Survey of Austria), M. Čarman and S. Kumeli (Geological Survey of Slovenia), C. Michoud and M. Jaboyedoff (University of Lausanne, Switzerland) (other project partners are listed already above).

We finally wish to thank the SafeLand partners J. Corominas (University of Catalonia, Spain) and J.P. Malet (CNRS-School and Observatory of Earth Sciences, France) for reviewing the questionnaire, and R. Tomas, V. Lima and M. Van Liedekerke (all of JRC, Italy) for providing information on the INSPIRE regulation.

1 INTRODUCTION

In European environmental policy, landslides, together with seven other soil threats (soil erosion, soil organic matter decline, subsoil compaction, soil sealing, salinisation, soil contamination, and decline of biodiversity) fall under the Thematic Strategy for Soil Protection (EC, 2006a), adopted by the European Commission on 22 September 2006. The legislative package included a communication on the Strategy (EC, 2006a), a proposal for a Soil Framework Directive (i.e. the Strategy implementing tool; EC, 2006b) and the impact assessment of the Strategy (EC, 2006c), and has the objective to protect the soil while using it sustainably through the prevention of further degradation, the preservation of soil functions and the restoration of degraded soils by delineating the risk areas and developing risk management strategies.

For landslide risk assessment, four types of information layers are required: landslide inventory data digitally stored in a database, geo-environmental factors, triggering factors, and elements at risk (van Westen et al., 2006). Of these, the landslide inventory or database is the most important (Dikau et al., 1996; Fell et al., 2008). A complete definition of landslide databases and their content can be found in Hervás (in press): "Landslide databases or digital landslide inventories constitute a detailed register of the distribution and characteristics of past landslides. They contain core attributes, additional information and complementary data. Core attributes are a unique identification code, location (geographical coordinates, landslide site name, municipality, province or county, and region or state), landslide type, date of occurrence or last reactivation, state of activity and volume or surface extent. Additional information may include landslide geometry (surface dimensions and depth of failure surface), geology (lithology, structure and material properties), hydrogeology, land cover/use, slope geometry, triggering factors, impact (casualties and damage), remedial measures, surveying methods and date, surveyor's name and bibliographical references. Finally, complementary data can be illustrations, ground or aerial photographs and monitoring data."

The production of landslide databases is a tedious procedure. In contrast to other natural hazards (e.g. floods, earthquakes) which affect large areas, landslides are generally isolated, localised features which individually may not be very large in size but which can occur with a high frequency and extensively in a region. They have to be mapped and described one by one, and each one may have different characteristics.

It is relatively well known that in Europe many countries have or are creating national and/or regional landslide databases. Yet, up to now only few attempts have been made to obtain an overview of such databases (Dikau et al., 1996; EEA, 2010). Dikau et al. (1996) presented in detail the situation in seven European countries as it was in the mid 1990s. The enquiry by Italy's Institute for Environmental Protection and Research (ISPRA) with the support of the Association of Geological Surveys of Europe (EuroGeoSurveys) in 2009 (EEA, 2010) included more countries but contained only a few questions. The main findings of this survey were that many European countries currently have a national landslide inventory map, but that they are highly variable with regard to resolution and level of information. The inventories were also not always available to the public.

Taking account of new European policy and legislation, including not only the EU Soil Thematic Strategy and its associated Proposal for a Soil Framework Directive (EC, 2006a,b), but also the INSPIRE Directive establishing an Infrastructure for Spatial Information in the European Community (EC, 2007a) and the communication on a Community approach on the prevention of natural and man-made disasters (EC, 2009), a more detailed overview of national landslide databases is needed. With regard to the Soil Framework Directive proposal asking for risk area delineation we need to know which national databases contain information on the location of landslide phenomena, the types, date or frequency of occurrence, state of activity, magnitude or size, failure

mechanisms, causal factors and the damage caused, while for INSPIRE, not only information on the database content but also its format and structure, metadata and network service is required.

Within the EU-FP7 SafeLand project (Grant Agreement 226479; <http://www.safeland-fp7.eu/>), which focused on the different topics related to quantitative landslide risk assessment at local to national scales, the Joint Research Centre was responsible for a detailed review of existing national landslide databases in Europe and to propose improvements for delineating areas at risk in agreement with recent EU legislation. To meet this task a detailed questionnaire was created and sent out to the competent persons in 37 EU member states, EU official candidate and potential candidate countries and EFTA countries in spring 2010, and a review of literature, websites and main European legislation on the subject was carried out. The analysis of the replies to the questionnaire and the above mentioned documentation was the basis of SafeLand's Deliverable 2.3 entitled "Overview of European landslide databases and recommendations for interoperability and harmonisation of landslide databases" (Van Den Eeckhaut and Hervás, 2011). Apart from the overview of national databases, the deliverable also contains information on a set of regional databases, because not all European countries maintain landslide databases at the national level. This report is largely based on the deliverable, but for each national and regional database it also includes a standardized fact sheet on the information included in the database (Annex B, C).

More specifically, the report starts with a detailed description of the questionnaire (Chapter 2) and an overview of the contacted persons and organisations (Chapter 3). Afterwards the results are presented, first for national and then for regional landslide databases (Chapter 4). This is followed by an overview of European policies influencing the content and structure of landslide databases (Chapter 5). Confrontation of the information collected on national landslide databases and the European legislation finally allows to draw general conclusions and to make recommendations for harmonisation and interoperability (Chapter 6)

The results presented in this report and the fact sheets in Annex B and C generally represent the situation of the databases in 2010. Since then, some databases might have been updated, but only for a limited number of national databases (e.g. Poland and Portugal) updates are incorporated in this report. Relevant information on INSPIRE's Natural Risk Zones has been updated as of September 2012.

2 QUESTIONNAIRE

For analysing national and regional landslide databases in Europe, a comprehensive questionnaire was created based on published questionnaires on landslide inventories (Dikau et al., 1996; Di Mauro et al., 2003; RAMSOIL, 2007–2008; Schweigl and Hervás, 2009). We also checked the contents of some landslide databases both inside and outside Europe (e.g. Italy, Austria, Flanders, Australia and Oregon) to make the enquiry as complete as possible. For the questions related to INSPIRE, the competent European Commission officials (former Spatial Data Infrastructures Unit, IES, JRC) were contacted (see section 2.7 and 5.2).

Before sending out the questionnaire, it was reviewed for completeness and clearness by Prof. J. Corominas (UPC), the leader of SafeLand's Work Package on harmonisation and development of procedures for quantifying landslide hazard and Dr. J.P. Malet (CNRS). The latter reviewer also filled-in the questionnaire on the national landslide database of France.

The final questionnaire consists of 10 sections which are preceded by a short introduction providing background information to the persons contacted. More details can be found in the next paragraphs.

This chapter contains only information on the structure of the questionnaire. The questionnaire itself can be found in Annex A.

2.0 INTRODUCTION TO THE QUESTIONNAIRE

The first page of the questionnaire provides information on this study on landslide databases in Europe and some general information on the SafeLand project. At the end of this introduction we provide the address to which contacted persons can directly send the completed questionnaire.

2.1 CONTACT INFORMATION

The first part of the actual questionnaire deals with contact information of the institute and the person responsible for the landslide database.

2.2 DATABASE AVAILABILITY

The second part of the questionnaire collects information on the type of landslide database that is available or in preparation. Priority was given to national landslide databases. However, for countries for which no national inventory was available, attempts were made to collect information on regional landslide databases. Additional information on regional landslide databases was also collected for some countries which have a national database. In this case the regional databases are generally an official reference, as for example the databases used by the local Italian Basin Authorities.

2.3 GENERAL INFORMATION OF LANDSLIDE DATABASE

The third part of the questionnaire contains general information on the landslide database. Questions deal with the area covered by the database (i.e. whole country or region), the language used, the date of first creation, the recurrence time for updating, the time period of landslide events covered (e.g. all landslides from pre-Holocene to 2010 or landslides reported in historical documents after 1950), and the presence of other natural hazards (e.g. floods, snow avalanches) in the database. It further contains questions on the actual number of recorded landslides, the proportion of the country affected and the estimated completeness of landslide locations (i.e. percentage of existing landslides that are currently included in the database). Throughout the

questionnaire four possible classes are suggested in case of questions related to the completeness of a certain feature in the database, i.e. <25%, 25-50%, 50-75%, >75%.

2.4 CONTENT OF LANDSLIDE DATABASE

The most comprehensive section of the questionnaire deals with questions related to the content of the landslide database. It contains for example questions related to the landslide inventory map (scale, reference coordinate system, representation of the landslides, mapping techniques, etc.), the landslide location, the landslide types, the type of landslide dimensions provided, the availability of triggering factors, landslide date/history and activity, and information on consequences.

2.5 FORMAT OF LANDSLIDE DATABASE

As the evolution of computer systems has allowed transition from document repositories (including maps) to digital, relational databases, the fifth part of the questionnaire collects information on the format of the spatial and alphanumeric database and the software platform used. To use the collected landslide information for landslide zoning, the availability of digital landslide data is a prerequisite.

2.6 CONDITIONS TO ACCESS AND USE OF LANDSLIDE DATABASE

Interoperability of landslide databases would allow production of cross-boundary landslide susceptibility, hazard and risk assessments, and eventually, creation of a harmonised European landslide database. Therefore section 6 collects information on the access and use constraints of the landslide database.

2.7 INFORMATION RELATED TO INSPIRE

INSPIRE is an EU directive to establish an infrastructure for spatial information in Europe that will help to make spatial or geographical information more accessible and interoperable for a wide range of purposes supporting sustainable development (see section 5.2 and <http://inspire.jrc.ec.europa.eu> for more information). In the beginning of November 2009, a Call for Expression of Interest for participation in the development of INSPIRE data specifications for Annex II & III Data Themes was launched (<http://inspire.jrc.ec.europa.eu/index.cfm/pageid/2>). One of the Annex III Data Themes considers "Natural risk zones", among which landslides. At the time of the survey, implementing rules laying down technical arrangements for interoperability and harmonisation of landslide databases were under development. Therefore, only questions related to the implementation of the metadata regulations and network services could be asked. Apart from that, also the willingness of the institutes to collaborate to the development of the INSPIRE regulation is verified.

2.8 AVAILABILITY OF OTHER DATA FOR LANDSLIDE HAZARD AND RISK ASSESSMENT

As mentioned in the introduction, the landslide database is only one of the four types of data layers needed for landslide risk assessment. The other three are data layers related to controlling and triggering factors, and elements at risk. In section 8 of the questionnaire, the availability of these layers is investigated. With regard to the controlling factors, we more specifically survey the presence of digital elevation models, and lithology, soil, land cover and land use maps. For climate and seismicity, we respectively check the presence of precipitation and temperature and of magnitude, intensity or peak ground acceleration. Data on elements at risk include information on population, buildings, engineering works, economic activities, public services utilities, infrastructure and environmental features.

Contact persons are asked to provide the official name, full reference, publication date and map scale or resolution of the available datasets.

2.9 ADDITIONAL INFORMATION

At the end of the questionnaire the responsible of the landslide database was asked to provide an example of a database sheet and an excerpt of the landslide inventory map. Also additional information such as scientific publications could be provided. If necessary, the responsible could also provide additional information that according to his/her experience was required for our interpretation of the landslide database.

2.10 GLOSSARY

Taking into account that currently not all nations are using the same landslide terminology, a short glossary was provided for reference as an annex to the questionnaire (see Annex A).

3 PERSONS/ORGANISATIONS CONTACTED

The competent persons in the organisations responsible for national or regional landslide databases in EU member states, EU candidate and potential candidate countries as well as in EFTA countries could receive the questionnaire in two ways. For most countries represented in SafeLand, a project partner was contacted and asked to distribute the questionnaire to the competent person in his/her country or in a neighbouring country he/she collaborates with (e.g. project partners in Norway were asked to contact institutes in Sweden, Finland and Denmark). In case contacted persons did not speak English, project partners were asked to help them filling in the questionnaire or to translate the questionnaire. In some cases the contacted project partner himself was able to complete the questionnaire (e.g. France). For the remaining countries, JRC directly contacted national and regional Geological Surveys, universities or other institutes.

In spring 2010, JRC sent the questionnaire to 11 project partners, who in turn forwarded it to 20 persons responsible for a national or regional questionnaire. Additionally, JRC sent out the questionnaire to 32 persons (Fig. 3.1). Generally the competent persons worked at the Geological Survey or in a university or research institute. In some countries, finding out the competent organisation involved a long, iterative contacting process, but no questionnaire was sent after October 2010. A literature and website research also helped on this task.

The filled-in questionnaires were returned to JRC by SafeLand project members or directly by the responsible of the database. All data was collected and checked for completeness. In a second phase, some contact persons were requested to clarify certain answers or to provide complementary information.

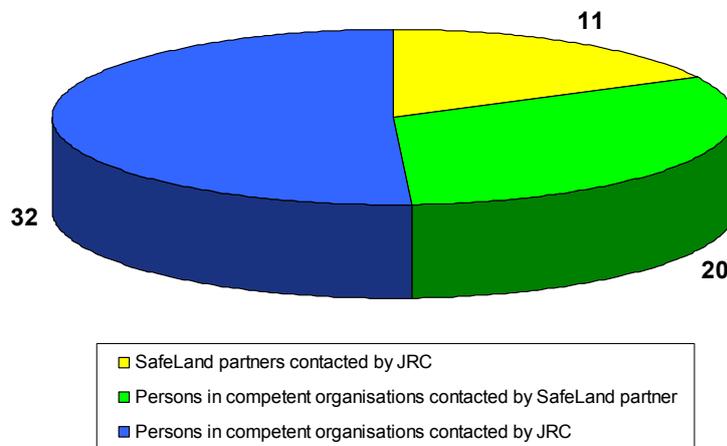


Figure 3.1: Persons contacted for distributing or filling in the questionnaire on national and regional landslide databases in Europe in October 2010.

4 RESULTS

4.1 DISTRIBUTION OF NATIONAL AND REGIONAL LANDSLIDE DATABASES IN EUROPE

Thirty-three out of 37 European countries contacted replied to our survey. Moreover, for some of the countries that did not respond to our request, we probably did not find the competent persons although several attempts were made. Twenty-two out of 37 countries currently have or are constructing a national landslide database (Fig. 4.1; Table 4.1).

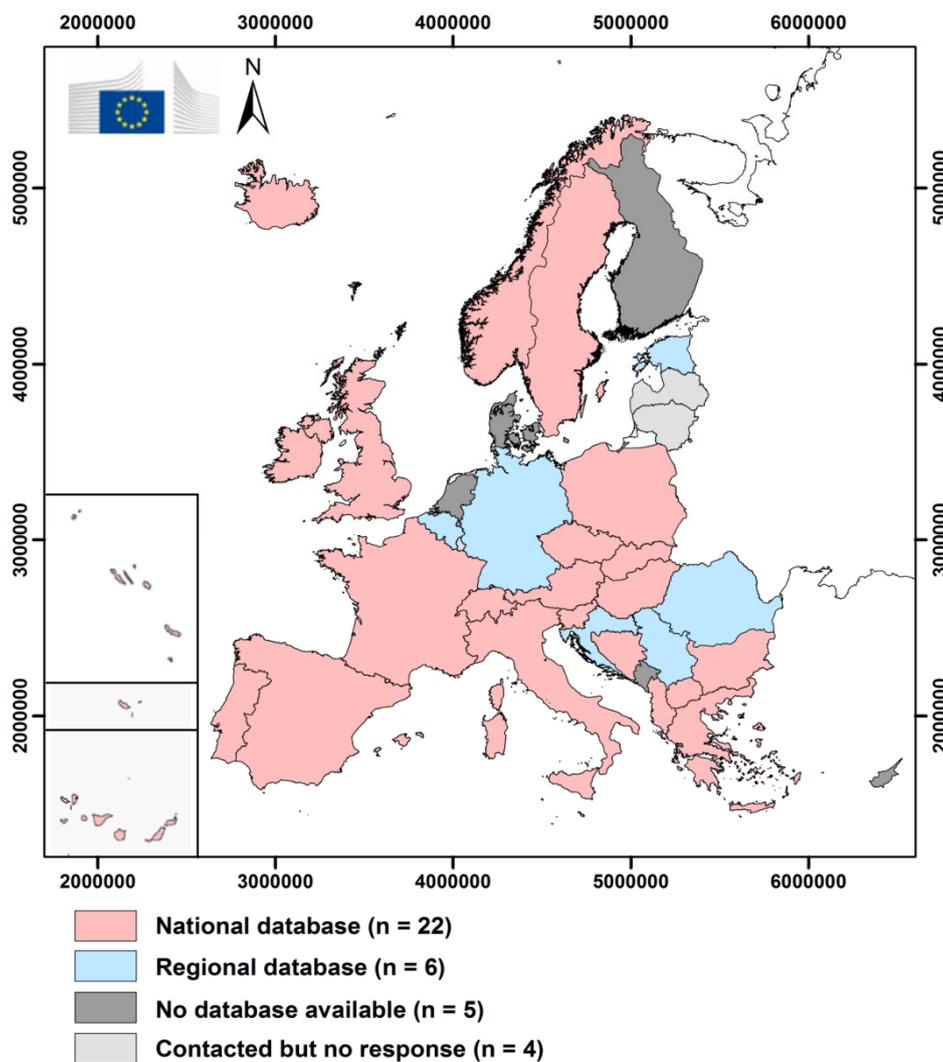


Figure 4.1: Distribution of national landslide databases in EU member states, EU official candidate and potential candidate countries and EFTA countries, and regional databases in countries where no national database exists. We refer to Figure 4.2 for the location of the regional databases. Canary, Madeira and Azores islands are shown in the bottom left inset.

For six other countries (Belgium, Croatia, Estonia, Germany, Romania, and Serbia) only information on regional landslide databases was available (Fig. 4.1 and 4.2; Table 4.2). This can be due to the fact that the construction of a landslide database is a regional responsibility (e.g. Germany with regional databases for Bavaria, Rheinland-Pfalz and Saxony, and Belgium with a regional database for Flanders) or that landslide databases are only constructed for the regions that are most affected by landslides (e.g. Estonia). Information on regional landslide databases was also obtained

from four countries with a national database. For Austria and Portugal, we received information of one database. For Spain, we received information for two databases, of which one (i.e. LLISCAT, Catalonia) also includes information for Andorra. For Italy, information of eight databases of which seven maintained by river basin authorities was collected (Fig. 4.2). Finally, five countries reported that they currently do not have a landslide database (Fig. 4.1). In total, the databases contain almost 633,700 landslides when only considering national databases, or 645,230 landslides when also including regional databases for countries for which no national database is available. About two thirds of the reported landslides are located in Italy, but also Austria, Czech Republic, France, Norway, Poland, Slovakia, and UK have more than 10,000 landslides in their database (Table 4.3).

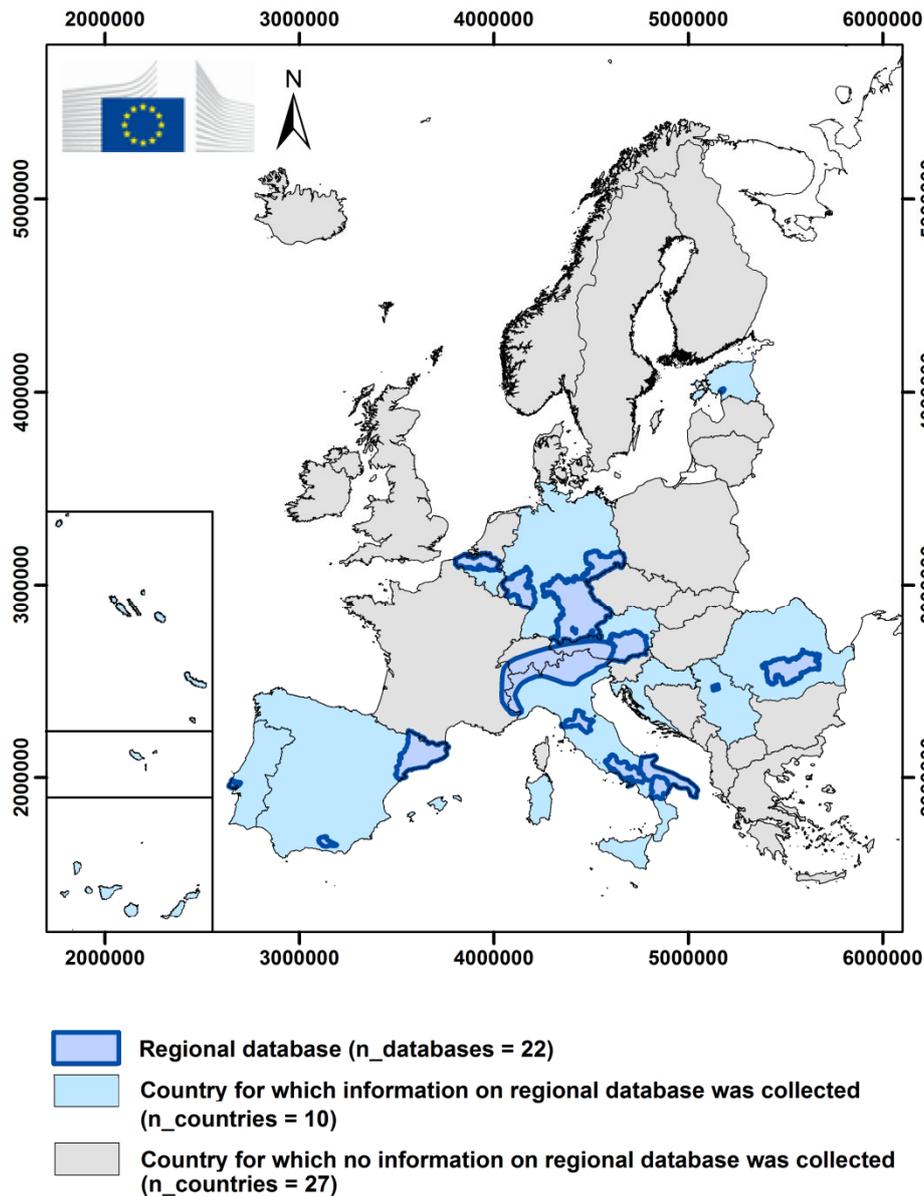


Figure 4.2: Distribution of regional landslide databases in EU member states, EU official candidate and potential candidate countries, and EFTA countries surveyed in this study.

Important to note is that not all countries have decided to create a landslide database that is as complete as possible. The database of Switzerland, for example, contains only the 317 most relevant landslide events, and the Swedish Natural Hazards Information System contains only detailed landslide information of the 17 most severe landslides. This information system not only

contains landslides but is a general natural hazard database that has not the goal to encompass all landslides, storms, floods, etc., that have ever occurred in Sweden. The database focuses on those events from which lessons can be learnt with regard to management.

It is interesting to note that the map shown in Figure 4.1 is somehow different from the map published by EEA (2010). First, the map in Figure 4.1 additionally shows countries not having a nation-wide database but having regional databases. Actually, the map by EEA (2010) incorrectly shows the presence of national scale landslide inventories in Belgium and Romania. For Belgium, a landslide database is only available for Flanders and not for Wallonia. For Romania, information on landslides that have caused damage is gathered as paper sheets in archives by regional (county level) authorities (Annex 7 of Law 575/2001). The information available in Romania is currently quite heterogeneous and needs ordering (in time and place) before it can be transformed into a landslide database. Second, EEA (2010) reported the existence of national landslide databases in Finland and Luxembourg. For Finland, several contacted experts informed us that no database is available. There is only a report on landslides in the country made by the Finnish Environment Institute (Ollila, 2002), which contains an overview of known landslides in the country. Third, we obtained filled in questionnaires for two national landslide databases in Sweden and one in Portugal while EEA (2010) reported the absence of a database in these countries.

Table 4.1: Overview of landslide-related national databases in Europe*: name, owner and weblink of database. Countries for which only regional landslide databases are available are not included as they are separately listed in Table 4.2.

(Dept.: Department; Inst.: Institute; Min.: Ministry; Univ.: University; n.a.: reported that database was not available; /: no response)

Country	Database name	Owner (not necessarily producer)	Weblink
Albania	Landslide database	Albanian Geological Survey	n.a.
Andorra	Natural hazard database of Andorra**	Andorran Research Inst. (IAE)	http://www.cenma.ad/mbaseriscos.htm
Andorra	Terrain zonation according to geological-geotechnical problems	Andorran Government	http://www.ideandorra.ad/geoportal/framesetup.asp
Austria	GEORIOS	Geological Survey of Austria (GBA)	http://geomap.geolba.ac.at/MASS/index.cfm
Bosnia and Herzegovina	The engineering-geology map Federation of Bosnia and Herzegovina	Federal Geology Survey	n.a.
Bulgaria	Map of landslides (no real specific name)	Min. of Regional Development and Public Works	n.a.
Cyprus	n.a.	n.a.	n.a.
Czech Republic	National Landslide Register	Czech Geological Survey	http://www.geology.cz/app/dbsesuvy (intranet; not publically accessible)
Denmark	n.a.	n.a.	n.a.
Finland	n.a.	n.a.	n.a.
Former Yugoslav Rep. of Macedonia	Landslide Cadastre	Min. of Economy, sector for mineral resources	n.a.
France	National Database of Ground Movements (BDMVT)	French Geological Survey (BRGM)	http://www.bdmvt.net
Greece	Geodatabase I.G.M.E./ eng_geol/ ground_failures	Inst. of Geology and Mineral Exploration (IGME)	http://maps.igme.gr/website_ext/igme_master_ext/viewer.htm?ln=en
Hungary	National Landslides Cadastre	Hungarian Office for Mining and Geology	n.a.
Iceland	OLI	Icelandic Meteorological Office (IMO) and Icelandic Inst. of Natural History (IINH)	n.a., weblink will be available in the future
Ireland	National Landslide Database	Geological Survey of Ireland	http://www.gsi.ie/mapping.htm
Italy	IFFI Project	Inst. for Environmental Protection and Research (ISPRA)	http://www.sinanet.apat.it/progettoiffi

* EU member states, EU official candidate and potential candidate countries (except Turkey), and EFTA countries

Italy	Areas Affected by Landslides and Floods in Italy (AVI)	National Research Council, Research Inst. for Hydrogeological Protection (CNR-IRPI)	http://avi.gndci.cnr.it ; http://sici.irpi.cnr.it
Latvia	/	/	/
Lithuania	/	/	/
Luxembourg	/	/	/
Malta	/	/	/
Montenegro	n.a.	n.a.	n.a.
Netherlands	n.a.	n.a.	n.a.
Norway	National Landslide Database	Geological Survey of Norway (NGU)	www.skrednett.no
Poland	SOPO	Polish Geological Inst.	n.a.
Portugal	Disaster database	Centre of Geographical Studies, Univ. of Lisbon	n.a.
Slovakia	Landslide Register	Geological Survey of the Slovak Republic (SGUDS)	http://mapserver.geology.sk/zosuvy/
Slovenia	GIS_UJME (part of larger database)	Min. of Defence	n.a.
Spain	Spanish Database of Geological Hazards	Geological and Mining Institute of Spain (IGME)	n.a.
Sweden	Swedish Natural Hazards Information System	Swedish Civil Contingencies Agency	http://ndb.msb.se/Default.aspx?l=EN
Sweden	SGI Landslide Database	Swedish Geotechnical Inst. (SGI)	n.a.
Switzerland	InfoSlide	Federal Office for the Environment (FOEN)	n.a.
United Kingdom	National Landslide Database	British Geological Survey (BGS)	n.a.

** Not included in the overview of national landslide databases as it is not really a landslide database but rather a landslide hazard map with additional information of some individual landslides

Table 4.2: Overview of the regional databases included in the study: name, owner and weblink of database.

(Dept.: Department; Inst.: Institute; Min.: Ministry; Univ.: University; n.a.: informed that database was not available; /: no response; P.A.I. Piano stralcio di bacino per l'Assetto Idrogeologico: plan regulating the more urgent aspects of the hydrogeological structure; ADB, Autorità di Bacino: River Basin Authority)

Country (Region)	Database name	Owner (not necessarily producer)	Weblink
Austria (Carinthia)	Landslide Event Cadastre	Geology and Soil Dept., Carinthian Provincial Government	n.a.
Belgium (Flanders)	Mapped landslides in Flanders	Dept. of Environment, Nature and Energy, Flemish Government	http://dov.vlaanderen.be
Croatia (Urbanized areas around Zagreb)	Landslide register	Croatian Geological Survey	n.a.
Estonia (Pärnu town)	Landslides near Pärnu town	Univ. of Tartu, Dept. of Geology	n.a.
Germany (Saxony)	Landslide Database of Saxony	Saxon State office for Environment, Agriculture and Geology (LfLUG)	http://www.umwelt.sachsen.de/umwelt/geologie/9605.htm (only information on the database)
Germany (Bavaria)	GEORISK	Environment Agency (LfU)	www.bis.bayern.de
Germany (Baden-Württemberg)	In progress, questionnaire was not filled in for this reason	Freiburg Regional Council, Regional Office for Geology, Raw Materials and Mining	n.a.
Germany (Rheinland-Pfalz)	Not specified yet	Regional Office for Geology, Raw Materials and Mining	n.a.
Italy (Northern Italy)	Alpine Inventory of Deep-Seated Gravitational Slope Deformations	Univ. of Milano-Bicocca	n.a.
Italy (Arno River Basin, Northern Apennines)	Landslide inventory of the Arno river basin	Dept. of Earth Sciences, Univ. of Florence and Arno River Basin Authority	http://www.adbarno.it
Italy (Campania, ADB Sarno, Provinces of Avellino and Salerno)	P.A.I. of Provinces of Avellino and Salerno	Sarno River Basin Authority	http://www.autoritabacinosarno.it/default.asp ; http://www.autoritabacinosarno.it/asp/pianostralcio/piantina.asp
Italy (Campania, ADB Sarno, Province of Napoli)	P.A.I. of Province of Naples	Sarno River Basin Authority	http://www.autoritabacinosarno.it/default.asp ; http://www.autoritabacinosarno.it/asp/pianostralcio/piantina.asp
Italy (Basin of Liri-Grarigliano and Volturno Rivers)	Landslide inventory	National Basin Authority of Liri-Garigliano and Volturno rivers	http://www2.autoritadibacino.it
Italy (Parts of Basilicata, Puglia and Calabria)	P.A.I. of ADB Basilicata	National Basin Authority of Basilicata	http://www.adb.basilicata.it/adb/risorseidriche.asp ; www.pcn.minambiente.it
Italy (Apulian Basin)	1. P.A.I. of Puglia/	Apulian Basin Authority	www.adb.puglia.it ; www.sit.puglia.it

Authority territory)	2. Hydrogeomorphological map of Puglia 3. Landslide Database of Puglia		
Portugal (North of Lisbon)	North of Lisbon Landslides	Centre of Geographical Studies	n.a.
Romania (Prahova, Arges, Dambovita, Valcea, Buzau County)	Landslide inventory	Geological Inst. of Romania (GIR)	n.a.
Serbia (Belgrade, Kragujevac)	Cadastre of landslides and unstable slopes on the territory of Serbia	Min. of Environment and Spatial Planning	n.a.
Serbia (Belgrade area)	BEOSlide	Belgrade Land Development Public Agency, Univ. of Belgrade	n.a.
Spain (Catalonia) and Andorra	LLISCAT	Technical Univ. of Catalonia (UPC)	http://www.lliscat.upc.es
Spain (Sierra Nevada, Granada)	Landslides database of the Southern Slopes of Sierra Nevada, Granada	Univ. of Granada	n.a.

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Table 4.3: Overview of landslide databases in Europe* showing number of landslides included and estimated completeness. Note that the table does not provide a complete overview of all regional landslide databases. (NA: not available; NR: no response; ADB, Autorità di Bacino: River Basin Authority)

Country: Region	Landslide database					
	Nation	Region	NA	NR	Number of Landslides (1)	Completeness
Albania	1				210	<25%
Andorra	2				274	
Austria	1				25000	25 - 50%
Austria: Carinthia		1			1000	>75%
Belgium: Flanders		1			291	25 - 50%
Bosnia and Herzegovina	1				1500	25 - 50%
Bulgaria	1				1107	<25%
Croatia		1			1540	50-75%
Cyprus			1			
Czech Republic	1				14178	25 - 50%
Denmark			1			
Estonia: Parnu town		1			28	>75%
Finland			1			
Former Yugoslav Rep. of Macedonia	1				150	50-75%
France	1				10000	>75%
Germany: Saxony		1			310	< 25%
Germany: Bavarian Alps		1			4236	< 25%
Germany: Rheinland-Pfalz		1			1800	>75%
Germany: Baden-Württemberg (2)		1				
Greece	1				2200	25 - 50%
Hungary	1				400	50-75%
Iceland	1				5000	< 25%
Ireland	1				422	25 - 50%
Italy	2				485004	>75%
Italy: Northern Italy		1			2216	>75%
Italy: Arno River Basin		1			27500	>75%
Italy: Campania, ADB Sarno, Provinces of Avellino and Salerno		1			3734	>75%
Italy: Campania, ADB Sarno, Province of Naples		1			465	>75%
Italy: Basin of Liri-Grarigliano and Volturno Rivers		1			32247	>75%
Italy: Parts of Basilicata, Apulia and Calabria		1			17233	25 - 50%
Italy: Apulian Basin Authority territory		1			1476	>75%
Italy: Apulia Region		1			1614	>75%
Latvia				1		
Lithuania				1		
Luxembourg				1		
Malta				1		

* EU member states, EU official candidate and potential candidate countries (except Turkey), and EFTA countries

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Montenegro					1	
Netherlands					1	
Norway	1				31500 (3)	< 25%
Poland	1				12150	25 - 50%
Portugal					163	< 25%
Portugal: Region north of Lisbon	1	1			2500	< 25%
Romania: Prahova, Arges, Dambovita, Valcea, Buzau County			1		>2000	50-75%
Serbia: Belgrade, Kragujevac			1		1160	< 25%
Serbia: Belgrade			1		110	50-75%
Slovakia	1				21190	>75%
Slovenia	1				6602	25 - 50%
Spain	1				900	< 25%
Spain: Catalonia and Andorra		1			400	< 25%
Spain: Sierra Nevada, Granada		1			500	>75%
Sweden	2				416	50-75%
Switzerland	1				317	< 25%
United Kingdom	1				15210	
Total	24	22	5	4	645,230 (4)	

(1) Situation spring 2010, with updating for Poland and Portugal in 2011

(2) Under construction

(3) Including snow avalanches

(4) For countries for which both information on national and regional landslide databases was collected only the number of landslides in the national landslide database is accounted here. National databases only contain 633,696 landslides.

Figure 4.3 provides information on the date of the first creation of the landslide databases. Older dates in the figure correspond to the creation of paper document archives consisting of inventory maps and separate data sheets. For some databases we received information on the first creation and on the transition of the paper archive into a digital database. For Bulgaria, Austria and Czech Republic, for example, already in 1963, 1965 and 1997 a paper document archive was constructed, and from 1999, 2001 and 2007 these archives were transformed into digital ones. France is one of the first countries that started with the creation of a digital landslide database. From 1994 the French Geological Survey (BRGM) together with Laboratoire Central des Ponts et Chaussées (LCPC), Institut National de l'Environnement et des Risques (INERIS) and Service de la Restauration des Terrains en Montagne (RTM) started creation of a ground movements spatial database of France called BDMvt (Table 4.1), initially combining existing landslide databases, among which ZERMOS (Zones Exposées aux Risques de Mouvements du Sol et du sous-sol; BRGM). The latter was created in the 1970s and included both landslide susceptibility zonation and landslide outlines.

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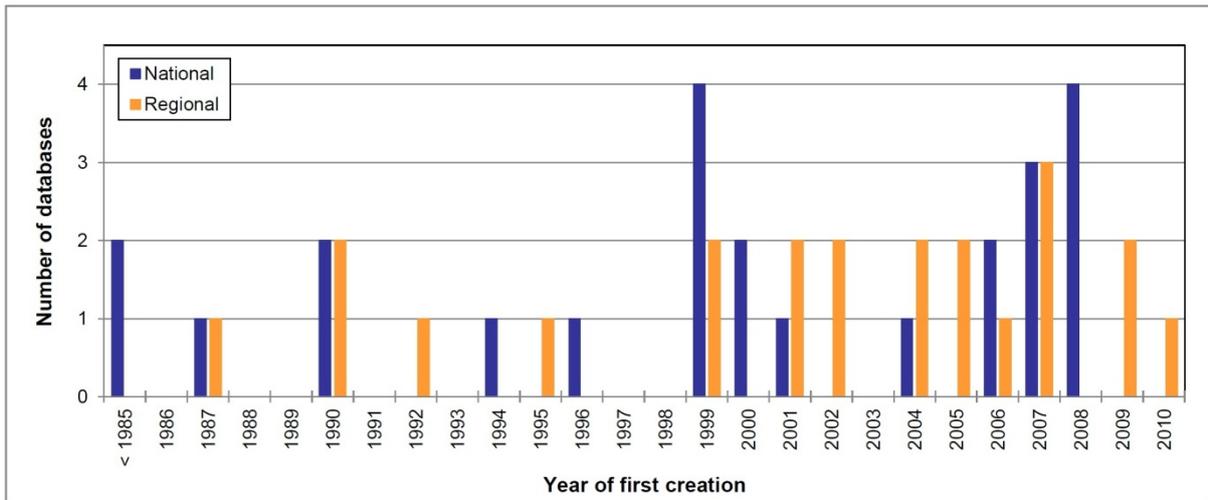


Figure 4.3: Date of first creation of the landslide databases. If dates for creation of paper archives and digital databases were provided, the latter is shown in the graph. The older dates in the graph refer to landslide databases for which only the creation date of the paper archive was provided.

4.2 ANALYSIS OF NATIONAL LANDSLIDE DATABASES

In this section the national landslide databases are discussed. It was decided to exclude the “Terrain zonation according to geological-geotechnical problems” map of Andorra as this is not really a landslide database but a landslide hazard map with additional information of some individual landslides (Table 4.1). For Italy and Sweden, we received information of two different national landslide databases. Therefore, this overview contains 24 national databases of 22 different EU member states, EU official candidate and potential candidate countries (except Turkey), and EFTA countries.

4.2.1 General information

The national databases discussed in this section are generally official documents, but most of them are not regulatory (Fig. 4.4). They are mainly produced for use within the country, so that almost all databases are only available in the official language of the country. Exceptions are Austria, Greece, Italy (IFFI) and Sweden (Swedish Natural Hazards Information System), which provide at least part of the landslide information in English (Fig. 4.5, 4.6). Fourteen of the 24 databases contain other natural hazards than landslides. These include earthquakes, floods, extreme precipitation, extreme temperatures, snow avalanches, storms, coastal erosion, subsidence and sinkholes.

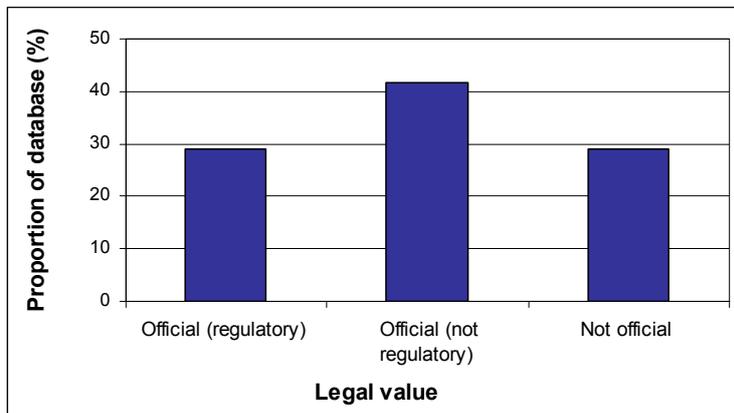


Figure 4.4: Legal value of the national landslide databases.



Figure 4.5: On the web interface of the published national landslide database of Austria, one can choose between German and English (<http://geomap.geolba.ac.at/MASS/index.cfm>; March, 2011).

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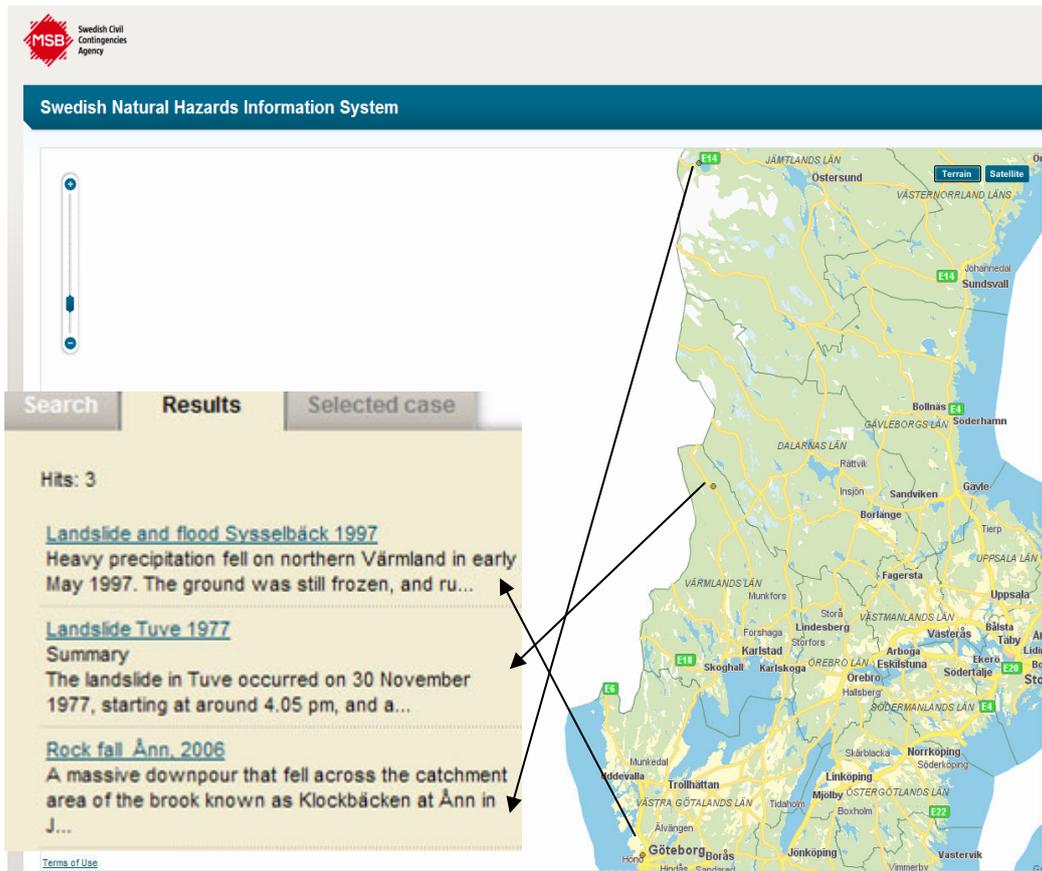


Figure 4.6: On the web interface of the Swedish Natural Hazards Information System, the information of the limited number of reported landslide events can be consulted in English (<http://ndb.msb.se/Default.aspx?l=EN>; March, 2011).

The collection of landslide information at the national and regional scales is an elaborate task. Although most countries try to include as many landslides as possible, the completeness of most of the databases is estimated lower than 50% of all landslides that have ever occurred in the country (Fig. 4.7, 4.8). Databases of France, Italy and Slovakia are estimated to be most complete.

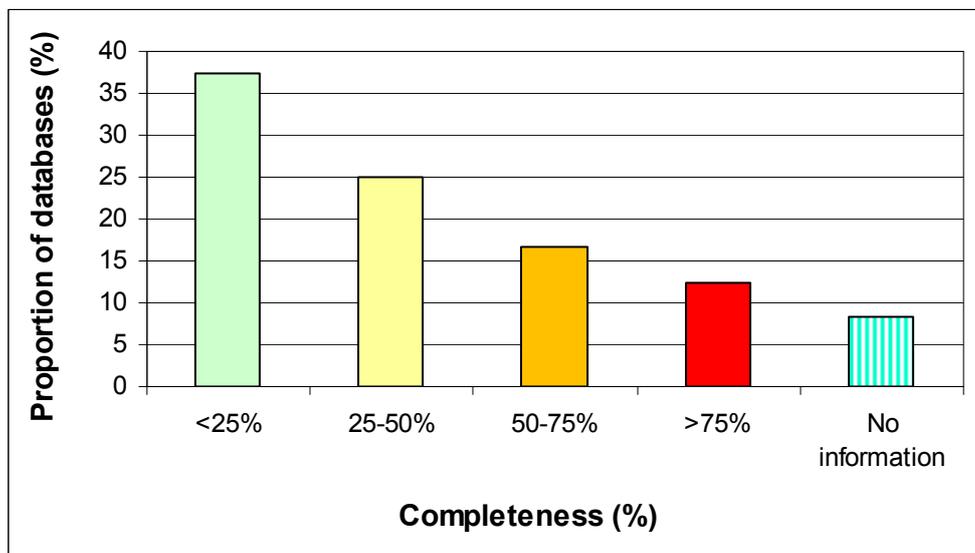


Figure 4.7 Estimate of the completeness of landslide locations in national landslide databases.

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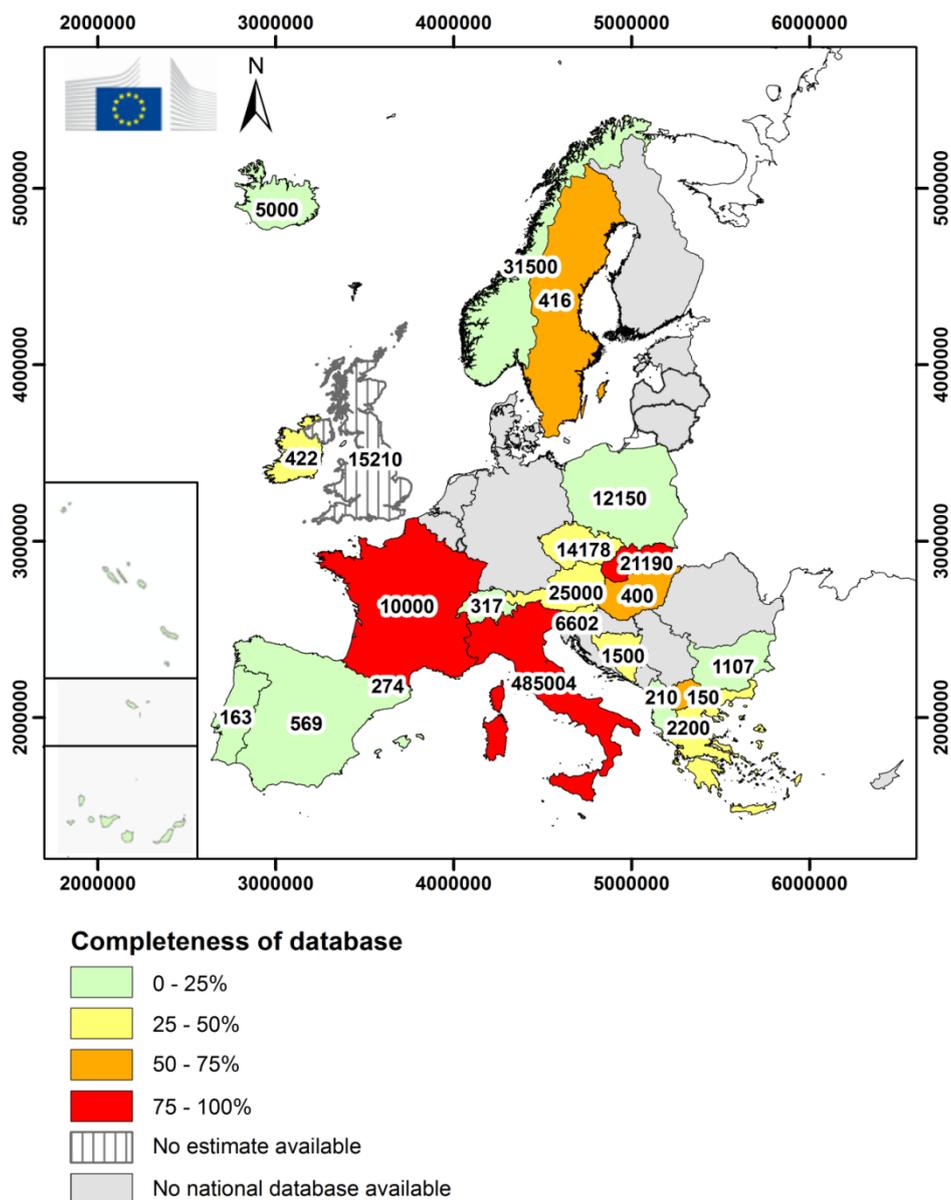


Figure 4.8: Number and estimated completeness of landslide locations in national (n = 24) landslide databases in Europe. Canary, Madeira and Azores islands are shown in the bottom left inset.

The completeness of a database might be related to its objectives, the time span of landslide events covered, and the methodology (see further) and resources employed. There is a large variability among the countries with databases including landslides with pre-Holocene origin to databases including only the landslides that occurred after 2000 (Table 4.4).

Table 4.4: Oldest landslides included in national landslide databases (AC: after Christ).

Period	Number of databases
Pre-Holocene – 1000 AC	2
1000 – 1800 AC	7
1800 – 1900 AC	1
1900 – 1950 AC	4
1950 – 2010 AC	8
No information	2

Figure 4.3 showed the creation date of all the national and regional landslide databases. More important than the creation date is the updating of the databases (Fig. 4.9). For only four out of 24 national landslide databases no updating of the database is foreseen. However, for some of these countries this might change if updating appears to be necessary. The other databases are generally updated at least once a year or after a major event.

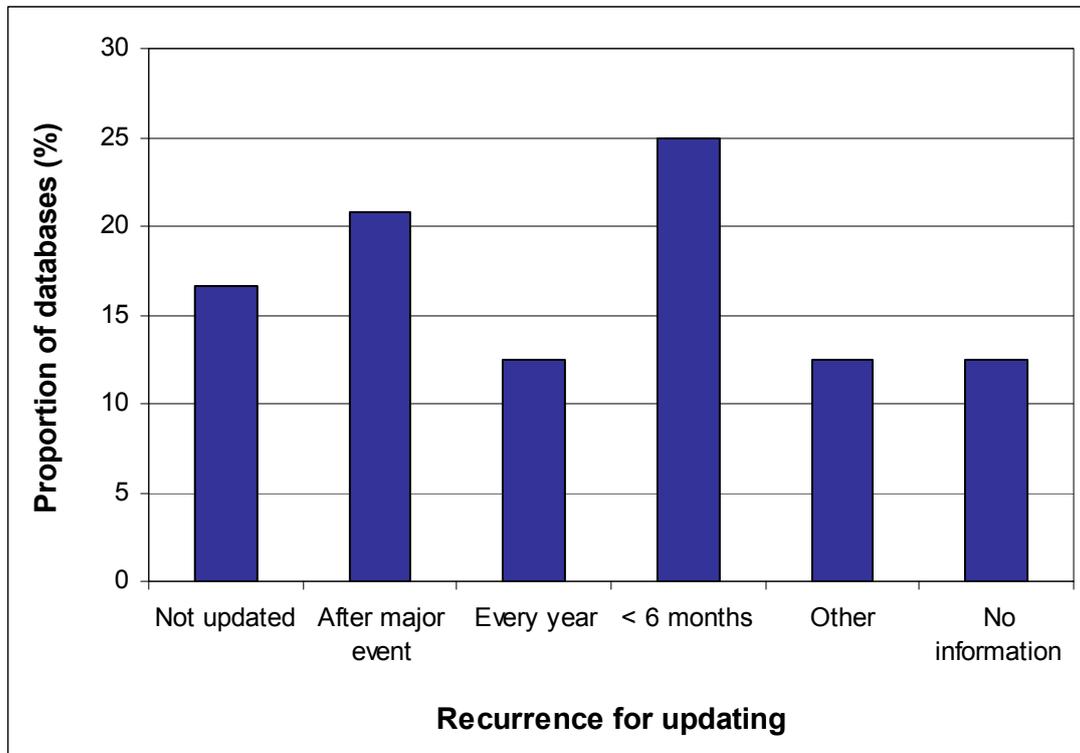


Figure 4.9: Update frequency of the national landslide databases (n = 24).

4.2.2 Content

4.2.2.1 Landslide inventory map

The landslide inventory map is one of the most important parts of a landslide database. Detailed landslide locations are for example necessary for production of landslide susceptibility and other zoning maps and for civil engineering works. Andorra, Spain and Switzerland do not have a landslide inventory map. However, the latter two countries have the landslides coordinates so it should be possible to produce a landslide map in the future. Although most national inventory maps are available in digital form (allowing zooming in and out; see further), the maps were generally created at a certain scale. Landslide inventory maps were created at a scale between 1:10,000 and 1:500,000 with six maps created at a scale of 1:10,000 (Fig. 4.10). With regard to the reference coordinate system used, generally a local coordinate system was used.

Ten of the persons that filled in the questionnaire responded that the database contained information on the spatial accuracy. However, only five of them provided extra information. For Albania, Ireland and UK accuracy is expressed in m. Where possible this is also the case for Norway, while otherwise the accuracy in this database is specified as certain or uncertain. France has three accuracy levels: the municipality, the local site or the exact location.

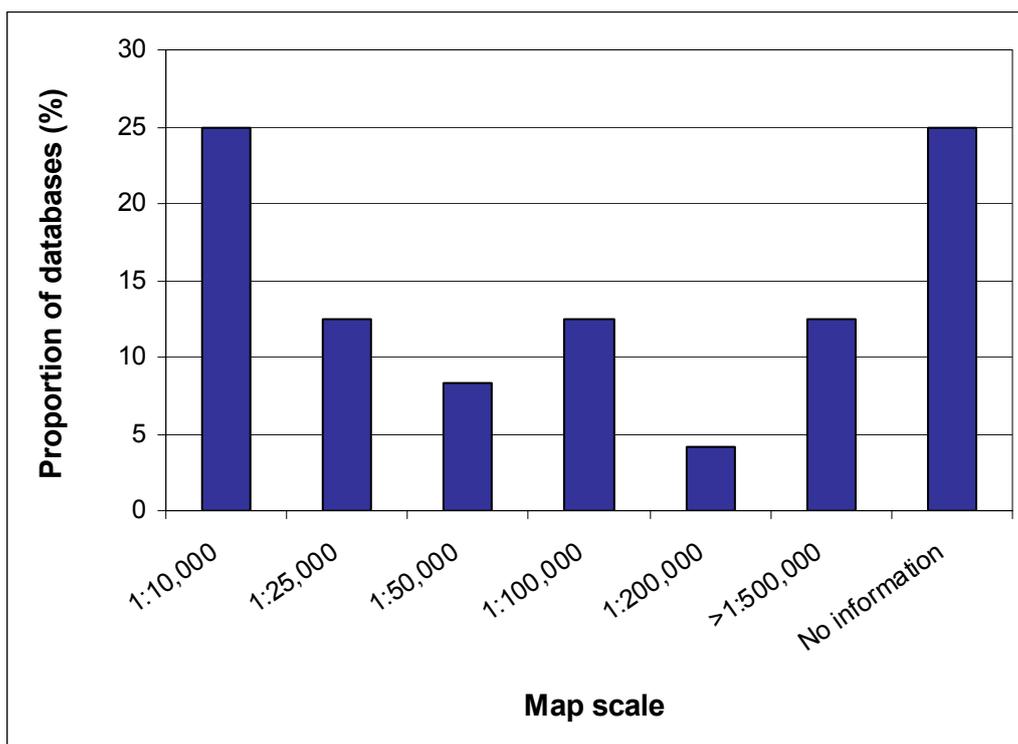


Figure 4.10: Scale of national landslide inventory maps.

Landslides are represented as points (58%) or as a combination of points, lines and polygons (42%; Fig. 4.11, 4.12, 4.13). Apart from the location on a map, also the alphanumeric part of the database contains information of the landslide location (Table 4.5). Most often these are the coordinates (83%) and municipality (75%). The database of Switzerland also provides the local name given on the topographical map. Norway reports the address where the damage was reported and Slovakia the regional geomorphic and regional engineering geological division. For landslides affecting roads, Slovenia indicates the location using the kilometre indication along the road.

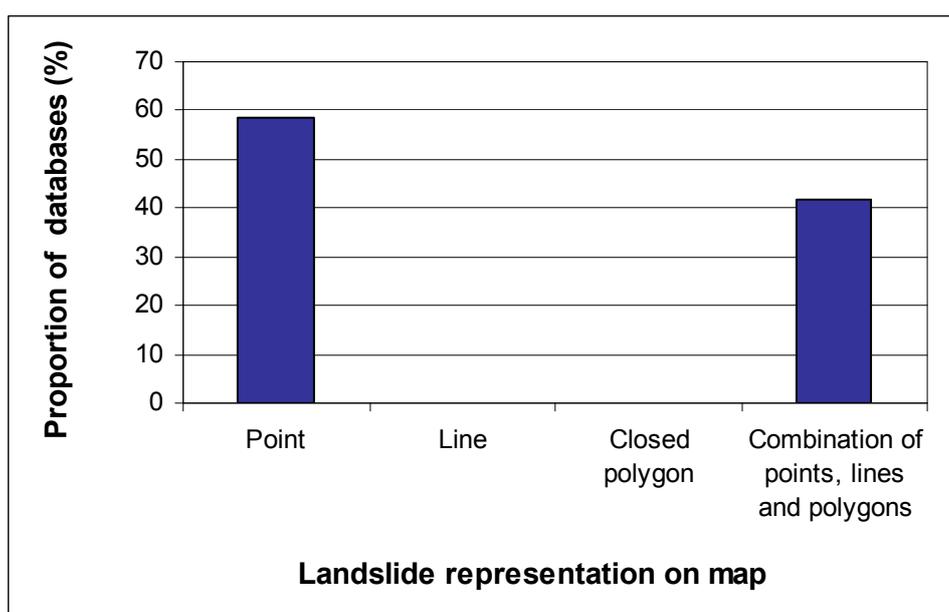


Figure 4.11: Symbol used to map landslide locations in national landslide databases.

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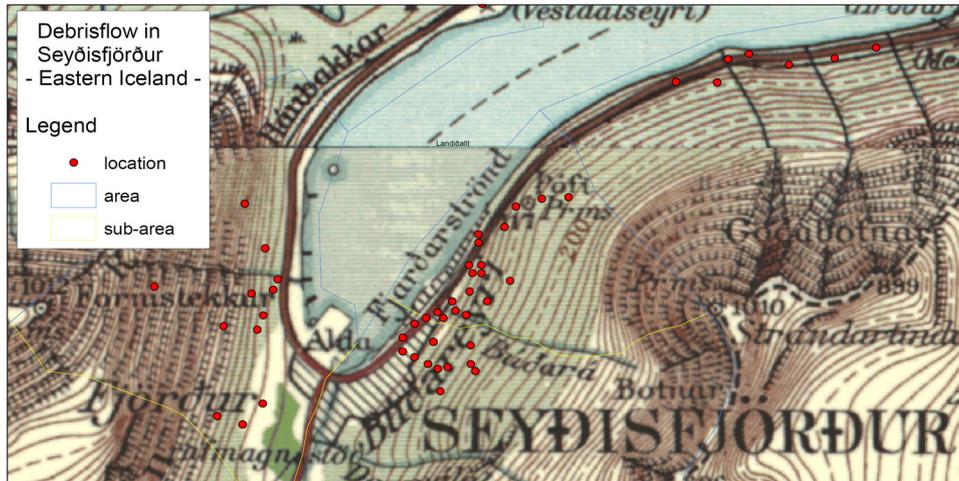


Figure 4.12: Landslides are represented as points on the landslide inventory map of Iceland (Icelandic Meteorological Office).

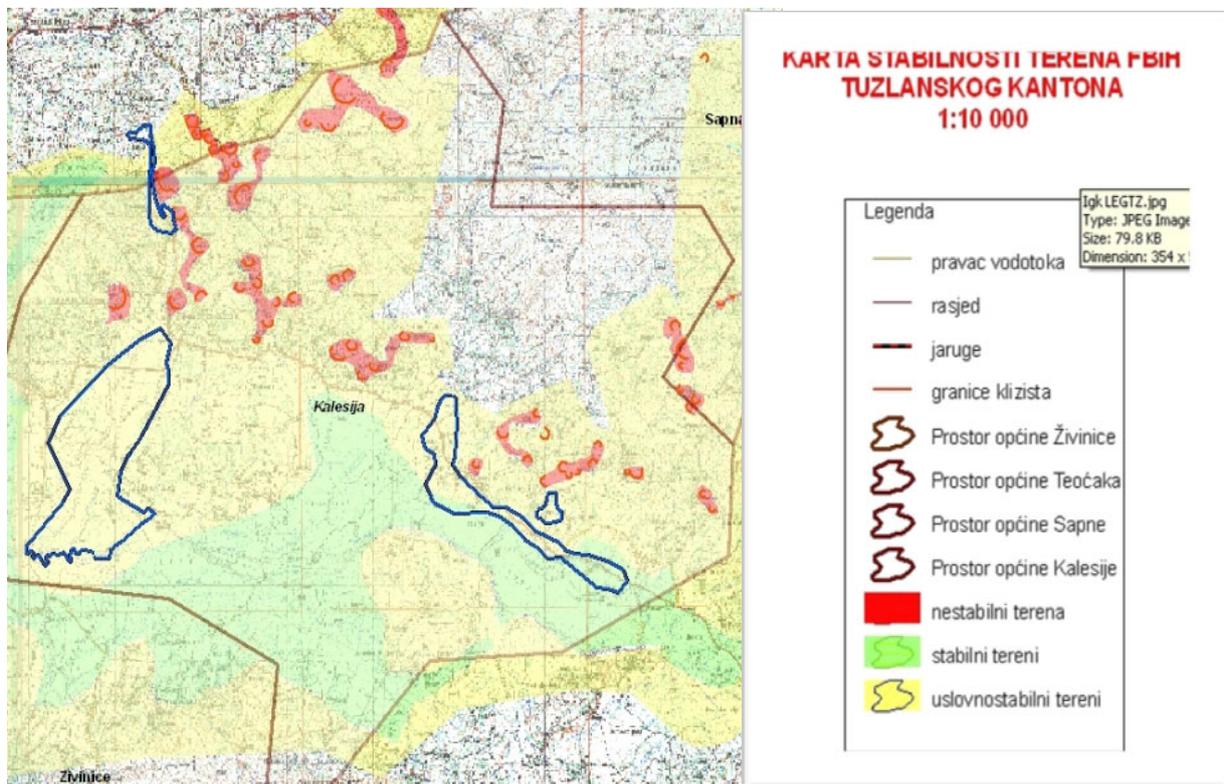


Figure 4.13: Landslides are represented as polygons on the landslide inventory map of Bosnia and Herzegovina (Federal Geological Survey).

Table 4.5: Specific information on landslide location provided in the national landslide databases.

Landslide locator	Number	%
Coordinates	20	83.3
Municipality	18	75.0
Province/county	13	54.2
Other	8	33.3

Landslide locations are generally obtained through a combination of different techniques (Fig. 4.14). Most commonly used are field surveys (16 or 67% of the databases), historical documents (18 or 75% of the databases) and aerial photograph analysis (9 or 38% of the databases). Airborne (other than aerial photographs) and satellite remote sensing are only occasionally used. Alternative methods for obtaining landslide locations are collecting local and regional inventories (Italy and Austria) or observations by road authorities and railroad companies (Norway), or geotechnical studies (Czech Republic).

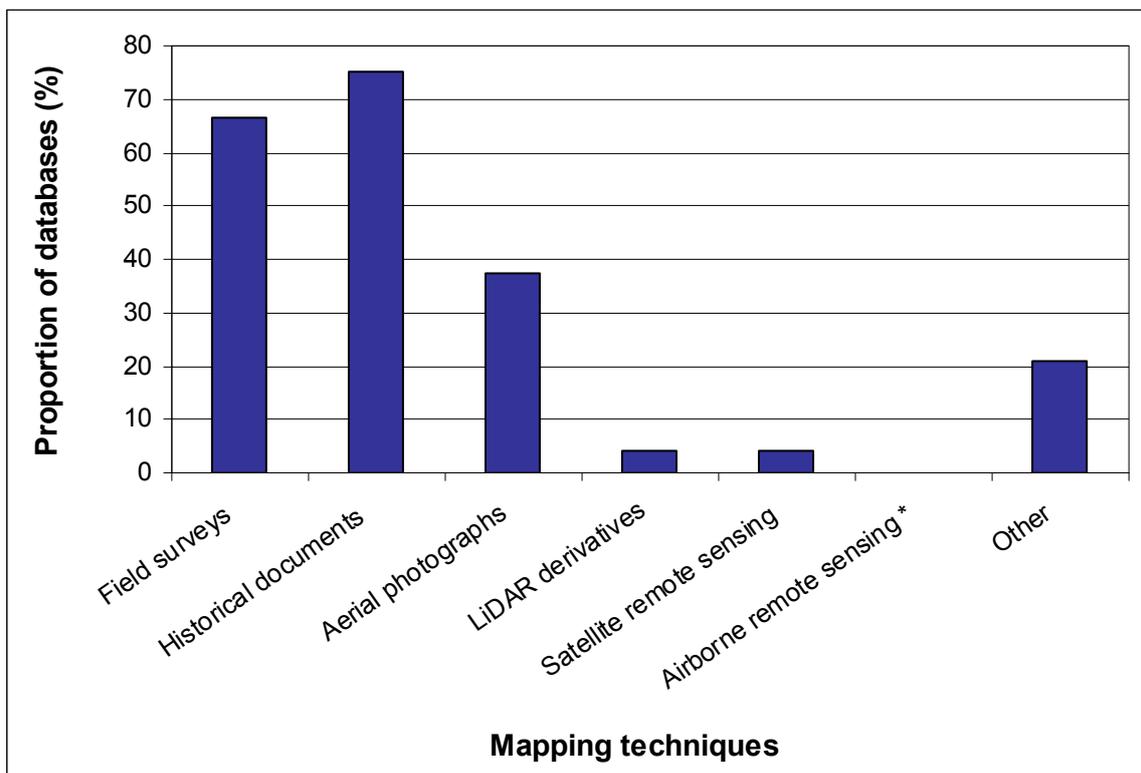


Figure 4.14: Techniques used to collect landslide locations.
* Other than aerial photographs and LiDAR

4.2.2.2 Landslide classification

A landslide database should include information on the type of landslides reported. Twenty-one of the 24 landslide databases (19 countries) provide this information (e.g. Fig. 4.15). This information is for example necessary for creation of separate susceptibility and hazard maps for different landslide types. Information on landslide type is not available in the two databases of Sweden and the one of Portugal. With regard to the classification system, 14 countries use a system that is similar to the one suggested by Cruden and Varnes (1996). The five other countries use a local classification system.

The number of landslide classes ranges from three to five. These are mainly types included in the Varnes (1978) or Cruden and Varnes (1996) classification (rock fall, translational and rotational slides, flows and complex slides). Italy (IFFI; n=12), Slovenia (n=15) and Greece (n=24) are exceptions. The IFFI database of Italy contains 12 types, i.e. fall, topple, rotational slide, translational slide, lateral spread, slow earth flow, rapid debris flow, sinkhole, complex landslide, deep-seated gravitational slope deformation, area affected by numerous rockfalls/topples, area affected by numerous sinkholes, and area affected by numerous shallow landslides.

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The landslide database of Greece even distinguishes between 24 classes (translational (sheet), earth flow, mud flow, debris flow, sand liquefaction, sand outwash, sagging of strata, scree, creep, soil topples, soil falls, subaqueous slides, rotational, squeezing of soft rocks, block slides, lateral spreads, planar, wedge, rock topples, rock falls, composite, failure controlled by two surfaces in rocks, sliding and toppling in rocks, failures and inductive stresses in rocks, and block sliding on composite surfaces in rocks).

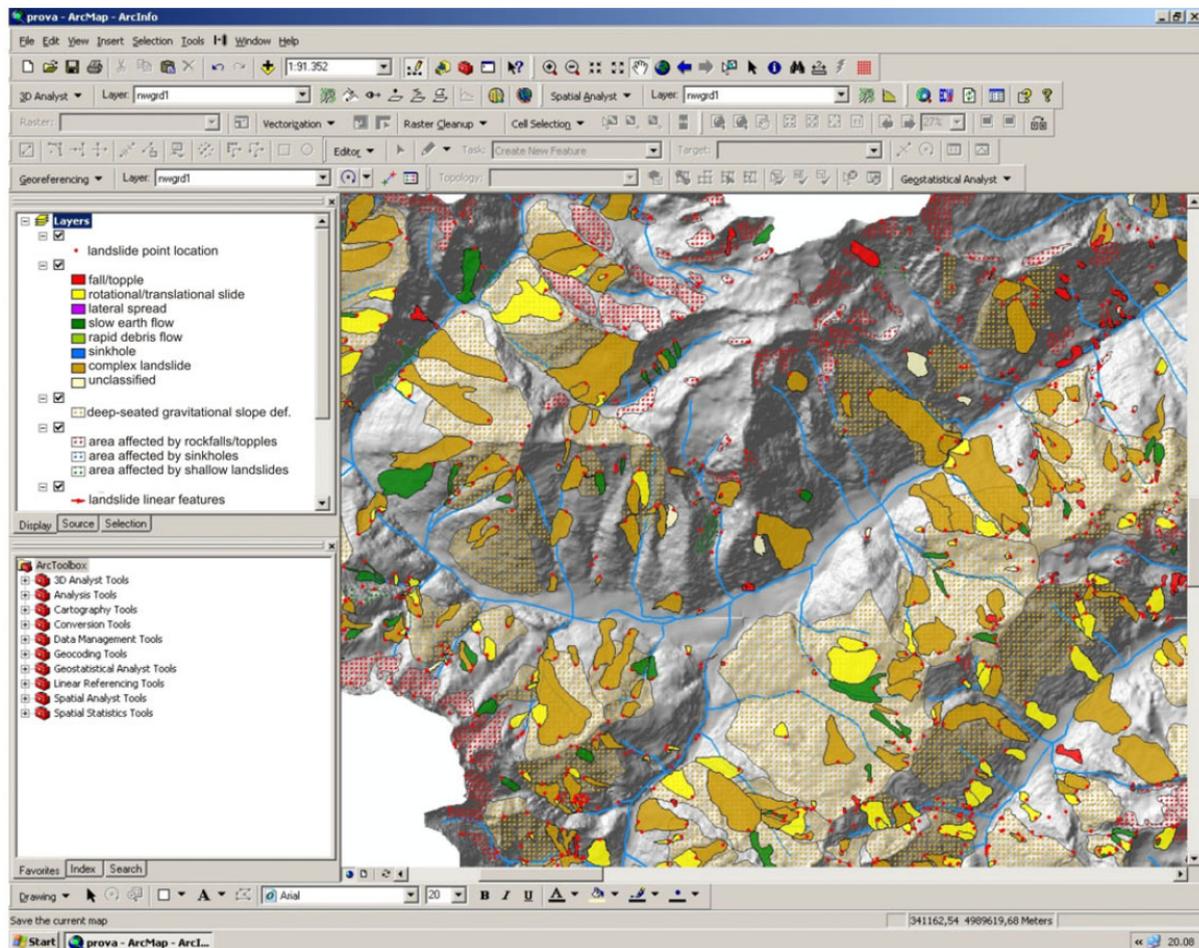


Figure 4.15: Representation of different landslide types in IFFI landslide database (Italy; Trigila et al., 2010).

4.2.2.3 Landslide dimensions

Information on the dimensions of existing landslides is important for the production of landslide hazard maps as for this information on the possible magnitude of the landslide is needed. Landslide magnitude has been represented by the displaced volume or affected area (e.g. Malamud et al., 2004; Van Den Eeckhaut et al., 2007). Calculation of the angle of reach, needed for runout modelling, requires information on height and length of the landslide (Corominas, 1996). These two examples show that landslide dimensions should be included in a landslide database.

Figure 4.16 illustrating the landslide morphometric characteristics stored in the database shows that almost all databases contain information on the landslide length and width and on the area affected by the landslide. As landslide volume is more difficult to assess than the affected area, the number of databases containing this information is somewhat lower. The latter databases generally also contain information on the depth of the surface of rupture. Other information sometimes included is the height from top to toe.

Landslide databases of Bosnia and Herzegovina, France, Iceland and Poland include all seven morphometric characteristics listed in the questionnaire. Hungary, Italy (IFFI and AVI), Former Yugoslav Republic of Macedonia and Spain include six of them. Of course, these characteristics are not always available for all landslides in the database. On the other side of the ranking, there are the databases of Portugal including no information on morphometric characteristics and of Andorra reporting only the area affected by the landslide. Other countries reporting only two of the morphometric characteristics in the landslide database are Norway (displaced volume and height) and UK (length and width).

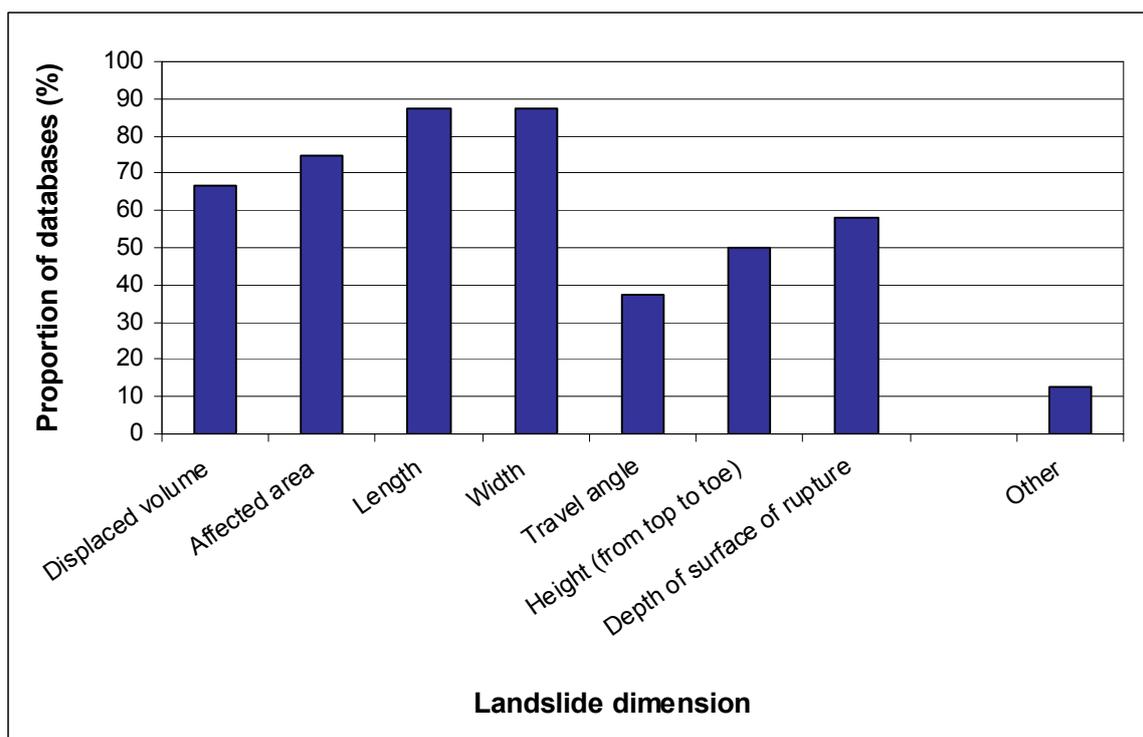


Figure 4.16: Morphometric characteristics of landslides reported in national landslide databases (total number of databases=24).

4.2.2.4 Geo-environmental characteristics at landslide site

Most landslide databases contain additional information on the geo-environmental characteristics at the landslide site, especially on lithology, hydrogeology and slope gradient (Fig. 4.17). About half of the databases also provide information on the orientation of the slope and the land use on the affected site.

Bosnia and Herzegovina, Iceland, and UK include all six geo-environmental characteristics listed in the questionnaire in their database. Five of the characteristics are reported in the databases of Greece, Ireland, Italy (IFFI), Poland and Slovakia. Of course, these characteristics are not always available for all landslides in the database. The landslide databases of Andorra and Portugal did not contain any of the characteristics.

Specific geo-environmental characteristics of the landslide site are important for local landslide hazard and risk studies. For national and regional analysis, the information can also be derived from e.g. DEMs and geological and land use maps.

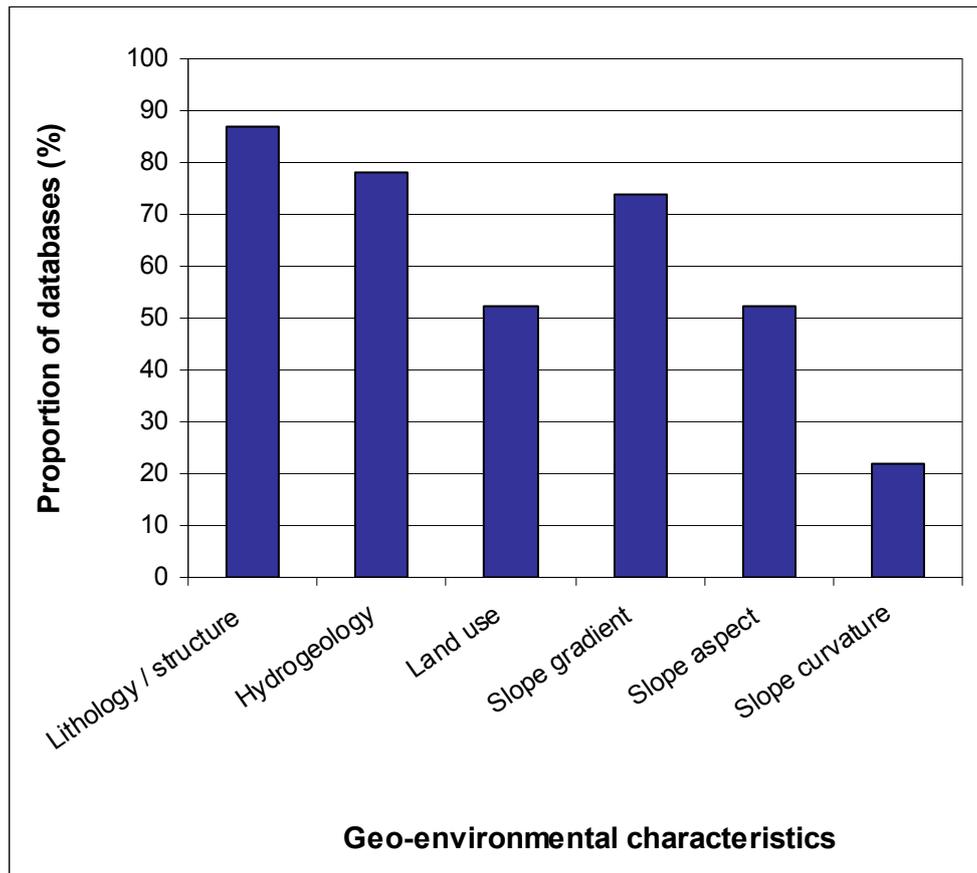


Figure 4.17: Geo-environmental characteristics at the landslide site reported in national landslide databases (total number of databases=24).

4.2.2.5 Landslide history and activity

Landslide history is important as it provides an idea of the temporal frequency of landsliding. If the date of the landslide event is known, analysis of rainfall and earthquake records may also allow determining possible landslide triggers (see section 4.2.2.6). Twenty-three out of 24 landslide databases include information on the initiation or reactivation date (i.e. history) of the landslide for the landslides for which this information is known, but for two no further information was provided. Nine databases only provide the date of the first occurrence of the landslide, while the other 14 databases provide information on the initiation and (eventual) reactivation dates. The percentage of the landslides in the database for which the date of initiation or reactivation is available, however, is generally smaller than 25% (Fig. 4.18). The objective of the database, however, largely influences this percentage. The Swedish Natural Hazards Information System, for example, contains only landslides collected from historical documents. Therefore, this database contains information on the history for more than 75% of the landslides. Databases that are, on the other hand, constructed through analysis of one (or a few) set(s) of aerial photographs generally have little information on landslide history.

More than half of the landslide databases (n=14) also contain a qualitative estimate of the activity of the landslides. In most of these cases, four or more activity states of the classification of Cruden and Varnes (1996) are distinguished. These include active, suspended, reactivated, inactive, dormant, abandoned, stabilized and relict landslides.

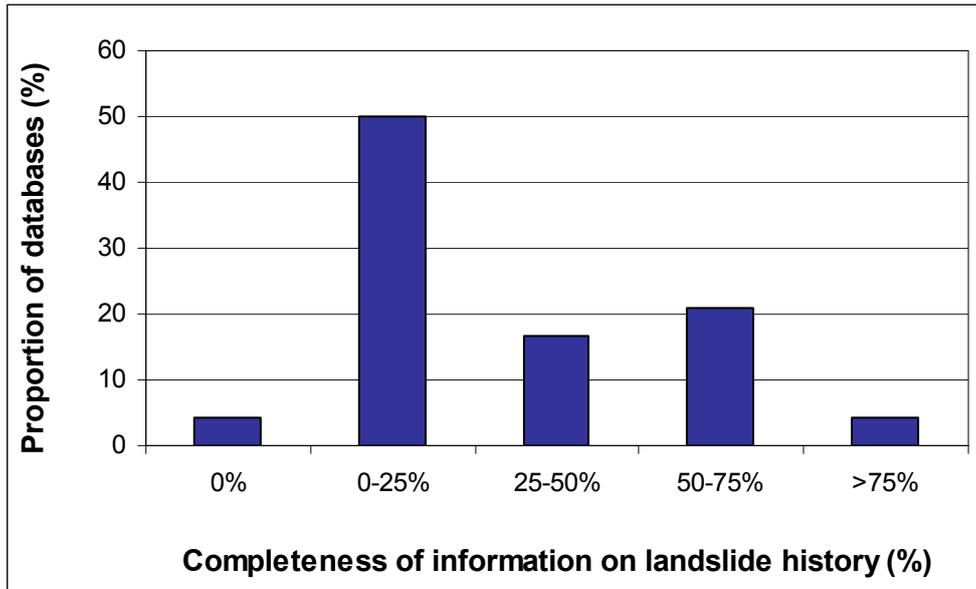


Figure 4.18: Estimated completeness of information on the landslide history (initiation and/or reactivation date) in national landslide databases (total number of databases=24).

4.2.2.6 Landslide trigger

Many landslide studies start from the hypothesis that the past and present landslides are the key to the prediction of future landslides. Hence, for prediction of the timing and frequency of future landslide events, information on the triggering factors of past events needs to be analyzed. Currently 19 of the 24 landslide databases provide this information, if it is available, because, as Figure 4.19 shows, in 50% of the databases the triggering factor is only reported for less than 25% of the recorded landslides. As the percentages in the figure are estimates, they have to be considered with care.

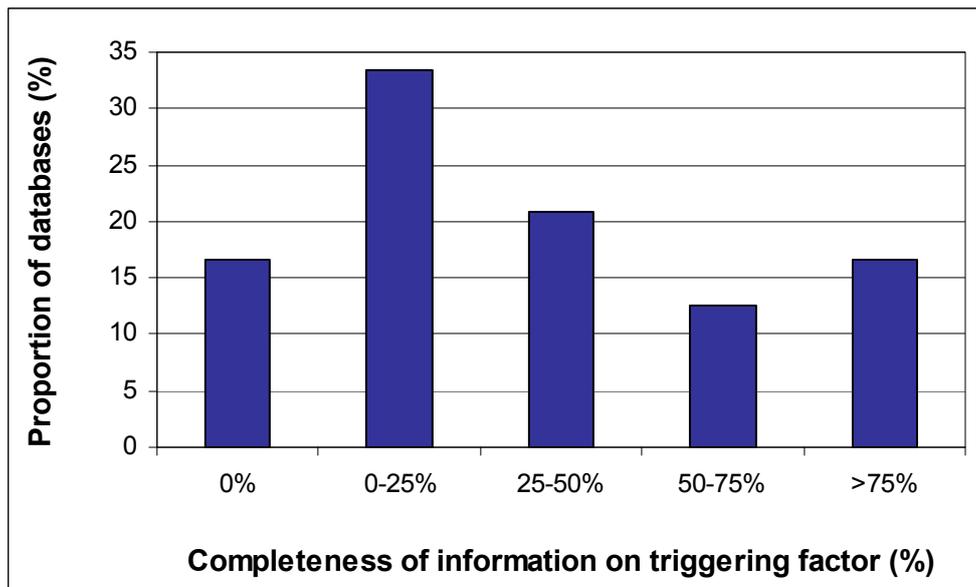


Figure 4.19: Estimated completeness of information on the triggering factor in national landslide databases (total number of databases=24).

4.2.2.7 Consequences

For estimating the damage caused by future landslides of a certain magnitude, information is needed on the damage caused by previous landslides of the same magnitude. If this information is available, it is reported in 21 of the 24 landslide databases. However, as for the triggering factor, the percentage of landslides in the databases with documented information on damage and victims caused is generally limited. For about half of the inventories the information is available for less than 25% of the recorded landslides (Fig. 4.20). Generally, only a qualitative description of the reported or observed casualties and damage is given. Damage can include building damages, road or railway closures, utility damages, losses of arable land, forest or cattle, and in a limited number of cases it also includes secondary effects such as tsunami or landslide dams. An estimate of the monetary value of damage and reparation costs is only given when available. In the landslide database of UK, this is for example the case for five landslides. The database of Sweden (Swedish Natural Hazards Information System; Table 4.1), containing the 17 most severe landslides that occurred in the country provides a very detailed description of the casualties, damage and remediation. Apart from that, also the Portuguese landslide database provides information on the damage caused by most of the 163 landslides.

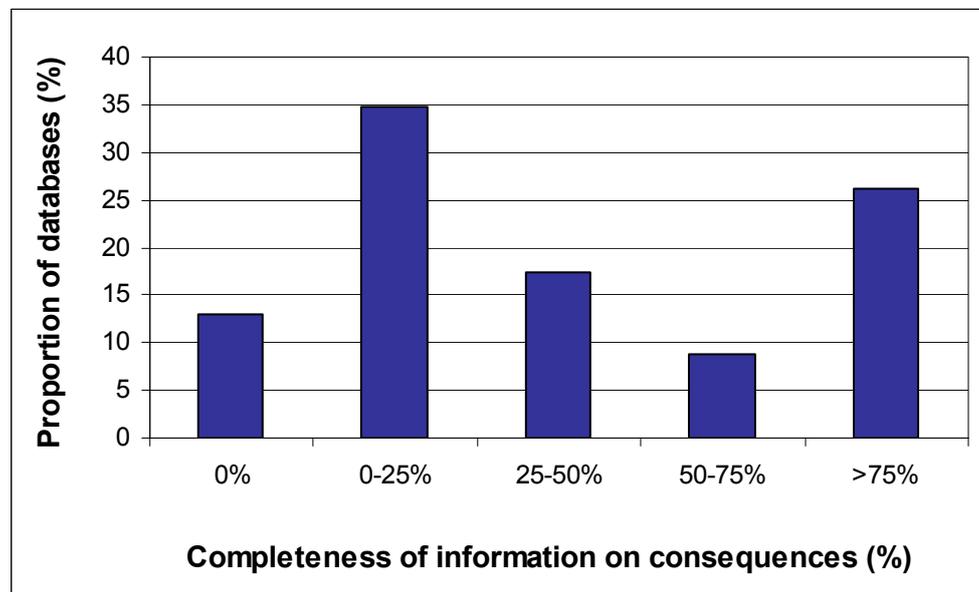


Figure 4.20: Estimated completeness of information on consequences in national landslide databases (total number of databases=24).

4.2.2.8 Other information

All 24 databases provide at least one of the additional types of information listed in Table 4.6. The class “Other” includes detailed descriptions of the landslide event and videos.

Our survey and a more recent additional search in the scientific literature and on the websites of the organizations responsible for the national landslide databases showed that publications describing the content of the databases exist for several countries. Without being exhaustive, this is the case for Ireland (Creighton and Irish Landslides Working Group, 2006), Bulgaria (Bruchev et al., 2007), Italy (for IFFI: APAT, 2007; Trigila et al., 2010; and for AVI: Guzzetti et al., 1994; Guzzetti and Tonelli, 2004; Guzzetti et al., 2005a,b; Salvati et al., 2010), Norway (Jaedicke et al., 2009), Poland (Grabowski and Przybycin, 2010; Mrozek et al., in press), Slovakia (Jelínek et al., 2001; Liščák and

Káčer, in press), and the UK (Hobbs, 2007; Foster et al., 2008; Evans et al., in press). In most cases the webpage of the responsible institute provides basic information on the database they are maintaining (Table 1).

Table 4.6: Additional information included in national landslide databases.

	Number of databases
Photographs	14
Monitoring data or physical properties	11
Bibliographic references	22
Other	4

4.2.2.9 Overview of important attributes in national landslide databases

To conclude this section on the alphanumeric content of national landslide databases, Table 4.7 provides an overview of the presence of the most important attributes for landslide risk assessment per country.

Table 4.7: Main parameters included in national landslide databases in Europe. Especially those required for hazard and risk assessments are listed (Y, yes; N, no; n.a., question not answered by contact person)

Country (database)	No. of landslides	Completeness	Date of creation	Update	Inventory map		Type	Size ^b	Activity	Geology	History ^c	Triggering factor ^c	Damage ^c
					Scale	Symbol ^a							
Albania	210	<25%	2008	Y	1:25,000	Pt	Y	A/V	Y	Y	0%	75-100%	75-100%
Andorra (IAE)	274	n.a.	2006	Y	/	/	Y	A	N	N	<25%	<25%	<25%
Austria	25,000	25-50%	2000	Y	1:10,000	Pt,L,Pg	Y	A	N	Y	<25%	75-100%	0%
Bosnia and Herzegovina	1500	25-50%	2008	Y	1:10,000	Pg	Y	A/V	Y	Y	25-50%	25-50%	25-50%
Bulgaria	1107	<25%	1999	N	1:500,000	Pg	Y	A/V	Y	Y	25-50%	<25%	50-75%
Czech Republic	14,178	25-50%	2007	Y	1:10,000	Pg	Y	A/V	Y	Y	25-50%	25-50%	<25%
Former Yugoslav Rep. of Macedonia	150	50-75%	1979	Y	1:100,000	Pg	Y	A/V	Y	Y	<25%	0%	<25%
France	10,000	75-100%	1994	Y	1:25,000	Pt	Y	A/V	N	Y	50-75%	25-50%	25-50%
Greece	2200	25-50%	2008	Y	1:50,000 - 1:500,000	Pg	Y		Y	Y	50-75%	50-75%	50-75%
Hungary	400	50-75%	1971	Y	1:100,000	Pt	Y	A/V	Y	Y	25-50%	25-50%	<25%
Iceland	5000	<25%	1999	Y	n.a.	Pt	Y	A/V	N	Y	<25%	<25%	75-100%
Ireland	422	25-50%	2004	Y	1:500,000	Pt	Y	A/V	Y	Y	50-75%	25-50%	25-50%
Italy (IFFI)	485,004	75-100%	1999	Y	1:10,000 - 1:25,000	Pg	Y	A/V	Y	Y	<25%	<25%	<25%
Italy (AVI)	21,159	n.a.	1990	Y	1:100,000	Pt	Y	A/V	Y	Y	50-75%	50-75%	n.a.
Norway	31,500	<25%	2001	Y	variable	Pt	Y	A	N	N	<25%	0%	75-100%
Poland	12,150	<25%	2007	Y	1:10,000	Pt, L,Pg	Y	A/V	Y	Y	n.a.	0%	0%
Portugal	163	<25%	2008	Y	1:1,000,000	Pt	N		N	N	<25%	0%	75-100%
Slovakia	21,190	75-100%	2006	Y	1:50,000	Pt,Pg	Y	V	Y	Y	<25%	75-100%	0%
Slovenia	6602	25-50%	1990s	N	1:25,000	Pt	Y		Y	Y	<25%	<25%	<25%
Spain	569	<25%	1987	N	1:200,000	/	Y	A/V	Y	Y	<25%	50-75%	75-100%
Sweden (MSB)	17	50-75%	2007	Y	variable	Pt,L,Pg	N	A/V	N	Y	75-100%	75-100%	75-100%
Sweden (SGI)	550	50-75%	1999	Y	1:10,000 - 1:50,000	Pt	N	A/V	N	N	50-75%	0%	25-50%
Switzerland	317	<25%	1996	N	/	/	Y		N	Y	<25%	<25%	<25%
United Kingdom	15,210	n.a.	2000	Y	n.a.	Pt	Y		Y	Y	<25%	<25%	<25%

^a Symbol: Pt, point; L, line; Pg, polygon

^b Size: A, area; V, volume

^c History, Triggering factor, Damage: estimated completeness

4.2.3 Format and access

Landslide data can only be directly used for landslide susceptibility, hazard or risk assessments if easily accessible and available in digital format. Ideally the alphanumeric and spatial databases are linked. Currently, this is the case for about 58% of the European countries (Fig. 4.21). Sixteen countries use ArcGIS to store the spatial data. Other spatial databases are created in ArcSD or Mapinfo. In combination with the GIS, 16 countries use Access or Oracle to store the alphanumeric data.

With regard to the accessibility, 12 countries allow the general public access to the data (in Italy the case for IFFI and AVI; Table 4.8). However, accessibility for general public is restricted to consultation for eight of these 13 landslide databases (Table 4.9). In some cases (e.g. Greece) only limited information is available, and more specific arrangements have to be made if more detailed information is required. In the absence of a web interface a few (e.g. OLI, Iceland) of these eight databases can also only be consulted in the database owner's office. As mentioned before, although many countries have a web interface (see Table 4.1 and Annex B and C for examples), they only have it in the local language, hampering consultation to most foreigners. Four databases allow free use of the data. These are Andorra, Ireland, Slovakia and Sweden (the latter only 17 landslides). Other countries eventually provide the data, but only under special conditions. In the latter case, only administrations (and sometimes scientists) have direct access to all data. Hence, currently use of landslide data from national databases for landslide zoning is generally restricted to database owners.

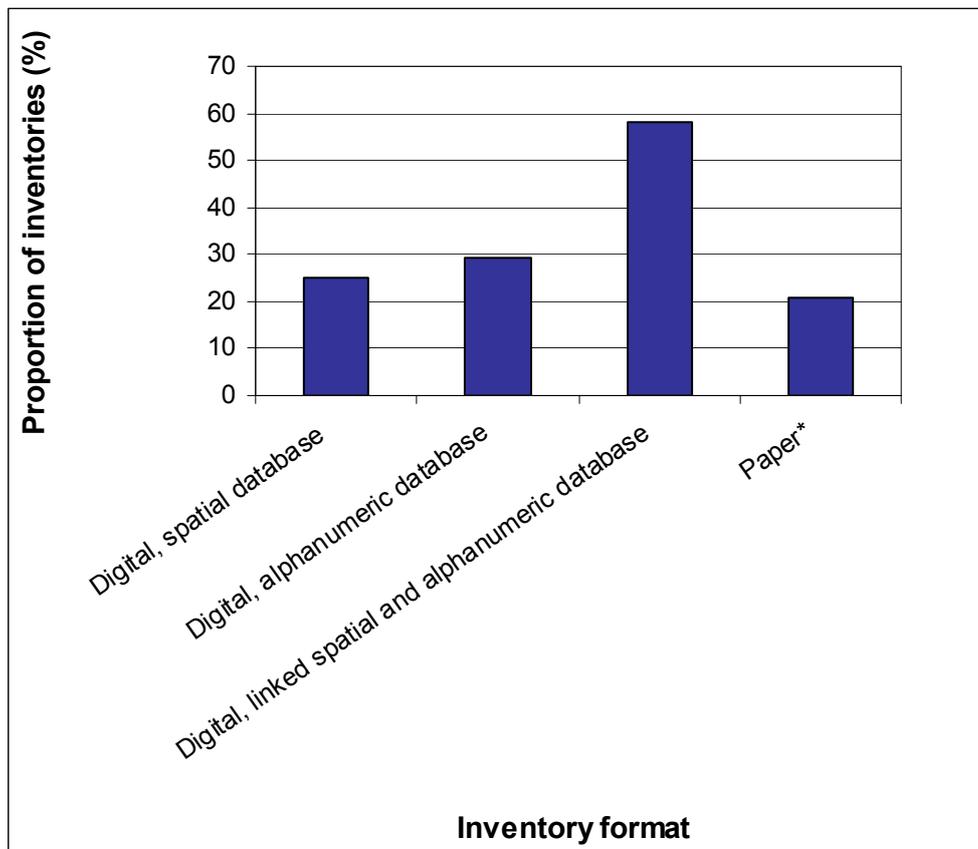


Figure 4.21: Format in which the spatial and alphanumeric data of national landslide inventories are available. (* 4 countries have also a digital database)

Table 4.8: Accessibility of national landslide databases. Accessibility is generally restricted to consultation (see Table 4.9).

Accessibility	Number of databases
General public*	13
Administration	20
Scientific purposes	21
Other (companies)	1

* All databases accessible for general public are assumed to be accessible to administration and for scientific purposes

Table 4.9: Possibilities for further use of accessible data in national landslide databases.

Possibilities for use	Number of databases
Use for consultation only	8
Use free of charge under any condition	4
Use after payment	1
Use without special conditions	5
Use under special conditions	8
Not known	4

4.2.4 INSPIRE Directive compliance

A detailed section on INSPIRE comes later in the report (Section 5.2). Here, only the outcomes of the questionnaires are shown. Figure 4.22 shows that at the time of the survey only for a few national databases the metadata was complying with INSPIRE metadata regulations (<http://inspire.jrc.ec.europa.eu/index.cfm/pageid/101>). According to INSPIRE regulation, digital data of European countries should be implemented in a network service (as specified in <http://inspire.jrc.ec.europa.eu/index.cfm/pageid/5>) to enable interoperability. This was only the case for three national databases. Also formulation of the metadata was only rarely (n=5) complying with INSPIRE regulation.

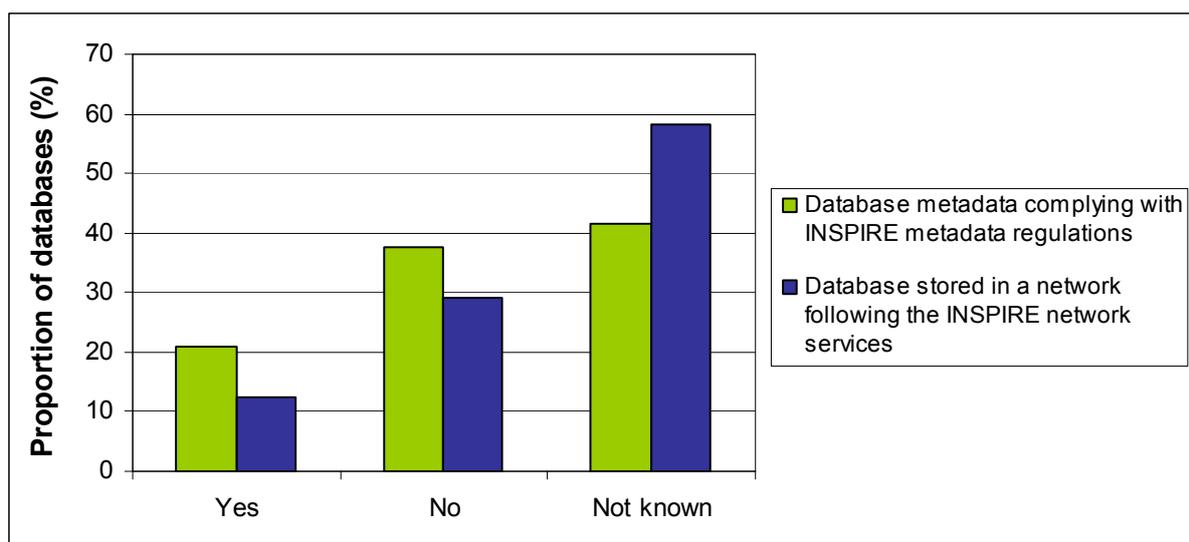


Figure 4.22: Compliance of national landslide databases with INSPIRE regulations on metadata and network services (situation 2010).

Important is that Figure 4.22 suggests that in 2010 the persons responsible for the database did not seem to be well-informed about the INSPIRE regulations on metadata and network services.

Most of them also did not know whether their metadata and network service were complying with INSPIRE regulation. They also did not know whether their institute was registered as Spatial Data Interest Communities (SDICs) or Legally Mandated Organisation (LMOs). Therefore, we checked ourselves whether the institutes were registered, and this showed that almost half of the institutes responsible for national landslide databases were a LMO (n=12) or SDIC (n=2). Hence, it seems that an important proportion of the contacted persons did not know who was following up INSPIRE in their institute.

4.2.5 Availability of ancillary data for landslide hazard and risk assessment

Since the landslide inventory is only one of the thematic layers necessary for landslide hazard and risk assessment, the questionnaire also included questions regarding the availability of data layers related to controlling and triggering factors, and elements at risk (i.e. section 8 of questionnaire).

The results obtained are listed in Table 4.10. They provide an overview of which data are generally present at relative high quality (i.e. up to date, high to moderate resolution and digitally available), and of which data are more problematic to collect and eventually hampering landslide risk assessment at national scale. Of course, care should be taken when analysing the data. For each country we have the response of one contact person only. Generally this person only provided information for which he/she was certain.

Table 4.10: Availability of ancillary thematic data for landslide hazard and risk assessment (max number of responses 22).

		Available	Digital*
Controlling factor	Topography	22	18
	Lithology	20	16
	Soil properties	14	13
	Land cover**	16	14
	Land use**	13	12
Triggering factor	Climate		
	Precipitation	16	11
	Temperature	15	10
	Seismicity		
	Magnitude	10	7
	Intensity	8	4
	Peak ground acceleration	8	3
Elements at risk	Physical elements and human activities (buildings, engineering works, economic activities, public services, utilities, infrastructure and environmental features)	10	10
	Population (country, municipality)	10	10

* Digital map is available or the map can be produced by linking the data to a location

** There might be some confusion on difference among some of the contact persons

With regard to data on controlling factors, it can be concluded that most countries have a DEM (1:10,000 to 1:200,000) and digital lithological map (1:10,000 to 1:500,000). Soil maps, especially digital versions, have a lower availability. About 30% of the contact persons which responded to have land cover data referred to the Corine land cover map.

Contact persons could not always provide information on available databases of landslide triggering factors (precipitation and seismicity) and elements at risk (buildings, infrastructure and population). It seems that population data is generally available up to the municipality level.

4.3 ANALYSIS OF REGIONAL LANDSLIDE DATABASES

In this section 22 regional landslide databases are analyzed (Fig. 4.2; Table 4.2). Information on regional databases was provided by:

1. Regional authorities, i.e. landslide database of Flanders (Belgium), Bavaria, Rheinland-Pfalz and Saxony (Germany), Carinthia (Austria);
2. National Geological Surveys, i.e. Landslide register of urbanized areas of the city of Zagreb (Croatia), Valcea-Arges-Dambovita-Prahova-Buzau (Romania), Cadastre of landslides and unstable slopes on the territory of Serbia;
3. Universities, i.e. Landslides near Pärnu town (Estonia), Alpine Inventory of Deep-Seated Gravitational Slope Deformations (Northern Italy), North of Lisbon Landslides (Portugal), BEOSlide (Serbia), LLISCAT (Spain and Andorra), Landslides Database of the Southern Slopes of Sierra Nevada, Granada (Spain); and
4. Eight Italian Basin Authorities.

Although some differences with national landslide databases can be observed, one has to be aware that the collection of regional databases is not representative for the complete collection of regional landslide databases in Europe, and that the four groups of contacted institutes listed above have various reasons for creation and maintenance of a landslide database (e.g. responsible by law, scientific interest, landslide management). The results shown are for example also influenced by the high number (i.e. 8) of regional landslide databases maintained by Italian Basin Authorities. We will focus in this section on the differences observed compared to the national landslide databases discussed in the previous section. Therefore most graphs will show the results obtained from both the national and regional databases.

4.3.1 General information

The regional landslide databases included are generally official archives, i.e. they are made by a government entity (such as a ministry or a mapping agency), but they are not regulatory (Fig. 4.23).

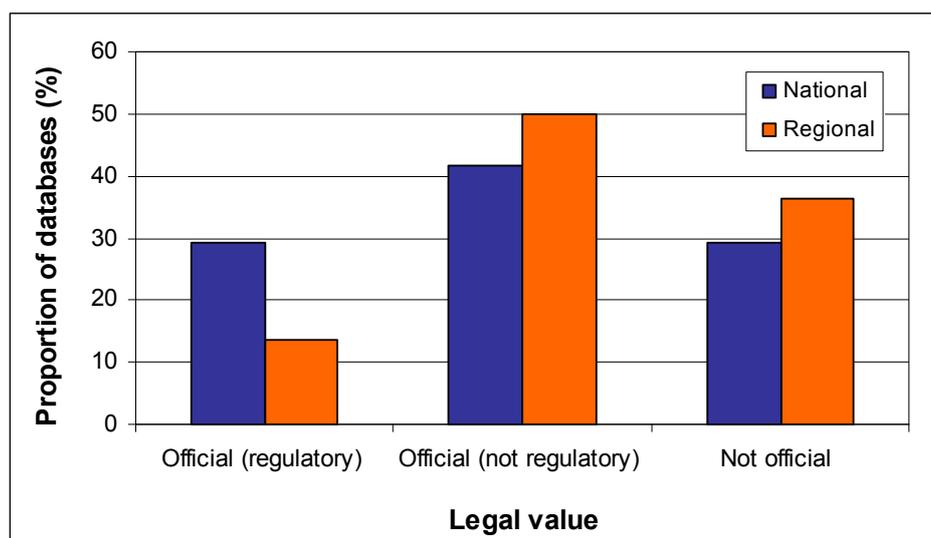


Figure 4.23: Legal value of the national and regional landslide databases.

The number of reported landslides is generally between 400 and 4000 (Table 4.3). Exceptions are three regional Italian landslide databases having more than 15,000 landslides. A first important observation is that regional inventories seem to be more complete compared to national inventories

(Fig. 4.24, 4.25). This could be related to the fact that generally more attention can be paid for data collection over smaller regions. Similar to most national databases, regional landslide databases are also frequently updated (Fig. 4.26).

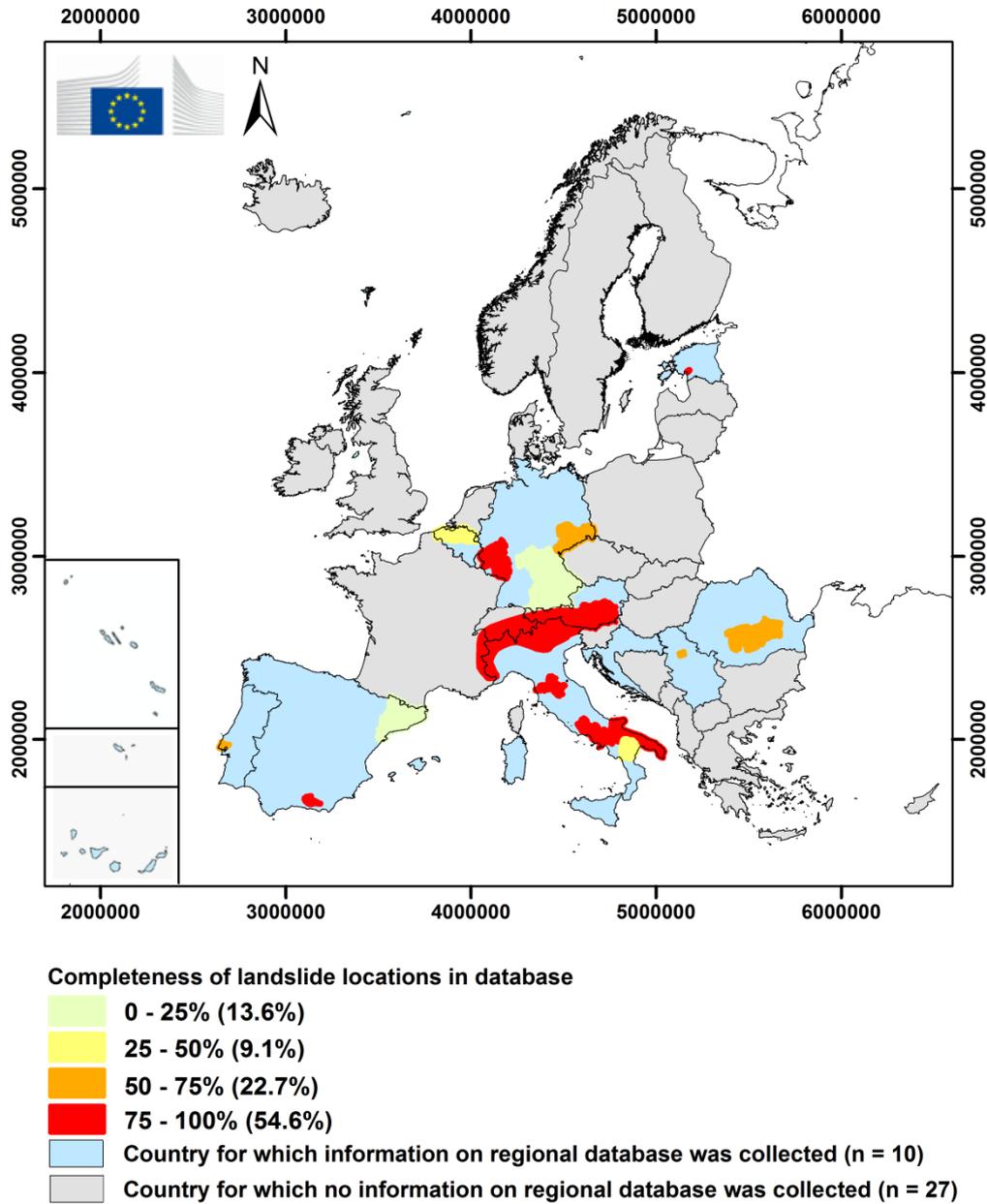


Figure 4.24: Estimated completeness of landslide locations in the regional landslide databases.

ANALYSIS RESULTS

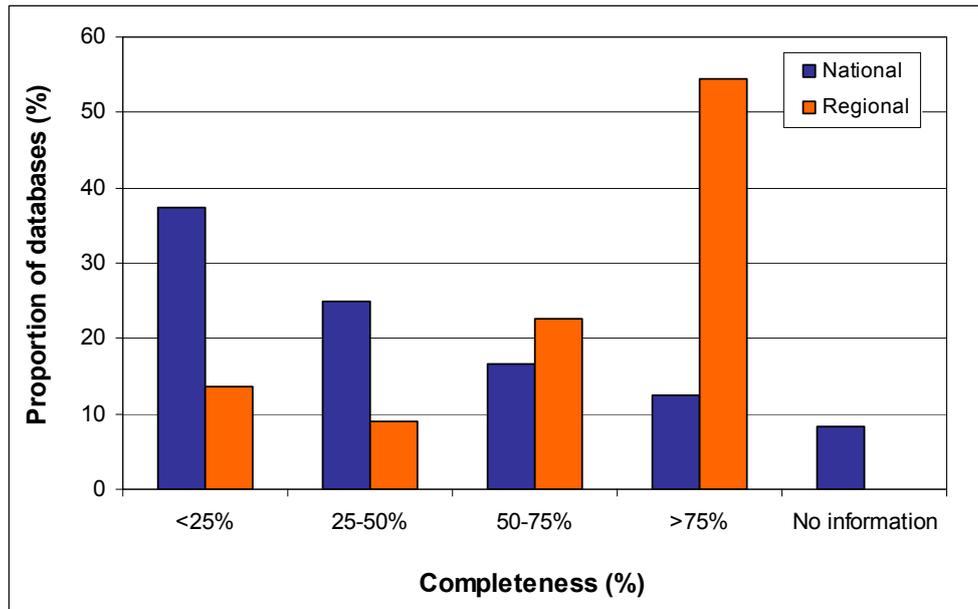


Figure 4.25: Estimated completeness of landslide locations in the national and regional landslide databases.

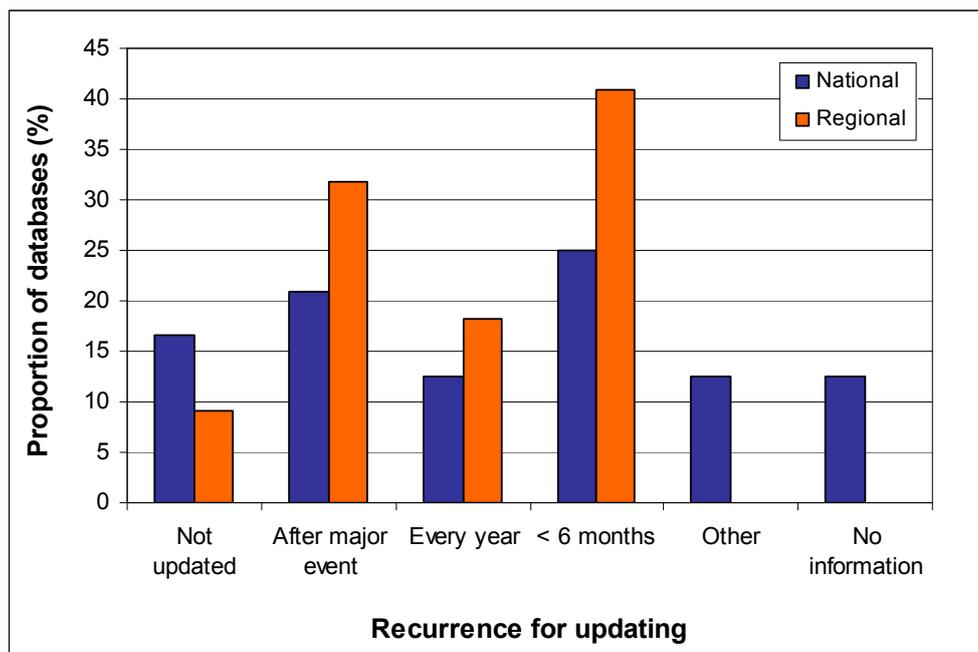


Figure 4.26: Comparison of update frequency of the national and regional landslide databases.

4.3.2 Content

4.3.2.1 Landslide inventory map

Generally covering smaller areas, regional landslide inventory maps are often produced at more detailed scale than national inventory maps (Fig. 4.27). Given the more detailed scale, landslides are most often indicated as lines or closed polygons and not as points (Fig. 4.28). For individual landslides, coordinates and municipality are separately listed in the alphanumeric database of more than half of the regional databases (Table 4.11).

With regards to the techniques used to acquire the landslide locations, Figure 4.29 shows that, similarly to the national inventories, the regional inventories are mainly created using field surveys, historical documents and analysis of aerial photographs. However, for databases produced for scientific purposes these traditional methods are used in combination with more innovative satellite and airborne remote sensing techniques. Also Google Earth™ provides opportunities for the production of landslide databases. This virtual globe, map and geographical information program was for example used for production of the “Alpine Inventory of Deep-Seated Gravitational Slope Deformations”.

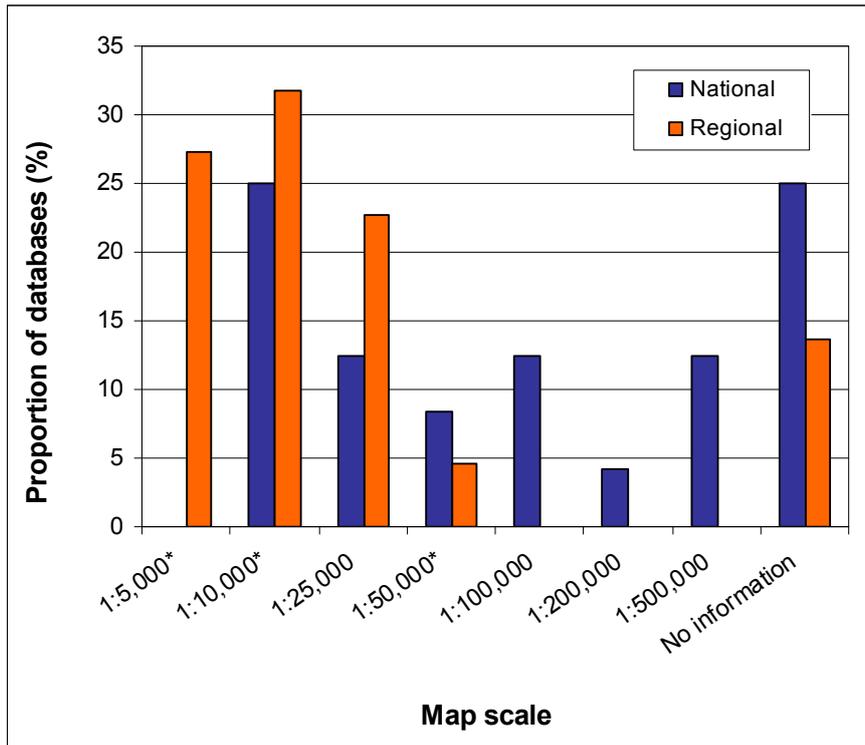


Figure 4.27: Scale of national and regional landslide inventory maps.
 (* some of the landslide inventory maps were created at smaller scale in some parts of the country).

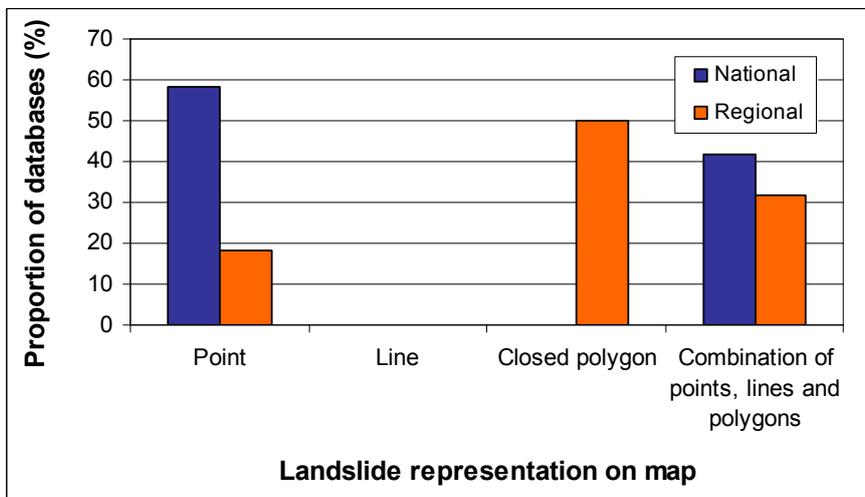


Figure 4.28: Symbol used for landslides in national and regional landslide databases.

Table 4.11: Specific information on landslide location provided in the regional landslide databases.

Landslide locator	Number	%
Coordinates	16	72.7
Municipality	13	59.1
Province/county	10	45.5
Other (hydrographic basin)	1	4.5

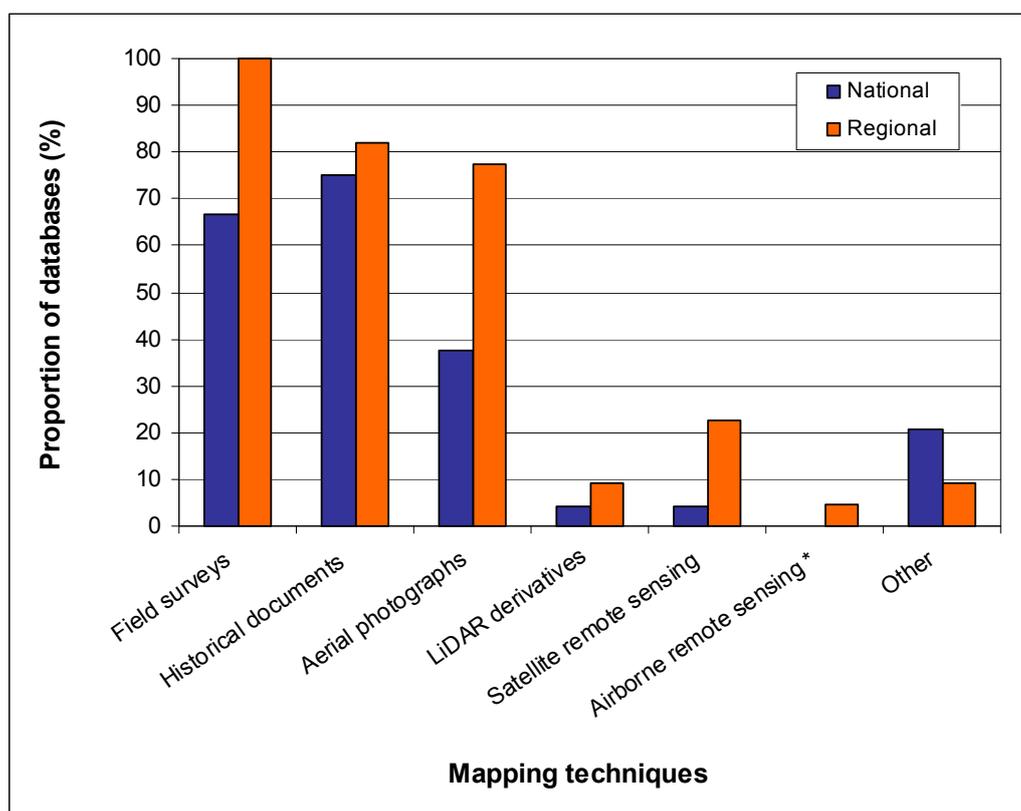


Figure 4.29: Techniques used to collect landslide locations.
* Other than aerial photographs and LiDAR.

4.3.2.2 Landslide classification

Eighteen of the 20 databases including information on the landslide type use a classification system derived from Cruden and Varnes (1996). The landslide databases not further classifying the landslides are the one of State of Rheinland-Pfalz (Germany) and BEOslide (Serbia). Fifteen of the 22 regional databases only contain landslides. The other seven databases also contain information on e.g. floods, sinkholes, badlands, active faults, sediment fans, and large slope deposits.

4.3.2.3 Landslide dimensions

Morphometric landslide characteristics were reported in 19 of the 22 regional landslide databases (Fig. 4.30). The results do not show remarkable differences with national landslide inventories, with exception of the displaced volume which is not so frequently available in the regional databases.

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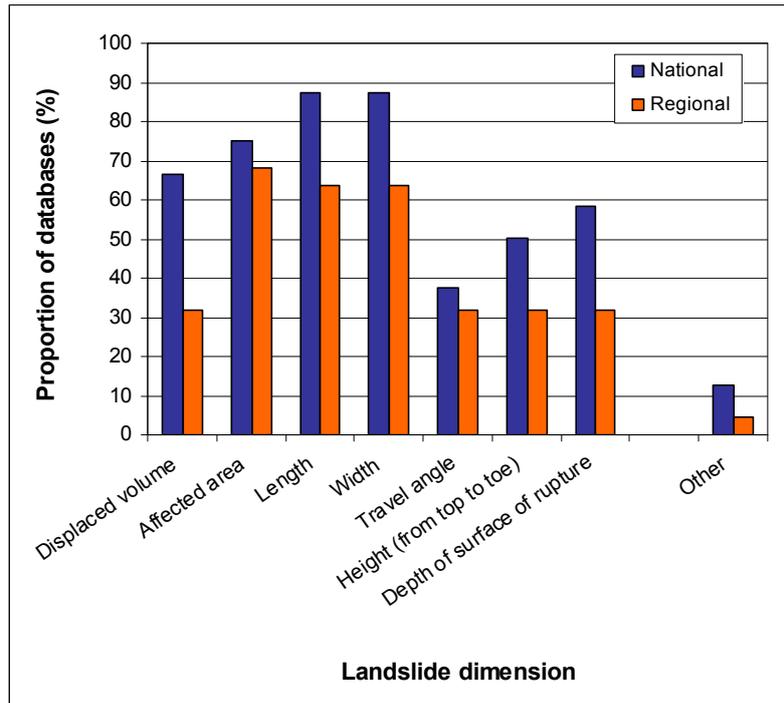


Figure 4.30: Morphometric characteristics of landslides reported in national and regional landslide databases.

4.3.2.4 Geo-environmental characteristics at landslide site

Geo-environmental characteristics at the landslide site were reported in 18 of the 22 regional landslide databases (Fig. 4.31). The results do not show remarkable differences with national landslide inventories. Information on lithology and slope gradient is almost always included in the database. There is no clear reasoning behind the observation that information of hydrogeology is less recorded in regional landslide databases.

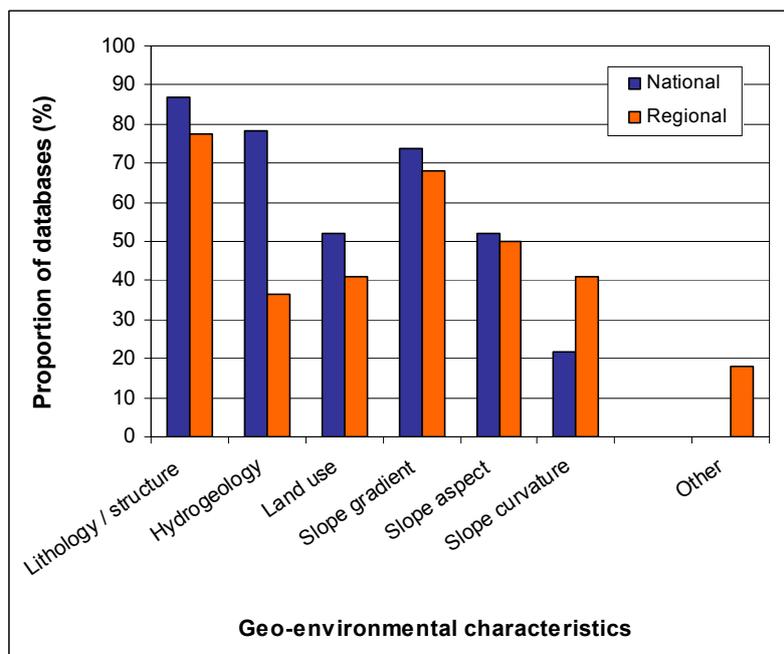


Figure 4.31: Geo-environmental characteristics at the landslide site reported in national and regional landslide databases.

4.3.2.5 Landslide history and activity

Information on the landslide history, available for 17 of the 22 regional databases, is relatively incomplete and for most databases below 50% (Fig. 4.32). For 12 databases qualitative information of the activity was given. Similar to national landslide databases, four or more activity states of the classification of Cruden and Varnes (1996) are distinguished. These include active, suspended, reactivated, inactive, dormant, abandoned, stabilized and relict landslides.

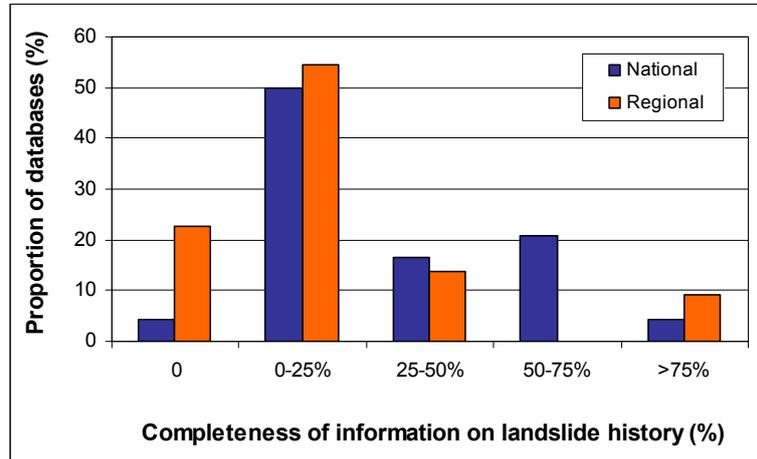


Figure 4.32: Estimated completeness of information on the landslide history (initiation and/or reactivation date) in national and regional landslide databases.

4.3.2.6 Landslide trigger

Information of the landslide trigger is included in about half of the regional landslide databases (Fig. 4.33). In contrast with an increase in overall completeness of landslide locations compared to national landslide databases (Fig. 4.25), regional databases are not more complete with regard to the triggering factors.

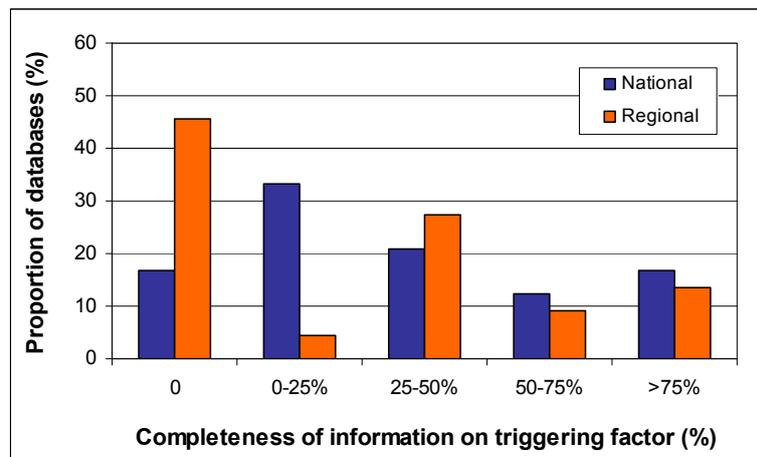


Figure 4.33: Estimated completeness of information on the triggering factor in national and regional landslide databases.

4.3.2.7 Consequences

Information on the landslide consequences (i.e. victims and estimates of damage) is included in 14 of the regional landslide databases (Fig. 4.34). In contrast with an increase in overall completeness of landslide locations compared to national landslide databases (Fig. 4.25), regional databases are also not more complete with regard to the consequences.

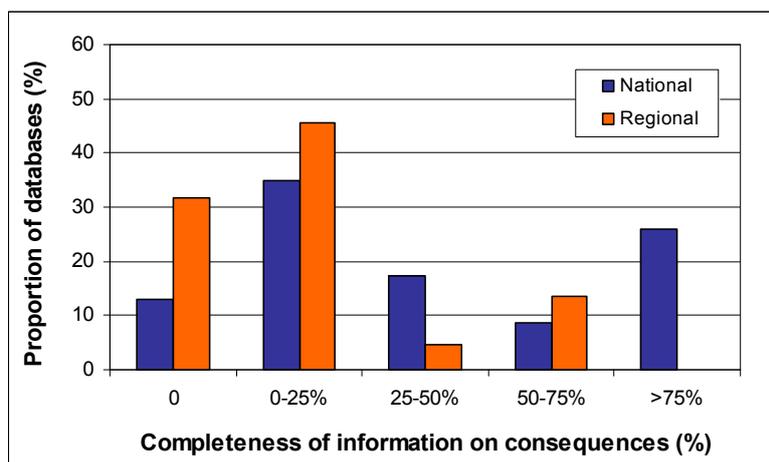


Figure 4.34: Estimated completeness of information on the consequences in national and regional landslide databases.

4.3.2.8 Other information

Seventeen regional databases include additional information such as photographs, monitoring data or bibliographic references (Table 4.12).

Table 4.12: Additional information included in regional landslide databases.

	Number of databases
Photographs	13
Monitoring data or physical properties	13
Bibliographic references	12
Other	1

4.3.3 Format and access

Similar to the national landslide databases, regional databases are generally linked databases where spatial and alphanumeric data are connected (Fig. 4.35). For nine databases, data is stored in a spatial database. They consist of a map with an attribute table and are most often produced in ArcGIS or Mapinfo. When alphanumeric-only databases are present they are generally produced in Microsoft Access or SQL server.

About 50% of the databases are accessible for general public (Table 4.13), but generally only for consultation (Table 4.14). This is, for example, the case for the databases maintained by Flemish Region, the German Länder and the Italian Basin Authorities which sometimes have a web interface (Table 4.2; Annex B and C). Generally, data can only be used under special conditions for further processing such as landslide zoning (Table 4.14).

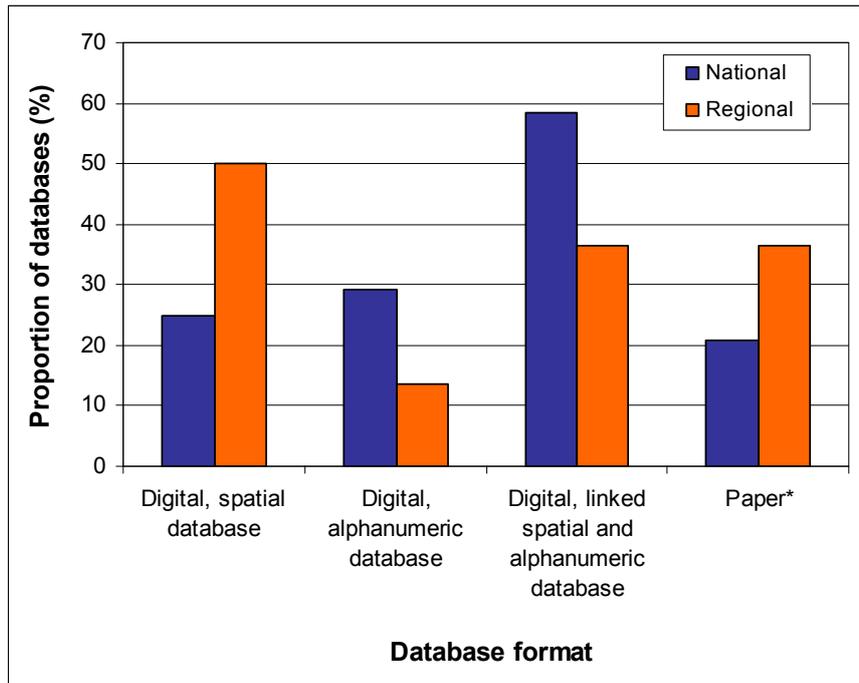


Figure 4.35: Format in which the spatial and alphanumeric data are available.

Table 4.13: Accessibility of regional landslide databases.

Accessibility	Number of databases
General public*	10
Administration	17
Scientific purposes	15
Other (internal, companies)	4

* All databases accessible for general public are assumed to be also accessible to administration and for scientific purposes

Table 4.14: Possibilities for further use of accessible data of regional landslide databases.

Possibilities for use	Number of databases
Use for consultation only	9
Use free of charge under any condition	3
Use after payment	0
Use without special conditions	4
Use under special conditions	10
Not known	4

4.3.4 INSPIRE Directive compliance

The regional databases included in this overview generally do not take into account the INSPIRE regulations (Fig. 4.36). The contact persons most often did not know whether their institute was able/willing to collaborate to INSPIRE regulations. As mentioned before, a more detailed discussion on landslide databases and INSPIRE regulation will follow in section 5.2.

LANDSLIDE INVENTORIES IN EUROPE

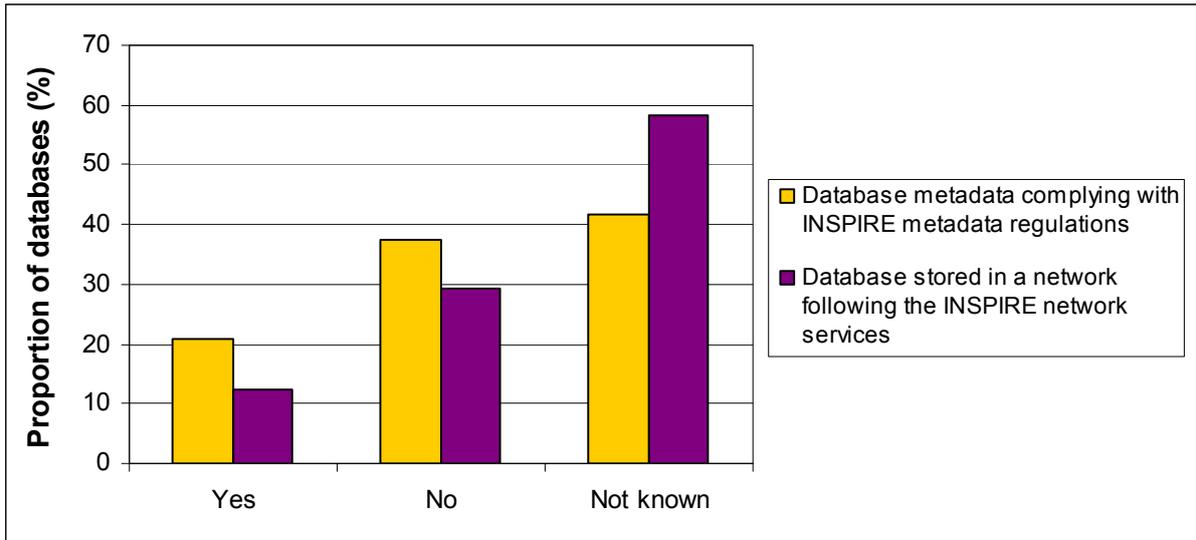


Figure 4.36: Compliance of regional landslide databases with INSPIRE regulations on metadata and network services.

5 POLICY-RELATED SUGGESTIONS FOR HARMONISATION AND INTEROPERABILITY

In the previous chapter we provided an overview of the information that is available in national and regional landslide databases. In this chapter we give suggestions on the content and structure landslide databases should have to meet both the proposal for a Soil Framework Directive and the INSPIRE data specifications for Natural Risk Zones. The chapter starts with a short introduction to both the proposed Soil Framework Directive and the INSPIRE Directive.

5.1 PROPOSED SOIL FRAMEWORK DIRECTIVE

Landslides constitute one of the eight soil threats considered in the EU Thematic Strategy for Soil Protection, adopted by the European Commission on 22 September 2006. The legislative package included a communication on the mentioned Strategy (EC, 2006a), a proposal for a Soil Framework Directive (EC, 2006b) and the impact assessment of the Strategy (EC, 2006c). To date, the Soil Framework Directive is still under discussion and is not yet adopted. Therefore, only limited suggestions for harmonisation of landslide databases in agreement with the proposed Soil Framework Directive can be given.

In the proposed Soil Framework Directive it is required, among other actions, to identify risk areas for several soil threats including landslides. The Soil Information Working Group (SIWG) of the European Soil Bureau Network (ESBN) developed a set of “common criteria” (i.e. for landslides, occurrence/density of existing ones along with a set of conditioning and triggering factors) to identify these risk areas (Eckelmann et al., 2006). The SIWG suggested a nested geographical approach based on “Tiers” and exploiting thematic data of different type, quality and resolution, outlining a variety of methodological and technological approaches. Basically, the Tier 1 assessment is aimed at the general identification (i.e. low-resolution evaluation) of areas potentially subject to soil threats, including landslides, using existing thematic data. The Tier 2 assessment is intended to perform detailed analyses in the areas identified as potentially at risk by the Tier 1 assessment, and should provide results at a higher spatial resolution using existing and new data currently not available. The Tier approach has been further elaborated specifically for landslide risk area delineation in Europe by the European Landslide Expert Group* (Hervás et al., 2007; Günther et al., 2008; in press).

In the proposal for a Soil Framework Directive, risk areas are understood as areas where one or more of the soil degradation processes have occurred or are likely to occur in the near future. Hence, identification of so-called landslide risk areas could in principle be accomplished by one or more of the following maps:

- Landslide inventory maps (and landslide density maps as a by-product), which show at least the geographical distribution of past landslides, and associated databases of landslide and terrain properties;
- Landslide susceptibility maps, which show the proneness or the probability of occurrence of landslides of certain type in a given area;
- Landslide hazard maps, which show the probability of occurrence of landslides of certain type and magnitude in a particular area within a given period of time; or
- Landslide risk maps, which show potential damage or losses caused by landslides to individuals, infrastructure and property.

* <http://eusoils.jrc.ec.europa.eu/library/themes/Landslides/>

As shown in previous sections, systematic landslide databases (including e.g. maps showing the location, type of known landslides in an area and landslide history) are not available and/or accessible for all European countries. Consequently, only a continent-wide assessment of landslide susceptibility is feasible. Therefore, the European Landslide Expert Group recommended:

“Carrying out a pan-European landslide inventory, reviewing the data already available (...). The minimum requirements for such an inventory are location and type of historical landslides. The landslide type classification should follow the one proposed by Varnes (1978). Additionally, the inventory should include date of occurrence, soil/bedrock material involved, surface extent and direct impact of landslide events.” (Hervás et al., 2007).

5.2 INSPIRE DIRECTIVE

5.2.1 General information on INSPIRE

INSPIRE is a Directive adopted by the European Parliament and the Council of the European Union on 14 March 2007, setting the legal framework for the establishment of the Infrastructure for Spatial Information in the European Community, for the purposes of Community environmental policies and policies or activities which may have an impact on the environment (EC, 2007a). INSPIRE should be based on the infrastructures for spatial information that are created and maintained by the Member States. The major components of the EU infrastructure include metadata, spatial data themes (as described in Annexes I, II, III of the Directive), spatial data services, network services and technologies, agreements on data and service sharing, access and use, and coordination and monitoring mechanisms, processes and procedures.

The guiding principles of INSPIRE are:

“that the infrastructures for spatial information in the Member States is designed to ensure that spatial data are stored, made available and maintained at the most appropriate level; that it is possible to combine spatial data and services from different sources across the Community in a consistent way and share them between several users and applications; that it is possible for spatial data collected at one level of public authority to be shared between all the different levels of public authorities; that spatial data and services are made available under conditions that do not restrict their extensive use; that it is easy to discover available spatial data, to evaluate their fitness for purpose and to know the conditions applicable to their use.” (Drafting team INSPIRE Data Specifications, 2009).

The text of the INSPIRE Directive 2007/2/EC (EC, 2007a) is available from the INSPIRE website (<http://inspire.jrc.ec.europa.eu>). Since INSPIRE Directive is a framework legislation identifying what needs to be achieved by the Member States, detailed provisions are defined in the Implementing Rules that have the form of EU Regulations or Decisions.

To facilitate the development of INSPIRE Implementing Rules, all stakeholders had the opportunity to participate in its specification and development. For this reason, the Commission has put in place a consensus building process involving data users and providers together with representatives of industry, research and government. These stakeholders are organised in Spatial Data Interest Communities (SDICs) and Legally Mandated Organisations (LMOs). SDICs typically are networks of data producers, transformers and users, whereas LMOs are responsible in the Member States for one or more components of the INSPIRE Directive. SDICs and LMOs have provided reference materials, participated in the user requirement and technical surveys, proposed experts for the Data Specification Drafting Team and Thematic Working Groups (TWG), expressed their views on the drafts of the technical documents of the data specification development framework, and are invited to comment and test the draft Implementing Rule on Interoperability of Spatial Data Sets and Services.

As the objective of INSPIRE is to create a framework that enables to combine spatial data and services from different sources in a consistent way the “Regulation on INSPIRE Data and Service Sharing (268/2010 from 29.03.2010)” (<http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2010:083:0008:0009:EN:PDF>) is the key document since it defines the conditions for sharing Member States spatial data with Community institutions and bodies. Another very important document is the “Regulation on INSPIRE interoperability of data sets and services for Annex I data themes (1089/2010 from 10.12.2012)” since it defines the data content of INSPIRE. The Amendment to this Regulation covering the remaining data themes from Annex II and III is currently being finalised.

5.2.2 Definition of interoperability in INSPIRE

One of the main tasks of the INSPIRE programme is:

“to enable *interoperability* and, where practicable, *harmonisation* of spatial data sets and services within Europe. Interoperability in INSPIRE means the possibility to combine spatial data and services from different sources across the European Community in a consistent way without involving specific efforts of humans or machines.”

It is important to note that in INSPIRE spatial data sets are provided through network services, typically via Internet. Interoperability is then achieved by “mapping” the local data provider’s structures and definitions to the common INSPIRE ones. The “mapping” can be carried out either by storing the harmonised structures at the data providers databases (permanent solution) or by utilising transformation services to publish spatial data sets in the INSPIRE infrastructure.

To make the concepts of interoperability and harmonisation more tangible, the Generic Conceptual Model, the model applicable for all INSPIRE thematic data specifications (e.g. natural risk zones, soil, ...) was developed by the INSPIRE Data Specifications Drafting team. It covers a set of interoperability components and their detailed specifications (Fig. 5.1).

(A) INSPIRE Principles	(B) Terminology	(C) Reference model
(D) Rules for application Schemas and feature catalogues	(E) Spatial and temporal aspects	(F) Multi-lingual text and cultural adaptability
(G) Coordinate referencing and units model	(H) Object referencing modelling	(I) Data translation model/guidelines
(J) Portrayal model	(K) Identifier Management	(L) Registers and registries
(M) Metadata	(N) Maintenance	(O) Quality
(P) Data Transfer	(Q) Consistency between data	(R) Multiple representations
(S) Data capturing	(T) Conformance	

Figure 5.1: Overview of data interoperability components as defined in INSPIRE. (Drafting team INSPIRE Data Specifications, 20090)

In this document only the components that are most relevant for landslide databases will be highlighted. These are:

- *The multi-lingual text and cultural adaptability* (F): All spatial object types (features) will be available in the INSPIRE Feature concept dictionary in multilingual forms, as well as their definitions, attributes / associations and attribute values (provided by enumerations / code lists).
- *The coordinate referencing and units model* (G): The focus is put on reference systems that are valid across Europe.
- *The identifier management* (K): Each spatial object in the database should have a unique object identifier (K). This will be a combination of the identifier of the object on a national level with a prefix referring to its location in the INSPIRE structure. To ensure object uniqueness throughout Europe, not the form of identifier, but the identifier management mechanisms (e.g. registers) in use at national level will need to be synchronised/ mapped to ensure pan-European integration.

5.2.3 Data specifications for Natural Risk Zones and implications for landslide databases

The INSPIRE Directive addresses 34 spatial data themes mainly, but not exclusively for environmental applications. These themes are subdivided in the three annexes of the directive. The complete list can be found on <http://inspire.jrc.ec.europa.eu/index.cfm/pageid/2/list/7>. Landslides, as a category of natural hazards, are part of the theme Natural Risk Zones (Annex III theme 12) and not of the theme soil as in the Soil Thematic Strategy. The INSPIRE Natural Risk Zones data theme is legally defined as vulnerable areas characterised according to natural hazards (all atmospheric, hydrologic, seismic, volcanic and wildfire phenomena that, because of their location, severity, and frequency, have the potential to seriously affect society), e.g. floods, landslides, earthquakes and volcanic eruptions (Directive 2007/2/EC, INSPIRE).

For each of the 34 themes, a Thematic Working Group (TWG), a team of selected domain experts, has developed INSPIRE data specifications. The data specifications follow the methodology of “ISO 19131 Geographic information - Data product specifications” standard as well as the INSPIRE Generic Conceptual Model. Each INSPIRE data specification includes following parts - chapters: the theme descriptions including the definitions of key terms used, the application schema(s), and complete feature catalogue, coordinate reference systems, data quality, metadata, encoding, portrayal rules etc. Each data specification also includes selected use cases descriptions that were used to define clear requirements on the data model.

The data specification is the work of the Natural Risk Zones TWG, a multinational team of experts selected by the European Commission from the community of SDICs and LMOs. The current version 3.0 (INSPIRE Thematic Working Group Natural Risk Zones, 2012; http://inspire.jrc.ec.europa.eu/documents/Data_Specifications/INSPIRE_DataSpecification_NZ_v3.0RC2.pdf) has been compiled using reference material submitted by SDICs and LMOs, analysis of the responses to a user requirements survey and analysis of the relevant legislation in place. While creating the data specification for Natural Risk Zones, the team also had to take into account links with other thematic areas from INSPIRE (e.g. Geology or Area management).

The TWG recognizes that among different natural hazards, differences in definitions of key relevant concepts such as risk, hazard, vulnerability and exposure exist. The definitions adopted are listed in Table 5.1. Figure 5.2 illustrates the relation between these concepts: Natural Risk Zones are the zones where a natural hazard area intersects with highly populated areas and/ or areas of particular environmental/ cultural/ economic value (or in other words with exposed elements that are vulnerable to the type of natural hazard).

The data specifications of Natural Risk Zones were produced at the time the information on landslide databases was collected and analysed, and they were finalized when this report was prepared. The definition of the data specification was a multi-stage procedure. After launching the Call for Expression of Interest for participation in development of INSPIRE data specifications for Annex II & III Data Themes in November 2009, the TWG produced version 1.0 of the data specification in September 2010. This version has been substantially improved, and version 2.0 was made publically available on the INSPIRE webpage in June 2011. Until October 2011 SDICs and LMOs were invited to test and comment version 2.0. The TWG was specifically interested in testing current databases of observed events or of susceptibility, hazard and risk assessments and this for any type of natural hazards. All comments sent to the TWG were discussed in a meeting in December 2011. The updated version 3.0 rc1 (Release candidate) was published in April 2012. The information provided in this report is based on this version. The latest version of the data specification is accessible on the INSPIRE official website.

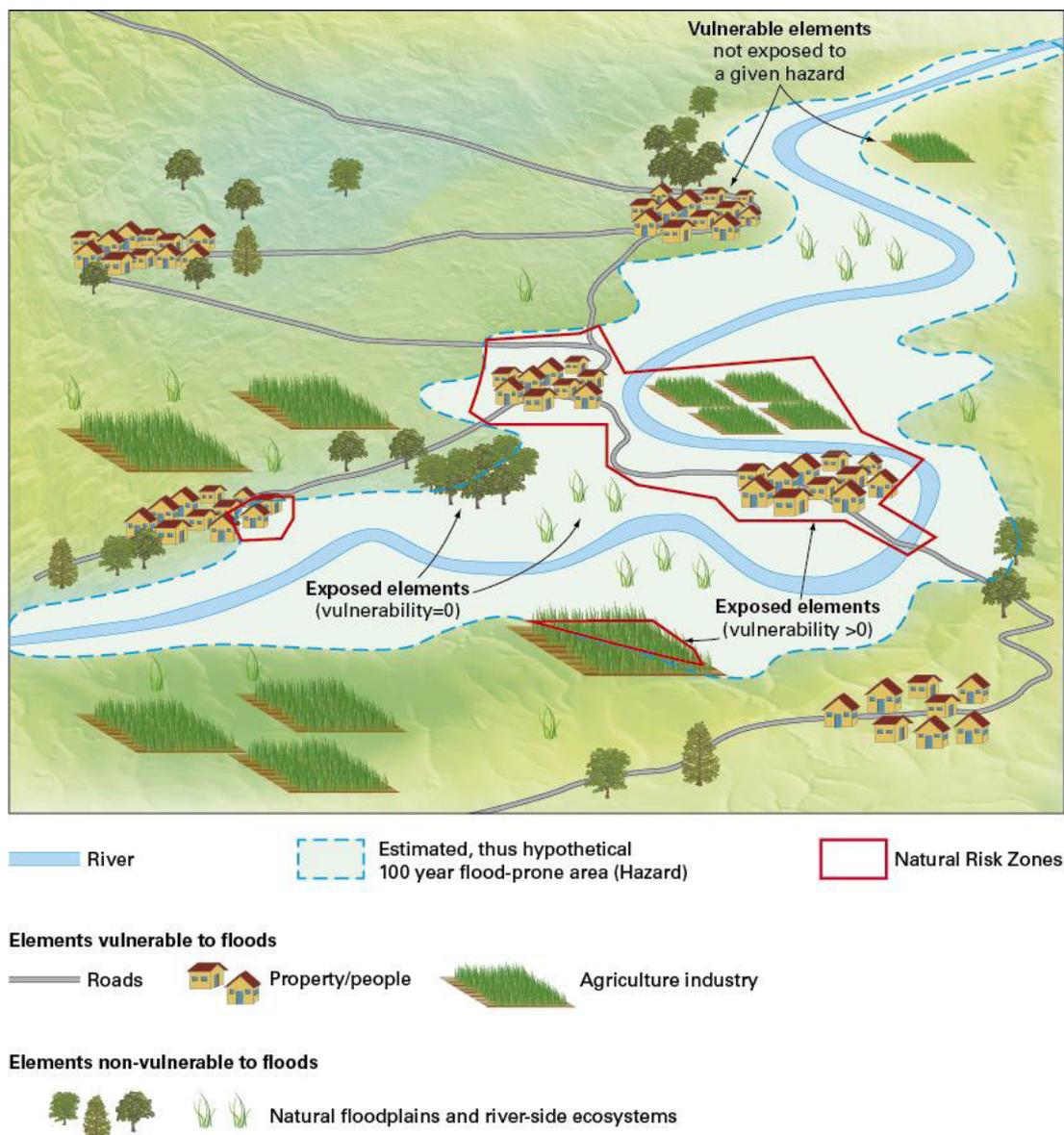


Figure 5.2: Relationships between main concepts (observed events, hazard areas, exposed elements (and their vulnerability), and risk zones) in Natural Risk Zones model illustrated for flood hazards (INSPIRE Thematic Working Group Natural Risk Zones, 2012).

Table 5.1: Definitions used by the Thematic Working Group of Natural Risk Zones (INSPIRE Thematic Working Group Natural Risk Zones, 2012).

<p><i>Risk</i></p> <p>The term risk refers to the combination of the consequences of an event (hazard) and the associated likelihood/probability of its occurrence. The word “risk” has two distinctive connotations. The emphasis is either placed on the concept of chance or possibility, or on the consequences, in terms of “potential losses” for some particular cause, place and period (UNISDR, 2009).</p> <p><i>Hazard</i></p> <p>A dangerous phenomenon, substance, human activity or condition that may cause loss of life, injury or other health impacts, property damage, loss of livelihoods and services, social and economic disruption, or environmental damage. In technical settings, hazards are described quantitatively by the likely frequency of occurrence of different intensities for different areas, as determined from historical data or scientific analysis (UNISDR, 2009).</p> <p><i>Vulnerability</i></p> <p>The characteristics and circumstances of a community, system or asset that make it susceptible to the damaging effects of a hazard (UNISDR, 2009).</p> <p><i>Exposure</i></p> <p>People, property, systems, or other elements present in hazard zones that are thereby subject to potential losses (UNISDR, 2009).</p>

Figure 5.3 shows the core model of the Natural Risk Zones application schema. This common schema covers spatial object types (features) seen as reached compromise to satisfy the scope of the data theme defined by the directive and address requirements identified by the use cases. The model consists of the four components shown in Figure 5.2, i.e. observed events, hazard areas, exposed elements (and their vulnerability) and risk zones. However, it is possible to add extensions to this general model for each specific natural hazard. The model enables interoperability, i.e. exchanging of spatial data utilising the definitions of the four components (Table 5.1). The model defines specifications not only for vector data, but also for coverages (rasters):

- An “abstract spatial object type” (i.e. alphanumeric part) that contains the properties (attributes, or constraints) of the spatial object that are common both to its vector representation and to its coverage representation.
- A “vector spatial object type” that is generated from the abstract spatial object. It has the properties that are specific to vector representation, such as the definition of the geometry.
- A “coverage spatial object type” that is generated both from the abstract spatial object and a generic coverage spatial object type. It has the properties that are specific to coverage representation, such as the definition of the domain and the definition of the range.

Figure 5.3 further indicates the most important part of this common scheme for landslide databases. They fall under the component “observed event”, and their three spatial object types should have the following properties:

The “AbstractObservedEvent” spatial object type contains:

- An “INSPIRE identifier” (and eventual local identifier): a mandatory unique identifier attribute for each spatial object (see also 5.2.2). This identifier shall be maintained by the national or regional authority, and shall consist of two parts, the namespace and a local id. The namespace is to uniquely identify a national database where the identifier is registered, whereas the local id is to uniquely identify an object within this namespace. The pragmatic approach to making the INSPIRE identifier internationally unique is to add a prefix of the member state identifier along with a theme specific identifier for the namespace.
- A “type of hazard”: a property modelled with a “Natural Hazard Classification” data type. For a landslide database it will be “landslide” or a specific “landslide type”. More specific landslide classification can be always added since the Natural Hazard Classification is defined as extensible. Optionally a data provider has a possibility to share any other classification used to define a natural hazard. To demonstrate the use of more detailed classification of landslides (Varnes, 1978 and WP/WLI, 1990) a dedicated use case is described in the Annex 5 of the data specification document.
- The “name” of the event: a commonly known name of the observed event (such as the “Vajont” landslide that occurred in Northern Italy in 1963). This property is voidable which means that if information on the name exists it shall be provided. If on the other hand it does not exist in a data provider database it does not need to be provided.
- The “likelihood of occurrence”: an attribute identifying the chances of a past observed event to occur in the future. This property is again voidable.
- The “ValidFrom”: an attribute providing information on the date of the hazardous event (“9th October 1963” for the Vajont Landslide).
- The “ValidTo”: an attribute providing information on the ending date of the hazardous event (more common for floods and other natural hazards than for landslides).

The information about “exposed elements”, is either available from other INSPIRE spatial objects defined by other TWG (TWG Transport networks) or from the risk data providers themselves. The latter can share their own (often aggregated) information about exposed elements inside a risk zone.

The “ObservedEventVector” spatial object type has the geometry as mandatory. Its property includes also the magnitude, or intensity of the event as voidable attributes. It is modelled using the data type “Level or intensity”.

The “ObservedEventCoverage” spatial object type expresses the information on either the magnitude or intensity, or the likelihood of occurrence.

In the “AbstractObservedEvent” only attributes present in the application scheme are discussed. The above mentioned spatial object types and their attributes represent the minimal set of properties that are proposed to be included in the legislation. However, as mentioned before, Member States can decide to extent the application schema and include other information available in their national database too.

The coordinate reference system to be used for the vector or coverage spatial object type needs to have the European Terrestrial Reference System 1989 (ETRS89) as datum in areas within its geographical scope, and the International Terrestrial Reference System (ITRS) datum in areas that are outside the geographical scope of ETRS89.

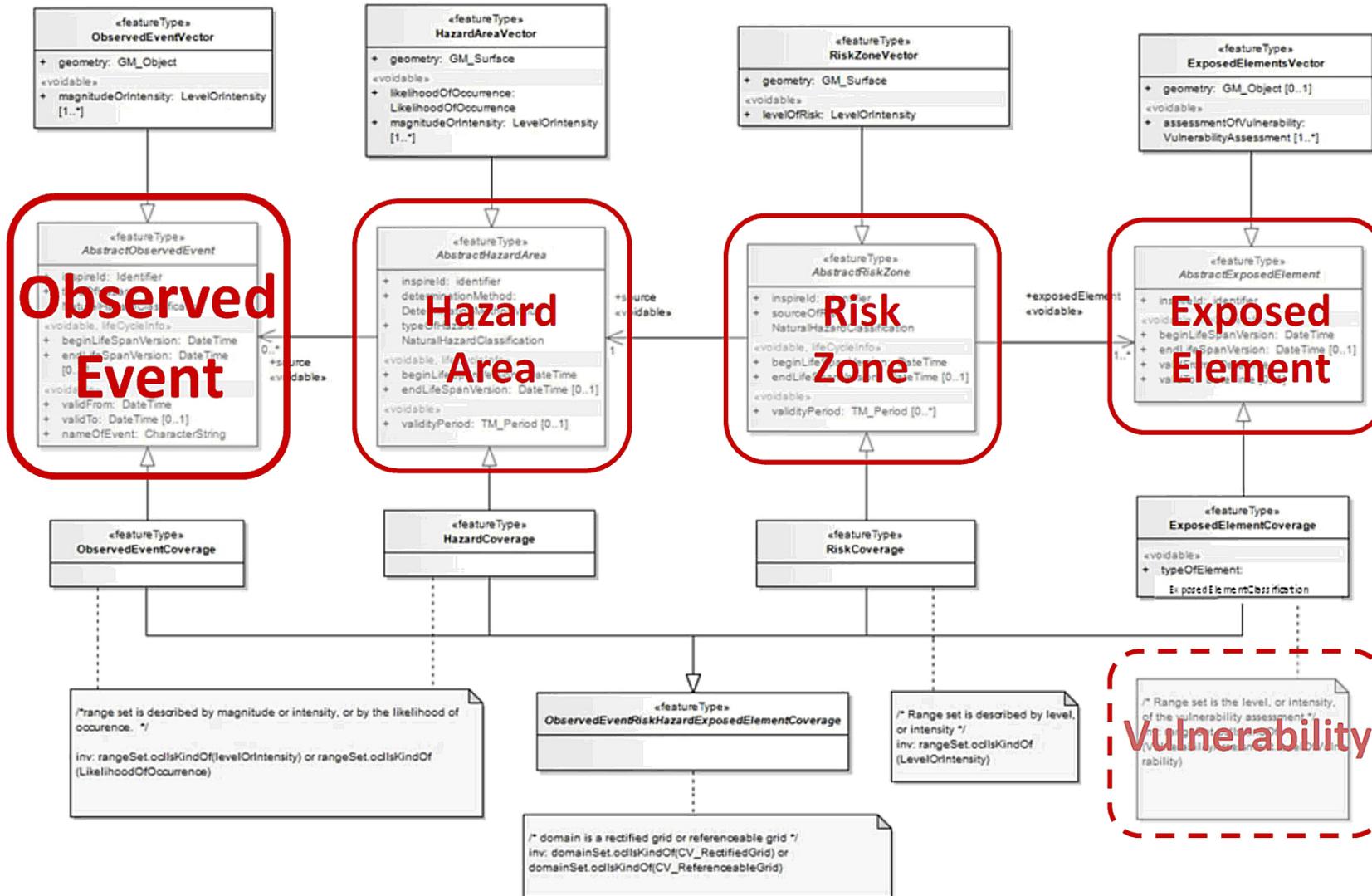


Figure 5.3: Natural Risk Zones application scheme / general model (version 3.0, 30/04/2012; after INSPIRE Thematic Working Group Natural Risk Zones, 2012). Readers are advised to check for eventual updated versions of this scheme on the INSPIRE webpage.

As landslide databases focus mainly on the Observed Events, data providers will utilise (provide data according to) the definition of the Observed Event spatial object types (both vector and raster). The other spatial data types as shown in Figure 5.3, the hazard area, risk zone and exposed elements will remain unused, unless the organisation is also responsible for maintaining the spatial datasets of these components. The annexes of the Natural Risk Zones data specifications contain some use cases of various natural hazards. As flood risk is significantly better and more precisely defined than other hazards, due to the development of the Flood Mapping Directive (2007/60/EC; EC, 2007b), the dedicated application schema was developed to demonstrate the extensibility of the core model to address specific requirements – in this case from the Flood Mapping Directive. For the natural hazards other than floods, use case descriptions demonstrate the complexity of the natural hazard/ risk domain. The use cases included in the data specification document were used to find the right balance – scope of the core Natural Risk Zones data model as well as to make suggestions for construction of more specific databases – applications. For example, the use case for landslides contains a list of attributes suggested necessary for landslide risk zoning.

Suggested landslide attributes are:

- Representative Location
- Shape
- Typical Movement Type
- Activity State
- Last Recorded Occurrence Time
- Recurrences
- Total Volume
- Causative Factor
- Triggering Factor

Suggested attributes regarding the damage caused by landslides are:

- Reported Cost
- Affected Entity Type
- Number Affected
- Report Date
- Damage Type
- Severity Code

These suggestions are in line with those made by the JRC European Landslide Expert Group (see above).

The Natural Risk Zones data specifications (Technical guidelines) (version 3.0rc1) further contain detailed information on the data quality requirements and on the data set level metadata. It is important to note that a chapter dedicated to data delivery (Portrayal) contains the list of layers and their definitions (name, composition of spatial object types) and, if available, their recommended styles. As mentioned before, data compliant to the INSPIRE data specification shall be made available through INSPIRE network services. So for instance it will become mandatory for landslide data providers to follow the naming and composition of the layers defined in the Portrayal chapter of the data specification.

The core model of the Nature Risk Zones data theme as well as some other parts of the data specification document (layer definitions, explicit requirements on data quality or metadata, etc.) will be legally binding. In the future, every national digital database on natural hazards should be interoperable (i.e. mapped following the Natural Risk Zones data specification model) through INSPIRE network services.

Our overview suggests that Member States with a digital national landslide database should not have problems to provide the Nature Risk Zones data model. More difficult might be to provide the obligatory “harmonised” information via INSPIRE network services. Currently only Andorra, Republic of Macedonia (not a member state), Spain and Switzerland (not a member state) do not have a digital landslide inventory map. However, as mentioned before, Spain and Switzerland should be able to produce one as the landslide coordinates are listed in the database. The same is true for true for Republic of Macedonia, which has a paper version of the inventory map. Our analysis also shows that in 2010 only three landslide databases, the ones from Czech Republic, Italy (IFFI) and Slovakia, were available through such web services (Fig. 4.22). The INSPIRE Directive does not oblige Member States to collect new data; however if in the future there is an activity related to the natural hazards and risk assessments the common INSPIRE data structure shall be used to increase interoperability of data related to the environment.

6 CONCLUSIONS AND RECOMMENDATIONS

6.1 CURRENT STATUS OF NATIONAL LANDSLIDE DATABASES

To have a first detailed overview of the availability and content of national landslide inventories in Europe, a questionnaire was sent to the competent persons in the institutes responsible for compilation and maintenance of the landslide databases in 37 EU member states, EU official candidate and potential candidate countries (except Turkey), and EFTA countries. As we received responses from 33 European countries our approach proved very successful. Currently already 22 countries have a national database (Fig. 4.1 and Table 4.1). Six other countries (i.e. Belgium, Croatia, Germany, Estonia, Romania and Serbia; Figs. 4.1 and 4.2 and Table 4.2) only have one or more regional databases. This can be due to the fact that creation and maintenance of landslide databases or landslide management (requiring a landslide database) is a regional responsibility, or to the fact that currently attention was paid to the most landslide affected areas only. We finally also collected and analysed information of representative regional databases in landslide-prone countries such as Italy, Austria, Portugal and Spain to compare with nation-wide databases.

Analysis of the returned questionnaires demonstrated that European national databases contained more than 633,000 landslides in Spring 2010. Two thirds are located in Italy, but also Austria, Czech Republic, France, Norway, Poland, Slovakia, and UK have more than 10,000 landslides in their databases. However, the total amount of landslides that have occurred in Europe is assumed to be more than twice this number as the completeness of most of the national databases is estimated to be lower than 50%. This incompleteness is mainly due to the fact that it is difficult, and perhaps not the objective of the database, to recognize all historical (inactive, dormant, abandoned, stabilized and relict) landslides. Apart from that, also the lack of resources and time, the surveyors' experience and the site characteristics influence the completeness of the database. A positive observation, on the other hand, is that 70% of the investigated databases are regularly updated; in most cases at least once a year or after a major event. Many of the remaining countries do not exclude updating their database if this appears necessary.

Several publications have mentioned that national landslide databases have various content, scale, language, format, structure and accessibility. However, this was never really proven in detail.

The variability in map scale and used symbology is true. Three countries with a national database, Andorra, Spain and Switzerland, currently do not have a landslide inventory map. However, for the latter two countries landslide coordinates are available in the database, which suggest that production of a (simplified) inventory map should be possible. All other countries produced a map at a scale ranging between 1:10,000 and 1:500,000 and showing landslides either as point features or closed polygons. Both symbols enable landslide zoning at regional and national scale. However, for more local analysis, accurate polygons are required.

The databases generally contain information on the landslide type, and on a limited or larger number of landslide morphometric characteristics and geo-environmental factors. There is indeed a large variety on the landslide types included in the databases, but we observed that for most databases it should be possible to classify the landslides in a limited number of types from the classification of Cruden and Varnes (1996; e.g. fall, flow and slide).

With regard to the landslide characteristics national landslide databases generally contain information on the length and width of the landslide and on its affected area. Information on landslide volume, necessary for magnitude-frequency relationships and hence for landslide hazard analysis is also available for 65% of the databases. The remaining countries could envisage the possibility of including information on landslide volume too.

For landslide susceptibility analysis on a regional, national or continental scale, landslide databases should not necessarily include detailed geo-environmental information of the landslide site, as this is generally extracted from thematic maps with a scale appropriate for that for which the analysis is being carried out. For more detailed local and site analysis, site-specific information, especially on topography, geology, and hydrogeology becomes more important.

Information on landslide history and activity, triggering factors and consequences, on the other hand, is scarce in most of the databases (i.e. completeness generally less than 25%), and this causes problems for hazard and risk studies. It could be advised to include also a qualitative estimate of landslide activity. Again it is suggested to use some of the classes defined by Cruden and Varnes (1996; e.g. active, reactivated, dormant, and relict).

6.2 USE OF NATIONAL DATABASES FOR HAZARD AND RISK ASSESSMENT

In Van Den Eeckhaut and Hervás (2012) the availability of information on the location, type, date and magnitude of past landslides, and damage caused in each national landslide database is used as criteria to categorize the national landslide databases according to their ability to provide susceptibility, hazard and risk assessments at the national scale. Important to note is that we only focus on the availability of the data specifically linked to the information in a landslide database, and we hypothesize that all other basic data sets needed, such as data on controlling factors and elements at risk, are present at an appropriate scale (i.e. scale of the inventory map or larger). The latter point is important because the scale of a certain landslide zoning is highly dependent on the scale at which both a landslide inventory map and required basic data sets are available. With regard to scale for landslide zoning, Eckelmann et al. (2006) recommend map scales between 1:1,000,000 and 1:250,000 for a continent-wide analysis, and Fell et al. (2008) specify map scales between 1:25,000 and 1:250,000 for more detailed regional and national zoning. We therefore suggest that a country with a national landslide inventory and ancillary maps produced at a scale smaller than 1:250,000 cannot provide realistic landslide hazard and risk zoning.

Figure 6.1 shows the flow chart used to categorize the national landslide inventories. From its definition it is clear that landslide susceptibility assessment requires information on location in the form of points or polygons, preferably in a database. It is also advisable to produce a susceptibility map for the major landslide types; therefore information on landslide type is needed as well. Consequently national landslide databases that meet these two requirements can assess national-scale landslide susceptibility on condition that maps of controlling factors are available at the optimal scale.

If these national landslide databases also contain information on dates (i.e. landslide history) and magnitude (i.e. volume) for a sufficient number of landslides, and if the scale of the inventory is not smaller than 1:250,000, national-scale landslide hazard assessment is also possible. It is assumed that information on dates has to be present for at least 25% of the reported landslides.

For landslide risk assessment, sufficient information on reported damage (qualitative and quantitative) should be present along with the four previous requirements. Again we set the threshold at 25% of the reported landslides, and it is assumed that nation-wide maps of elements at risk are available at the scale of the analysis.

The result of this classification of European countries according to possible landslide zoning is shown in Fig. 6.2. For Sweden only the SGI national landslide database was evaluated as the SMB national landslide database contains too few landslides. According to the criteria listed in Fig. 6.1, currently six countries have sufficient data for a nation-wide landslide risk assessment (i.e. Bosnia

Herzegovina, France, Hungary, Ireland, Italy (AVI) and Sweden). Furthermore, one country can do hazard assessment (Czech Republic) and 14 countries can only produce landslide susceptibility maps. For almost all these countries the lack of information on the dates of historical landslides hampers landslide hazard assessment. Greece is an exception here. Its national landslide database does contain sufficient landslides with information on their dates, but it does not include information on landslide volume or affected area (Table 4.7). Although Spain and Switzerland do not have landslide inventory maps, we also classified these two countries as being able to perform a susceptibility analysis because, as noted, the coordinates of landslides are available in the alphanumeric database. On the other hand, the absence of a landslide inventory map for Andorra hampers any kind of zoning. As mentioned already, the scale at which the analysis can be carried out will mainly depend on the scale at which the landslide inventory was produced and on the scale of the thematic data. For the Former Yugoslav Republic of Macedonia, Hungary, Ireland, Spain, Sweden and Switzerland, the quality of the final zonation maps will suffer from the rather limited number of landslides in the national landslide databases

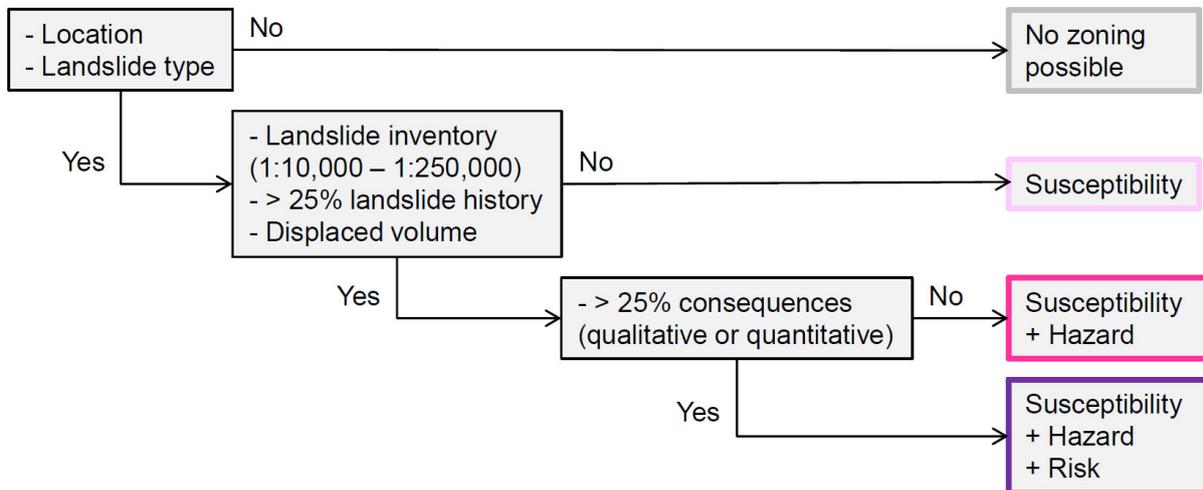


Figure 6.1: Process tree used for classification of national landslide databases according to their ability to perform landslide susceptibility, hazard or risk assessment. Attention is paid to the availability of the landslide data. It is assumed that other thematic information (e.g. controlling factors and elements at risk) needed for landslide zoning is available at the appropriate scale (after Van Den Eeckhaut and Hervás, 2012).

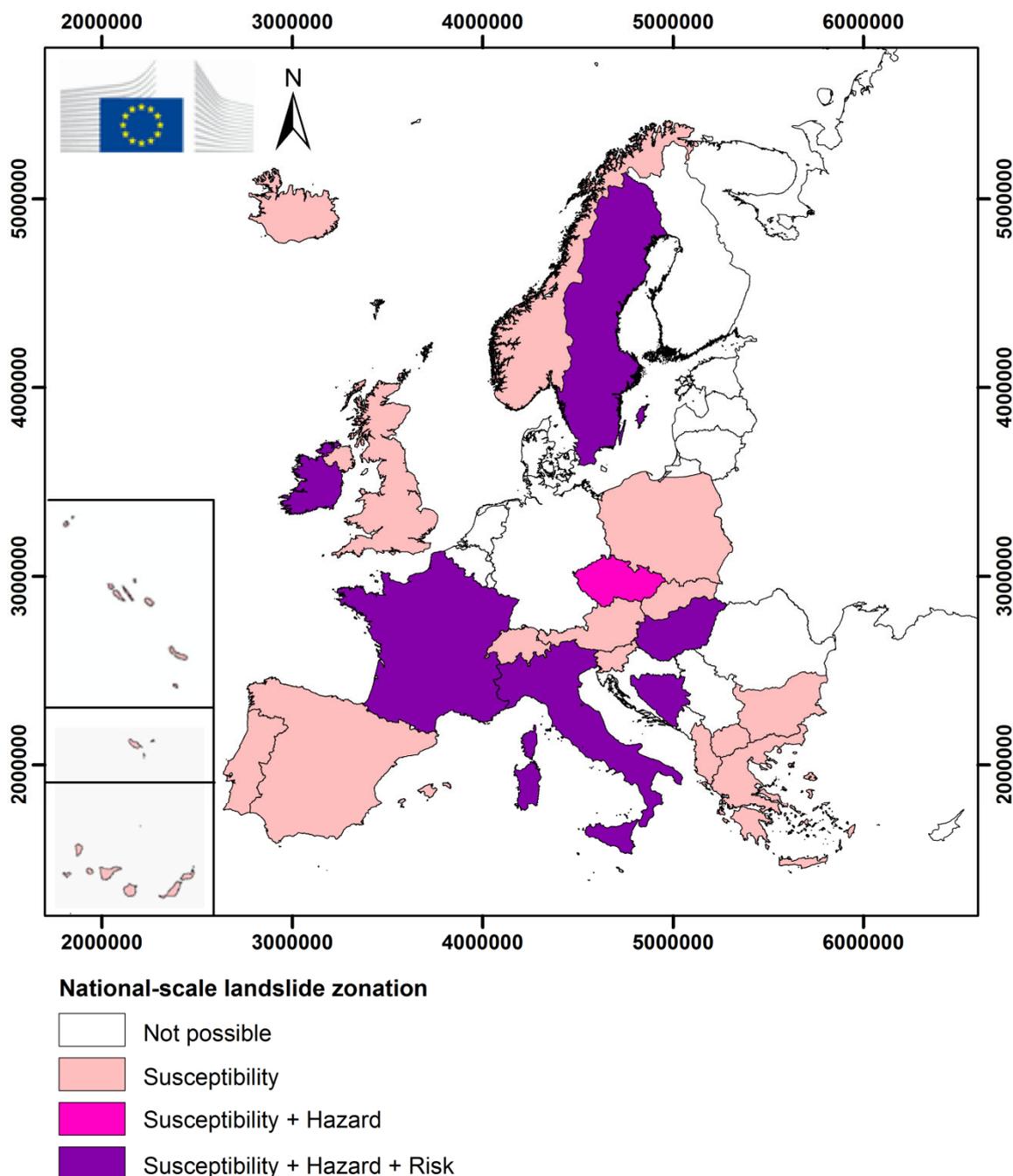


Figure 6.2: Possibility of European countries to perform national scale landslide susceptibility, hazard and risk assessments with the landslide information stored in the national landslide database using the criteria in Fig. 6.1. Canary, Madeira and Azores islands are shown in the bottom left inset.

6.3 EU POLICY AND RECOMMENDATIONS

In the near future, INSPIRE might help in overcoming the problem of variability in language, format, structure and accessibility of landslide databases. INSPIRE regulation and data specifications of Natural Risk Zones v3.0, including landslides (as defined in INSPIRE Thematic Working Group Natural Risk Zones, 2012), were presented in section 5.2. Since physical combination of all landslides in one harmonised European database is currently impossible, and probably not recommended, the

procedure followed by the INSPIRE regulation seems feasible. INSPIRE focuses on designing a framework or infrastructure to ensure that spatial data are stored, made available and maintained at the most appropriate level; that it is possible to combine spatial data and services from different sources across the Community in a consistent way and share them between several users and applications; that it is possible for spatial data collected at one level of public authority to be shared between all the different levels of public authorities; that spatial data and services are made available under conditions that do not restrict their extensive use; and that it is easy to discover available spatial data, to evaluate their fitness for purpose and to know the conditions applicable to their use. Each member state transposing the directive should create and maintain this infrastructure, including detailed general schemes (Fig 5.3) on natural risk zones such as landslides, and share it with other public authorities in EU member states. This should increase interoperability and accessibility of spatial landslide information, including a limited set of features (i.e. mandatory are a digital landslide inventory map, a landslide INSPIRE identifier and the hazard type, while landslide history can be included if available) among member states. The general scheme or conceptual model itself will be in English, but feature catalogues are envisaged to be multilingual, so it should be possible to translate the limited set of features in a national landslide database from one language into another one. It can be concluded that the limited information to be included in the general model as defined by INSPIRE regulation will probably allow quantitative landslide susceptibility modelling at a European scale. For landslide hazard and risk modelling, however, more datasets regarding landslides are needed. This is also clear from Figure 6.1.

In contrast to INSPIRE regulation that will soon have some specifications for digital landslide databases, the EU Thematic Strategy for Soil Protection currently does not have legally binding regulations for landslide databases, because its associated legislative proposal for a Soil Framework Directive is still not approved. According to the current proposal, identification of risk zones will be required. For this, landslide information from the EU countries will be necessary. Therefore, the Soil Information Working Group (SIWG) of the European Soil Bureau Network (ESBN) developed a set of “common criteria” (i.e. occurrence/density of existing landslides along with a set of conditioning and triggering factors) to identify these risk areas (Eckelmann et al., 2006) and they suggested using a nested geographical approach based on “Tiers”. As currently no harmonised landslide databases are available throughout Europe, the European Landslide Expert Group recommended carrying out a pan-European landslide inventory by reviewing the data already available and including at least information on the location and type of historical landslides, but if possible also on date of occurrence, surface extent and direct impact (Hervás et al., 2007). The minimum suggested information would then allow creation of a European landslide susceptibility map.

Hence, these preliminary recommendations of INSPIRE and the recommendation proposed by the European Landslide Expert Group are more or less in agreement. In both cases, a limited mandatory set of information to be included in the database is defined, while other information can be provided too. In both cases the minimum set of information allows assessment of landslide susceptibility, but not of hazard and risk.

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ANNEX A: QUESTIONNAIRE

The SafeLand project

SafeLand is a Large-scale integrating Collaborative research project funded by The Seventh Framework Programme for research and technological development (FP7) of the European Commission. The project team is composed of 25 institutions from 13 European countries. More information can be found on <http://www.safeland-fp7.eu/Introduction.html>.

SafeLand will develop generic quantitative risk assessment and management tools and strategies for landslides at local, regional and European scales and establish the baseline for the risk associated with landslides in Europe, to improve the ability to forecast landslide hazard and detect hazard and risk zones. Part of the research focuses on reviewing existing landslide databases and proposing improvements for delineating areas at risk in agreement with the EU Soil Thematic Strategy and its associated Proposal for a Soil Framework Directive, and for achieving interoperability and harmonization in agreement with the INSPIRE European Directive.

What we would like to know from you

This questionnaire has been sent to you to survey the current situation of landslide databases in your country. Given that the SafeLand project focuses on landslide risk assessment, there is a need to know which landslide databases currently contain the information required for quantitative landslide hazard and risk assessment (i.e. type, location, timing of landslide and, if possible, impact / damage). Based on the results of this questionnaire, options for harmonization of landslide databases for quantitative landslide hazard and risk assessment in the EU will be suggested. Hence, it is very important to have a representative coverage of Europe.

For each country we contact SafeLand project partners of that country and we ask them to fill the questionnaire themselves (if they are able to do it) and/or to distribute the questionnaire to the competent persons in their country or in a neighbouring country they collaborate with. In case contacted persons do not speak English, we ask the project partners to help them filling in the questionnaire or to translate the questionnaire.

This questionnaire

The questionnaire consists of 10 short sections and it will take approximately 45 minutes to complete it. A short glossary can be found at the end of this document. We ask you to return this questionnaire to the SafeLand project partner from your country from whom you received it or to us if we directly sent it to you. If, for any reason, you are unable to send it to the project partner of your country, please send the questionnaire back to us via E-mail or via postal mail (see below). We kindly request you to return the questionnaire before May 15, 2010. For questions regarding this questionnaire please send an E-mail to miet.van-den-eeckhaut@jrc.ec.europa.eu with contact details.

Contact persons and contact address

Javier Hervás (javier.hervas@jrc.ec.europa.eu) and Miet Van Den Eeckhaut (miet.van-den-eeckhaut@jrc.ec.europa.eu)

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QUESTIONNAIRE

1. Contact information

Your Name:

Telephone number:

E-mail address:

Institute / Governmental body / company:

Address:

Country:

2. Database availability

Is there a landslide database available for your country?

Yes, we have / are preparing a national landslide database. *Please continue answering the questionnaire.*

Yes, we have / are preparing (a) regional landslide database(s). *Please continue answering the questionnaire.*

No, we do not have / are not preparing a national or regional landslide database. *In this case, you are not able to fill in the questionnaire. We thank you for your collaboration.*

Note: If you can provide information or are responsible for more than one landslide database, please fill in this questionnaire for each of the databases.

3. General information of landslide database

Name of the country / region for which the database is prepared	
Official name of the database	
Approximate area covered by the database (km ²)	
Which institute owns the database? Who is the contact person?	
Which institute produced the database?	
Is the landslide database an official * document?	<input type="checkbox"/> Yes, it is a regulatory/compulsory document indicated by force in a law? <input type="checkbox"/> Yes, but it is not a regulatory/compulsory document indicated by force in a law? <input type="checkbox"/> No
Which language is used in the database?	
When was the database first created?	
When was the database last updated?	
What is the recurrence for updating the database?	<input type="checkbox"/> Original database is not updated <input type="checkbox"/> Database is updated after a major landslide triggering event <input type="checkbox"/> Database is updated each year <input type="checkbox"/> Other:
What is the time period of landslide events covered by the database?	
Does the database contains features other than landslides? (e.g.** floods, sinkholes, avalanches)	<input type="checkbox"/> Yes, please specify <input type="checkbox"/> No
How many landslides (active, dormant and relict) are currently included in the database?	
What is the completeness of the database (estimate in %)?	<input type="checkbox"/> < 25% of the existing landslides <input type="checkbox"/> 25 - 50 % of the landslides <input type="checkbox"/> 50 - 75% of the landslides <input type="checkbox"/> > 75% of the landslides

* Official: document made by a government entity, such as a ministry, a mapping agency, the army or other, regardless of their possible availability to the public or their possible use only for internal purposes

** e.g.: example given

QUESTIONNAIRE

4. Content of landslide database

What type of information is available? (1/2) (For each type of information, the second column can only be filled in if information in first column is available)	
<input type="checkbox"/> Landslide inventory map	<p>What is the scale? What is the reference coordinate system? Is there information on the positional accuracy? <input type="checkbox"/> yes / <input type="checkbox"/> no / <input type="checkbox"/> I don't know If yes, please explain How are landslides represented on the map? <input type="checkbox"/> Point <input type="checkbox"/> Line <input type="checkbox"/> Closed polygon <input type="checkbox"/> Combination of points, lines and polygons (depending on landslide size and mapping/visualisation scale) <input type="checkbox"/> Other: How was this map produced? (Please indicate all techniques used) <input type="checkbox"/> Field survey <input type="checkbox"/> Historical documents (e.g. newspapers, technical reports, scientific papers, parish chronicles) <input type="checkbox"/> Aerial photograph interpretation <input type="checkbox"/> LiDAR (Light Detection and Ranging) derived images <input type="checkbox"/> Satellite remote sensing <input type="checkbox"/> Airborne remote sensing, other than aerial photos and LiDAR <input type="checkbox"/> Other:</p>
<input type="checkbox"/> Landslide location	<p>How is landslide location reported in the database? (More than one category can be selected) <input type="checkbox"/> Coordinates <input type="checkbox"/> Municipality <input type="checkbox"/> Province / County <input type="checkbox"/> Other:</p>
<input type="checkbox"/> Type of landslide	<p>Which landslide classification is used? (e.g. Cruden and Varnes, 1996) Which landslide types are distinguished?</p>
<input type="checkbox"/> Landslide dimension	<input type="checkbox"/> Displaced volume <input type="checkbox"/> Affected area <input type="checkbox"/> Length <input type="checkbox"/> Width <input type="checkbox"/> Travel angle (i.e. Length / Height) <input type="checkbox"/> Height (from top to toe) <input type="checkbox"/> Depth of surface of rupture <input type="checkbox"/> Other:

LANDSLIDE INVENTORIES IN EUROPE

What type of information is available? (2/2) (For each type of information, the second column can only be filled in if information in first column is available)	
<input type="checkbox"/> Geo-environmental characteristics at landslide site	<input type="checkbox"/> Lithology and / or structure <input type="checkbox"/> Hydrogeology (e.g. presence of springs and/or ponds) <input type="checkbox"/> Land use <input type="checkbox"/> Slope gradient <input type="checkbox"/> Slope aspect <input type="checkbox"/> Slope curvature <input type="checkbox"/> Other:
<input type="checkbox"/> Triggering event or cause of landslide	Triggering factor is included for <input type="checkbox"/> None of the inventoried landslides <input type="checkbox"/> < 25% of the landslides <input type="checkbox"/> 25 - 50 % of the landslides <input type="checkbox"/> 50 - 75% of the landslides <input type="checkbox"/> > 75% of the landslides
<input type="checkbox"/> Landslide date / history	<input type="checkbox"/> Information on initiation date <input type="checkbox"/> Information on reactivation date(s) (e.g. for old landslides) <input type="checkbox"/> Information on initiation and reactivation dates (Multi-temporal information) Landslide history is available for <input type="checkbox"/> None of the inventoried landslides <input type="checkbox"/> < 25% of the landslides <input type="checkbox"/> 25 - 50 % of the landslides <input type="checkbox"/> 50 - 75% of the landslides <input type="checkbox"/> > 75% of the landslides
<input type="checkbox"/> Landslide activity	Which activity classes are distinguished (e.g. active, reactivated, suspended, dormant, relict, inactive)?
<input type="checkbox"/> Consequences (i.e. victims and estimate of damage)	Consequences are included for <input type="checkbox"/> None of the inventoried landslides <input type="checkbox"/> < 25% of the landslides <input type="checkbox"/> 25 - 50 % of the landslides <input type="checkbox"/> 50 - 75% of the landslides <input type="checkbox"/> > 75% of the landslides If included, please specify how landslide damage is described (e.g. very detailed description with monetary value of damage and/or reparation cost)
<input type="checkbox"/> Other:	<input type="checkbox"/> Photographs <input type="checkbox"/> Monitoring data or physical properties from field and/or laboratory tests (even if locally for a limited number of landslides only). Please specify : <input type="checkbox"/> Bibliographic references (e.g. historical documents, reports or scientific papers) <input type="checkbox"/> Other:

QUESTIONNAIRE

5. Format of landslide database

In which format is the database currently available?	<input type="checkbox"/> Digital, a spatial database in a GIS <input type="checkbox"/> Digital, an alphanumeric database <input type="checkbox"/> Digital, a spatial database in a GIS linked to an alphanumeric database (i.e. relational database) <input type="checkbox"/> Other digital: <input type="checkbox"/> Paper
If digital, which spatial software is used?	<input type="checkbox"/> ArcGIS <input type="checkbox"/> Other GIS:
If digital, which alphanumeric software is used?	<input type="checkbox"/> Oracle <input type="checkbox"/> Microsoft Access <input type="checkbox"/> Other software:
If paper, which type of document is available?	<input type="checkbox"/> Datasheets <input type="checkbox"/> Maps

6. Conditions to access and use of landslide database

The landslide database is accessible to?	<input type="checkbox"/> General public <input type="checkbox"/> Administration <input type="checkbox"/> Scientific purposes <input type="checkbox"/> Other:
The landslide database (It is possible to indicate two boxes; i.e. one for accessibility and one for use)	<input type="checkbox"/> Is accessible for consultation only (not downloadable) <input type="checkbox"/> Is downloadable free of charge under any condition <input type="checkbox"/> Is downloadable by paying <input type="checkbox"/> Can be used without special conditions <input type="checkbox"/> Can be used under certain conditions only <input type="checkbox"/> I don't know
Please (if existing) list the weblink to the landslide database.	

7. Information related to INSPIRE

INSPIRE is an EU directive to establish an infrastructure for spatial information in Europe that will help to make spatial or geographical information more accessible and interoperable for a wide range of purposes supporting sustainable development (<http://inspire.jrc.ec.europa.eu>).

In the beginning of November 2009, a call for Expression of Interest for participation in the development of INSPIRE data specifications for Annex II & III Data Themes was launched (<http://inspire.jrc.ec.europa.eu/index.cfm/pageid/2>). One of Annex III Data Themes considers “Natural risk zones”, among which landslides. Hence, in the near future implementing rules laying down technical arrangements for interoperability and harmonisation of landslide databases will be developed.

(If this is the responsibility of somebody else in your institute or organisation, please contact him/her for helping you answer these questions.)

<p>Is the metadata of the landslide database complying with INSPIRE metadata regulations? (http://inspire.jrc.ec.europa.eu/index.cfm/pageid/101)</p>	<p><input type="checkbox"/> Yes <input type="checkbox"/> I don't know <input type="checkbox"/> No</p>
<p>Is the landslide database provided through / stored in a network following the INSPIRE network services (e.g. viewing, discovering, downloading)? (http://inspire.jrc.ec.europa.eu/index.cfm/pageid/5)</p>	<p><input type="checkbox"/> Yes <input type="checkbox"/> I don't know <input type="checkbox"/> No</p>
<p>Is your institute currently registered as an INSPIRE stakeholder?</p>	<p><input type="checkbox"/> Yes, as Legally Mandated Organisation (LMO*) <input type="checkbox"/> Yes, as Spatial Data Interest Community (SDIC*) <input type="checkbox"/> I don't know <input type="checkbox"/> No</p>
<p>Is your institute willing to register as an INSPIRE stakeholder?</p>	<p><input type="checkbox"/> Yes, as Legally Mandated Organisation (LMO*) <input type="checkbox"/> Yes, as Spatial Data Interest Community (SDIC*) <input type="checkbox"/> I don't know <input type="checkbox"/> No</p>
<p>Is your organization willing to participate in the real testing or reviewing of a draft of the INSPIRE Data Specifications related to the spatial data theme “Natural Risk Zones” when it is developed by the Thematic Working Group?</p>	<p><input type="checkbox"/> Yes <input type="checkbox"/> I don't know <input type="checkbox"/> No</p>

* SDICs typically are networks of data producers, transformers and users, whereas LMOs are responsible in the Member States for one or more components of the INSPIRE Directive (http://inspire.jrc.ec.europa.eu/documents/Data_Specifications/INSPIRE_DataSpec_ToR_AnnexII_III.pdf)

8. Availability of other databases for landslide hazard and risk assessment

The European Commission Proposal for a Framework Directive for the protection of soil has identified several factors ('common criteria or elements') that can be used for landslide hazard assessment. Please indicate which information is available in your country.

(Please note that another element, namely the occurrence/density of existing landslides, was already the main object of previous questions).

Common Criteria Landslides	Map available	Only point data available	Map scale	Spatial resolution	Date	Official name of map/database and reference
Topography	<input type="checkbox"/> Yes, please specify: <input type="checkbox"/> digital / <input type="checkbox"/> paper					
Lithology	<input type="checkbox"/> Yes, please specify: <input type="checkbox"/> digital / <input type="checkbox"/> paper					
Soil properties	<input type="checkbox"/> Yes, please specify: <input type="checkbox"/> digital / <input type="checkbox"/> paper					
Land cover	<input type="checkbox"/> Yes, please specify: <input type="checkbox"/> digital / <input type="checkbox"/> paper					
Land use (including land management, farming systems and forestry)	<input type="checkbox"/> Yes, please specify: <input type="checkbox"/> digital / <input type="checkbox"/> paper					
Climate						
Precipitation (liquid/solid)	<input type="checkbox"/> Yes, please specify: <input type="checkbox"/> digital / <input type="checkbox"/> paper	<input type="checkbox"/>				
Temperature	<input type="checkbox"/> Yes, please specify: <input type="checkbox"/> digital / <input type="checkbox"/> paper	<input type="checkbox"/>				
Other:	<input type="checkbox"/> Yes, please specify: <input type="checkbox"/> digital / <input type="checkbox"/> paper	<input type="checkbox"/>				
Other:	<input type="checkbox"/> Yes, please specify: <input type="checkbox"/> digital / <input type="checkbox"/> paper	<input type="checkbox"/>				
Seismicity						
Magnitude	<input type="checkbox"/> Yes, please specify: <input type="checkbox"/> digital / <input type="checkbox"/> paper	<input type="checkbox"/>				
Intensity	<input type="checkbox"/> Yes, please specify: <input type="checkbox"/> digital / <input type="checkbox"/> paper	<input type="checkbox"/>				
Peak ground acceleration	<input type="checkbox"/> Yes, please specify: <input type="checkbox"/> digital / <input type="checkbox"/> paper	<input type="checkbox"/>				
Other:	<input type="checkbox"/> Yes, please specify: <input type="checkbox"/> digital / <input type="checkbox"/> paper	<input type="checkbox"/>				
Other:	<input type="checkbox"/> Yes, please specify: <input type="checkbox"/> digital / <input type="checkbox"/> paper	<input type="checkbox"/>				

For landslide risk assessment additional information is necessary. Please indicate which information is available.

Common Criteria Landslides	
<input type="checkbox"/> Elements at risk (buildings, engineering works, economic activities, public services utilities, infrastructure and environmental features)	<input type="checkbox"/> Digital map is available or the map can be produced by linking the data to a location (e.g. municipality) in a GIS - Spatial resolution: - Map scale: - Date: - Official name and reference:
<input type="checkbox"/> Population data (absolute number and population density)	<input type="checkbox"/> Digital map is available or the map can be produced by linking the data to a location (e.g. individual building, municipality) in a GIS - Spatial resolution: - Map scale: - Administrative level for which data is available <ul style="list-style-type: none"> <input type="checkbox"/> Country <input type="checkbox"/> Province or County <input type="checkbox"/> Municipality <input type="checkbox"/> Quarters within municipalities <input type="checkbox"/> Street <input type="checkbox"/> Individual buildings <input type="checkbox"/> Other: - Date: - Official name and reference:

9. Additional information

- Please send us, together with the filled-in questionnaire, an example of a database sheet or attribute table and an excerpt of the landslide inventory map (with legend).
- Please provide us additional information that, according to your experience, could be useful for the overview of European landslide databases. (e.g. Please mention if the landslide database is restricted to a specific type of landslides, to active or recent landslides, or to landslides causing significant damage, and hence pays less attention to inventorying other types of landslides)

10. Glossary

(Glade et al., 2005; Fell et al., 2008)⁴

Consequence – The outcomes or potential outcomes arising from the occurrence of a landslide expressed qualitatively or quantitatively, in terms of loss, disadvantage or gain, damage, injury or loss of life. In other words, the effects usually (but not always) negative or adverse resulting from hazard. Negative consequences may be referred to as losses or costs involving both economic and non-economic values.

Elements at risk – The population, buildings and engineering works, economic activities, public services utilities, infrastructure and environmental features in the area potentially affected by landslides.

Landslide hazard – (Not to be confused with landslide susceptibility) The probability of occurrence of a potentially damaging landslide with a certain magnitude within a specified period of time and within a given area. The description of landslide hazard should include information on the location, the period of time and the magnitude (i.e. volume or area, velocity) of the event. In other words, the probability of a landslide occurring in a unit of time. This probability varies with the magnitude of the event.

Landslide inventory – Information of the location, classification, volume, activity and date of occurrence of landslides.

Landslide risk – A measure of the probability and severity of an adverse effect (a landslide) to health, property or the environment (i.e. the elements at risk). In other words, it is the expected degree of loss due to a landslide with a certain magnitude within a specified period of time and within a given area.

⁴ Fell, R., Corominas, J., Bonnard, C., Cascini, L., Leroi, E. and Savage, W.Z. on behalf of the JTC-1 Joint Technical Committee on Landslides and Engineered Slopes, 2008. Guidelines for landslide susceptibility, hazard and risk zoning for land use planning. *Engineering Geology* 102, 85-98.

Glade, T, Anderson, M.G. and Crozier, M.J. (Eds.), 2005. *Landslide Hazard and Risk*. Wiley, Chichester.

ANNEX B: DETAILED DATASHEET FOR EACH NATIONAL LANDSLIDE DATABASE

This annex shows the responses on the questionnaire (Annex A) for each national landslide database in the survey. This data was mainly collected between spring and autumn of 2010. Afterwards a limited number of updates were made (e.g. for Poland and Portugal in 2011).

This annex further includes selected extracts of the national landslide databases sent by the contact persons or taken from the publically accessible website interface. These extracts are not provided for all European countries.

ALBANIA: Landslide Database

Name of contact person	Mimoza Jusufati,	Albert Avxhiu
Telephone number	+355 (0) 684045752	++ 355 (0) 684045601
E-mail	Jusufati2000@yahoo.com	aavxhi@yahoo.com
Institute	Albanian Geological Survey	
Address	Rr.Kavajes, Nr.153, Tirane	
Official name of database	Landslide database	
Owner of database	Albanian Geological Survey	
Contact person	Mimoza Jusufati, Albert Avxhiu	
Producer of database	Albanian Geological Survey	
Website	/	

Approximate area covered (km ²)	1000	
Official document	Yes, regulatory	No
	Yes, but not regulatory	
Language	Albanian	
First creation date	2008 - in progress	
Last update	In progress	
Recurrence for updating	<input type="checkbox"/> Not updated <input type="checkbox"/> After major event <input checked="" type="checkbox"/> Every year <input type="checkbox"/> < 6 months <input type="checkbox"/> Other	
Time period of landslide events covered	2000 - 2009	
Other features than landslides in database	Yes	No
Number of landslides	210	
Completeness of the database (estimate)	<input checked="" type="checkbox"/> <25% <input type="checkbox"/> 25-50%	<input type="checkbox"/> 50-75% <input type="checkbox"/> >75%
Landslide inventory map		
Scale	1:25,000	
Reference coordinate system	Pulkovo 1942 Gauss Kruger Zone 4	
Information on the positional accuracy	Yes, accuracy of GPS	No
	Don't know	
Landslides representation	<input checked="" type="checkbox"/> Point <input type="checkbox"/> Line <input type="checkbox"/> Closed polygon <input type="checkbox"/> Combination of points, lines and polygons <input type="checkbox"/> Other	
Production method	<input checked="" type="checkbox"/> Field survey <input type="checkbox"/> Historical documents <input type="checkbox"/> Aerial photographs <input type="checkbox"/> LiDAR derivatives <input type="checkbox"/> Satellite remote sensing <input type="checkbox"/> Airborne remote sensing * <input type="checkbox"/> Other	
Representation of landslide location	<input checked="" type="checkbox"/> Coordinates <input checked="" type="checkbox"/> Municipality <input checked="" type="checkbox"/> Province/county <input type="checkbox"/> Other	
Landslide classification	Yes	No
	Agreement with Cruden and Varnes (1996)	
Landslide types	Rock fall, rotational slide, translational slide	
Landslide dimension	<input checked="" type="checkbox"/> Displaced volume <input checked="" type="checkbox"/> Affected area <input checked="" type="checkbox"/> Length <input checked="" type="checkbox"/> Width <input checked="" type="checkbox"/> Travel angle <input type="checkbox"/> Height (from top to toe) <input type="checkbox"/> Depth of surface of rupture <input type="checkbox"/> Other	
Geo-environmental characteristics	<input checked="" type="checkbox"/> Lithology <input checked="" type="checkbox"/> Hydrogeology <input checked="" type="checkbox"/> Land use <input checked="" type="checkbox"/> Slope gradient <input type="checkbox"/> Slope aspect <input type="checkbox"/> Slope curvature <input type="checkbox"/> Other	

LANDSLIDE INVENTORIES IN EUROPE

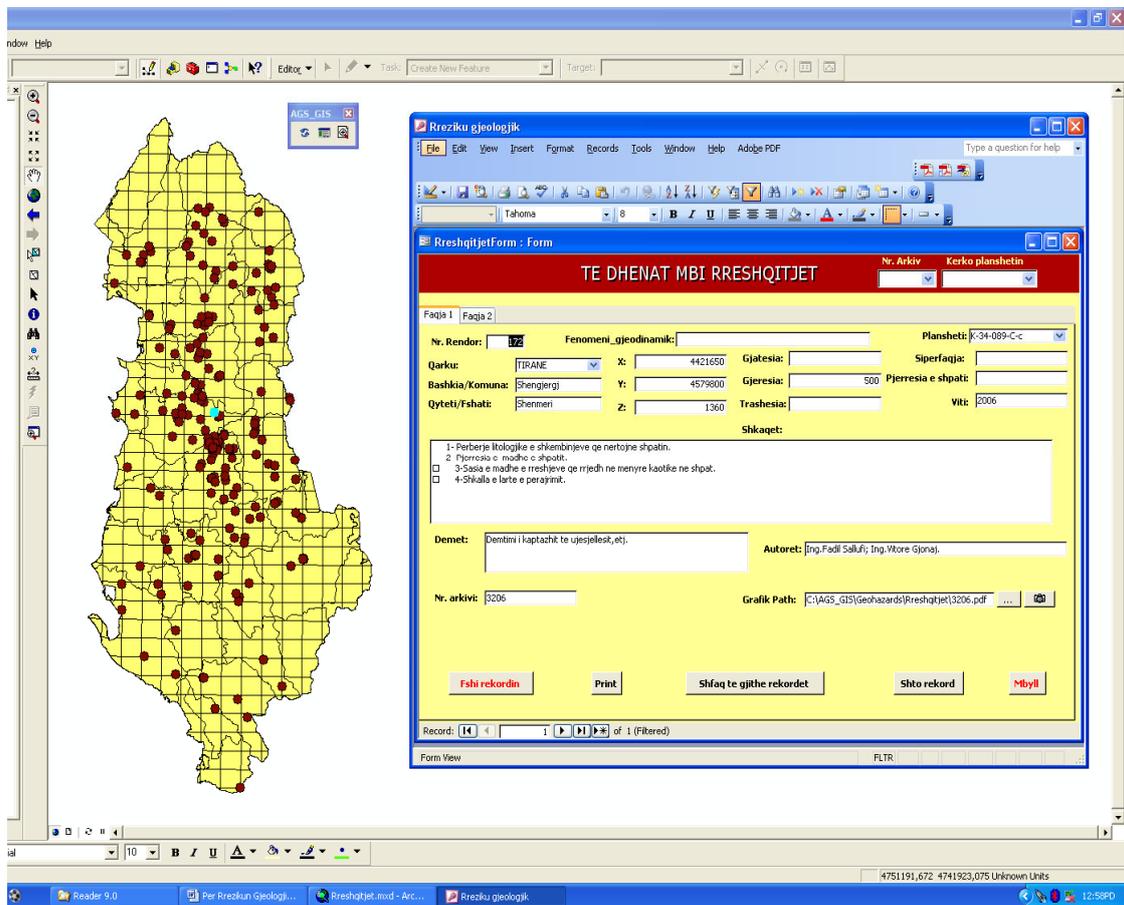
Completeness of triggering factor	<input type="checkbox"/> 0% <input type="checkbox"/> 0-25% <input type="checkbox"/> 25-50%	<input type="checkbox"/> 50-75% <input checked="" type="checkbox"/> >75%
Landslide data/history	Yes	No
Initiation date	Yes	No
Initiation and reactivation dates	Yes	No
Completeness	<input checked="" type="checkbox"/> 0% <input type="checkbox"/> 0-25% <input type="checkbox"/> 25-50%	<input type="checkbox"/> 50-75% <input type="checkbox"/> >75%
Landslide activity	Yes	No
Activity classes	Active, inactive, reactivated	
Consequences	Yes	No
Completeness	<input type="checkbox"/> 0% <input type="checkbox"/> 0-25% <input type="checkbox"/> 25-50%	<input type="checkbox"/> 50-75% <input checked="" type="checkbox"/> >75%
Other information	<input checked="" type="checkbox"/> Photographs <input checked="" type="checkbox"/> Monitoring data or physical properties <input checked="" type="checkbox"/> Bibliographic references <input type="checkbox"/> Other	

Format	<input type="checkbox"/> Digital, spatial database <input type="checkbox"/> Digital, alphanumeric database <input checked="" type="checkbox"/> Digital, linked spatial and alphanumeric database <input type="checkbox"/> Digital, other <input type="checkbox"/> Paper
Spatial software	<input checked="" type="checkbox"/> ArcGIS <input type="checkbox"/> Other
Alphanumeric software	<input type="checkbox"/> Oracle <input checked="" type="checkbox"/> Microsoft Access <input type="checkbox"/> Other
Type of paper document	<input type="checkbox"/> Datasheets <input checked="" type="checkbox"/> Map
Accessibility	<input type="checkbox"/> General public <input checked="" type="checkbox"/> Administration <input checked="" type="checkbox"/> Scientific purposes <input type="checkbox"/> Other
Use	<input type="checkbox"/> For consultation only <input type="checkbox"/> Free of charge under any condition <input type="checkbox"/> After payment <input type="checkbox"/> Without special conditions <input checked="" type="checkbox"/> Under special conditions <input type="checkbox"/> I do not know

Database metadata complying with INSPIRE metadata regulations	Yes	No
	I do not know	
Database provided through/stored in a network following the INSPIRE network services	Yes	No
	I do not know	
Institute registered as an INSPIRE stakeholder	<input type="checkbox"/> LMO <input type="checkbox"/> SDIC <input type="checkbox"/> I do not know <input checked="" type="checkbox"/> No	
Institute willing to register as an INSPIRE stakeholder	<input type="checkbox"/> LMO <input type="checkbox"/> SDIC <input type="checkbox"/> I do not know <input checked="" type="checkbox"/> No	
Organization willing to participate in the real testing or reviewing of a draft of the INSPIRE Data Specifications related to the spatial data theme "Natural Risk Zones" when it is developed by the Thematic Working Group	Yes	No
	I do not know	

DETAILED DATASHEET FOR EACH NATIONAL LANDSLIDE DATABASE

Screenshot of the landslide inventory map and linked datasheet of Albanian Geological Survey's landslide database.



Excerpts of the natural hazards database of Andorra (Base de dades de riscos naturals d'Andorra) in Microsoft Access
 (http://www.cenma.ad/mbaseriscos.htm, http://www.wg3.mongrafic.net/index.asp?id=103; under construction in July 2012).

Microsoft Access - [Riscos : Form]

cenma IEA
 Centre d'estudis de la neu i de la neuergènia d'Andorra

BASE DE DADES RISCOS NATURALS D'ANDORRA

Titular: Noticiari

Titular 2:

Data: 01 March 1935 Períodic:

Data del risc: Andorra Agrícola

Risc: Esllavissament Fenomen: Natural

Tamany noticia: 2 pàgines Parròquia: La Massana

Tipus noticia: directe Mida del risc: puntual

Localització: Carretera de la Massana, prop del poblet del Fui

DANYS

Núm ferits: 0

Núm morts: 0

Danys materials: Carretera tallada uns quants dies

COMENTARIS

Caigué una esllavissada imponent prop del poblet de Fui a la carretera de la Massana. Fou motiu que per uns quants dies restés la carretera interceptada.

Microsoft Access - [Recull de notícies : Table]

Períodic	Parròquia	Tamany de la notícia	Data del risc	Risc	Fenomen	Tipus noticia	Localització	Tamany del risc	Núm ferits	Núm morts	Danys material	Comentaris
El Periòdic d'Ando	Encamp	Un quart de pàgina		Moviment del terreny	Natural	associada	Zona del Pedral	puntual	0	0	Esquerdas en v	Els veïns del P
Informacions	Encamp	Molt breu		Moviment del terreny	Natural	associada	Zona del Pedral	puntual	0	0	Importants esq	Els veïns de l'e
Dian d'Andorra	La Massana	Mitja pàgina		Moviment del terreny	Antròpic	associada	Bordes a la car	puntual	0	0	Bordes molt da	El Tribunal de E
Dian d'Andorra	Encamp	Mitja pàgina		Moviment del terreny	Natural	associada	Zona del Pedral	puntual	0	0	Grans esquerde	Els veïns de l'e
Dian d'Andorra	La Massana	Tota la pàgina		Moviment del terreny	Antròpic	directe	Set bordes a la	puntual	0	0	28 persones af	Set famílies s'h
Poble Andorrà	La Massana	Tota la pàgina		Moviment del terreny	Antròpic	associada	Set bordes a la	puntual	0	0	20 veïns desall	Se celebrarà l'a
Dian d'Andorra	Andorra la Vella	Tota la pàgina		Moviment del terreny	Antròpic	directe	Un edifici del c	puntual	0	0	Fonaments gre	Les obres de c
Dian d'Andorra	Encamp	Mitja pàgina		Moviment del terreny	Natural	associada	Zona del Pedral	puntual	0	0	Nombroses esc	Un dels promot
Dian d'Andorra	Encamp	Portada		Moviment del terreny	Natural	associada	Zona del Pedral	puntual	0	0	Cost de les obr	Els veïns de l'e
Poble Andorrà	La Massana	Mitja pàgina		Moviment del terreny	Antròpic	associada	Set bordes a la	puntual	0	0	Greus desperfe	Cinc mesos de
Dian d'Andorra	Encamp	Mitja pàgina		Moviment del terreny	Natural	associada	Zona del Pedral	puntual	0	0	Esquerdas en c	El Govern incre
Poble Andorrà	Andorra la Vella	Un quart de pàgina		Moviment del terreny	Antròpic	directe	Carretera de la	puntual	0	0	El moviment ha	Moviments de t
Dian d'Andorra	Andorra la Vella	Tota la pàgina		Moviment del terreny	Antròpic	associada	Edifici Cuberes	puntual	0	0	Grans esquerde	Les obres d'apu
Poble Andorrà	La Massana	Mitja pàgina		Moviment del terreny	Antròpic	associada	Set bordes a la	puntual	0	0	Bordes molt gr	Tres mesos de
El Periòdic d'Ando	Encamp	Molt breu		Moviment del terreny	Natural	associada	Solà d'Encamp	puntual	0	0		Al Solà d'Encar
Dian d'Andorra	La Massana	Mitja pàgina		Moviment del terreny	Antròpic	associada	Set bordes a la	puntual	0	0	Greus desperfe	Les set famílies
Dian d'Andorra	La Massana	Mitja pàgina		Moviment del terreny	Antròpic	associada	Set bordes a la	puntual	0	0	Bordes molt gr	El judici de les
Dian d'Andorra	Ordino	Mitja pàgina		Moviment del terreny	Antròpic	associada	Urbanització de	puntual	0	0	Vial d'accés a	l Els veïns de la
Poble Andorrà	La Massana	Un quart de pàgina		Moviment del terreny	Antròpic	associada	Bordes a la car	puntual	0	0	Bordes molt af	El Tribunal de C
Dian d'Andorra	La Massana	Tota la pàgina		Moviment del terreny	Antròpic	associada	Set bordes de l	puntual	0	0	Grans danys m	El cas de les s
Dian d'Andorra	La Massana	Mitja pàgina		Moviment del terreny	Antròpic	associada	Set bordes a la	puntual	0	0	Greus desperfe	El Tribunal de C
El Periòdic d'Ando	Encamp	Un quart de pàgina		Moviment del terreny	Natural	associada	Zona del Pedral	puntual	0	0	Esquerdas en c	El Govern ha de
Dian d'Andorra	Encamp	Tota la pàgina		Moviment del terreny	Natural	associada	Zona del Pedral	puntual	0	0	Esquerdas en v	El batlle haurà v
Dian d'Andorra	La Massana	Tota la pàgina		Moviment del terreny	Antròpic	directe	Gasolinera Ess	puntual	0	0	Greus desperfe	La gasolinera s
El Periòdic d'Ando	Encamp	Portada		Moviment del terreny	Natural	associada	Zona del Pedral	puntual	0	0	Esquerdas en v	Una companyia
Informacions	La Massana	2 pàgines		Moviment del terreny	Antròpic	associada	Set bordes a la	puntual	0	0	Greus desperfe	Un dels veïns q
Informacions	La Massana	Tota la pàgina	30/11/1992	Moviment del terreny	Antròpic	associada	Les Boigues a l	puntual	0	0	Carretera afect	Els estudis sob
Dian d'Andorra	Encamp	Mitja pàgina		Moviment del terreny	Natural	associada	Zona del Pedral	puntual	0	0	Esquerdas en c	Els 13 coprope
Dian d'Andorra	Encamp	Tota la pàgina		Moviment del terreny	Natural	associada	Zona del Pedral	puntual	0	0	Importants fiss	Error de proce
Dian d'Andorra	Encamp	Portada		Moviment del terreny	Natural	associada	Zona del Pedral	puntual	0	0	Esquerdas en c	Els desperfecte
Dian d'Andorra	Encamp	Un quart de pàgina		Moviment del terreny	Natural	associada	Zona del Pedral	puntual	0	0	Esquerdas en v	Diversos arquite
Dian d'Andorra	Ordino	Mitja pàgina		Moviment del terreny	Antròpic	directe	Urbanització C	puntual	0	0	Vial d'accés a l	Els veïns de la
Poble Andorrà	La Massana	Mitja pàgina		Moviment del terreny	Antròpic	associada	Set bordes a la	puntual	0	0	Greus desperfe	El Tribunal de E
Dian d'Andorra	La Massana	Mitja pàgina		Moviment del terreny	Antròpic	associada	Set bordes a la	puntual	0	0	Desperfectes a	Després del col
Dian d'Andorra	La Massana	Mitja pàgina	30/11/1992	Moviment del terreny	Antròpic	associada	Les Boigues, al	puntual	0	0	Carretera esq	El penill potenci
Dian d'Andorra	Encamp	Tota la pàgina		Moviment del terreny	Natural	directe	Zona del Pedral	puntual	0	0	Uns 150 pisos	En almenys 8 il
Dian d'Andorra	La Massana	Mitja pàgina		Moviment del terreny	Antròpic	associada	Set bordes a la	puntual	0	0	Bordes molt af	Després de la v
Dian d'Andorra	La Massana	Tota la pàgina		Moviment del terreny	Antròpic	associada	Set bordes de l	puntual	0	0	Grans desperfe	El Tribunal de E

ANDORRA: Natural Hazard Database of Andorra

Name of contact person 1	Montserrat Mases Coberó
Telephone number	+376 742630
E-mail	mmases.cenma@iea.ad
Institute	Andorran Research Institute (IAE)
Address	Av. Rocafort, 21-23. Edifici Moli, 3 pis. AD600 Sant Julià de Lòria
Official name of database	Natural Hazard Database of Andorra (Base de dades de riscos naturals)
Owner of database	Andorran Research Institute (IAE)
Contact person	Jordi Guillamet
Producer of database	Andorran Research Institute (IAE)
Website	www.cenma.ad

Approximate area covered (km ²)	465
Official document	Yes, regulatory No Yes, but not regulatory
Language	Catalan
First creation date	2006
Last update	2009
Recurrence for updating	<input type="checkbox"/> Not updated <input type="checkbox"/> After major event <input type="checkbox"/> Every year <input type="checkbox"/> < 6 months <input checked="" type="checkbox"/> Other: not predefined, irregular updating
Time period of landslide events covered	1970 - present
Other features than landslides in database	Yes, all natural hazards No
Number of landslides	274
Completeness of the database (estimate)	<input checked="" type="checkbox"/> <25% <input type="checkbox"/> 50-75% <input type="checkbox"/> 25-50% <input type="checkbox"/> >75%
Landslide inventory map	Not available, only alphanumeric database
Scale	
Reference coordinate system	
Information on the positional accuracy	Yes No Don't know
Landslides representation	<input type="checkbox"/> Point <input type="checkbox"/> Line <input type="checkbox"/> Closed polygon <input type="checkbox"/> Combination of points, lines and polygons <input type="checkbox"/> Other
Production method	<input type="checkbox"/> Field survey <input type="checkbox"/> Historical documents <input type="checkbox"/> Aerial photographs <input type="checkbox"/> LiDAR derivatives <input type="checkbox"/> Satellite remote sensing <input type="checkbox"/> Airborne remote sensing * Other
Representation of landslide location	<input type="checkbox"/> Coordinates <input checked="" type="checkbox"/> Municipality <input type="checkbox"/> Province/county <input type="checkbox"/> Other
Landslide classification	Yes No Agreement with Cruden and Varnes (1996)
Landslide types	Rock fall, slide, collapse
Landslide dimension	<input type="checkbox"/> Displaced volume <input checked="" type="checkbox"/> Affected area <input type="checkbox"/> Length <input type="checkbox"/> Width <input type="checkbox"/> Travel angle <input type="checkbox"/> Height (from top to toe) <input type="checkbox"/> Depth of surface of rupture <input type="checkbox"/> Other
Geo-environmental characteristics	<input type="checkbox"/> Lithology <input type="checkbox"/> Hydrogeology <input type="checkbox"/> Land use <input type="checkbox"/> Slope gradient <input type="checkbox"/> Slope aspect <input type="checkbox"/> Slope curvature <input type="checkbox"/> Other

LANDSLIDE INVENTORIES IN EUROPE

Completeness of triggering factor	<input type="checkbox"/> 0% <input checked="" type="checkbox"/> 0-25% <input type="checkbox"/> 25-50%	<input type="checkbox"/> 50-75% <input type="checkbox"/> >75%
Landslide data/history	Yes	No
Initiation date	Yes	No
Initiation and reactivation dates	Yes	No
Completeness	<input checked="" type="checkbox"/> 0% <input type="checkbox"/> 0-25% <input type="checkbox"/> 25-50%	<input type="checkbox"/> 50-75% <input type="checkbox"/> >75%
Landslide activity	Yes	No
Activity classes		
Consequences	Yes	No
Completeness	<input checked="" type="checkbox"/> 0% <input type="checkbox"/> 0-25% <input type="checkbox"/> 25-50%	<input type="checkbox"/> 50-75% <input type="checkbox"/> >75%
Other information	<input type="checkbox"/> Photographs <input type="checkbox"/> Monitoring data or physical properties <input checked="" type="checkbox"/> Bibliographic references <input type="checkbox"/> Other	

Format	<input type="checkbox"/> Digital, spatial database <input checked="" type="checkbox"/> Digital, alphanumeric database <input type="checkbox"/> Digital, linked spatial and alphanumeric database <input type="checkbox"/> Digital, other <input checked="" type="checkbox"/> Paper	
Spatial software	<input type="checkbox"/> ArcGIS <input type="checkbox"/> Other	
Alphanumeric software	<input type="checkbox"/> Oracle <input checked="" type="checkbox"/> Microsoft Access <input type="checkbox"/> Other	
Type of paper document	<input checked="" type="checkbox"/> Datasheets <input type="checkbox"/> Map	
Accessibility	<input checked="" type="checkbox"/> General public <input checked="" type="checkbox"/> Administration <input checked="" type="checkbox"/> Scientific purposes <input type="checkbox"/> Other	
Use	<input type="checkbox"/> For consultation only <input checked="" type="checkbox"/> Free of charge under any condition <input type="checkbox"/> After payment <input checked="" type="checkbox"/> Without special conditions <input type="checkbox"/> Under special conditions <input type="checkbox"/> I do not know	

Database metadata complying with INSPIRE metadata regulations	Yes	No
	I do not know	
Database provided through/stored in a network following the INSPIRE network services	Yes	No
	I do not know	
Institute registered as an INSPIRE stakeholder	<input type="checkbox"/> LMO <input type="checkbox"/> SDIC <input type="checkbox"/> I do not know <input checked="" type="checkbox"/> No	
Institute willing to register as an INSPIRE stakeholder	<input type="checkbox"/> LMO <input type="checkbox"/> SDIC <input type="checkbox"/> I do not know <input checked="" type="checkbox"/> No	
Organization willing to participate in the real testing or reviewing of a draft of the INSPIRE Data Specifications related to the spatial data theme "Natural Risk Zones" when it is developed by the Thematic Working Group	Yes	No
	I do not know	

ANDORRA: Terrain Zonation of Geological-Geotechnical Problems**

Name of contact person 1	Xavier Planas Batlle
Telephone number	+376 875700
E-mail	xplanas@andorra.ad
Institute	Government of Andorra
Address	Camí de la Gral s/n AD500 Andorra la Vella
Official name of database	Terrain Zonation of Geologic-Geotechnical Problems (Estudi de la zonificació del terreny segons la seva problemàtica geològica-geotècnica)
Owner of database	Government of Andorra
Contact person	Xavier Planas Batlle
Producer of database	Euroconsult-Eurogeotècnia
Website	http://www.ideandorra.ad/geoportal/

Approximate area covered (km ²)	160 (high mountain areas not included)	
Official document	Yes, regulatory	No
	Yes, but not regulatory	
Language	Catalan	
First creation date	2001	
Last update	2010	
Recurrence for updating	<input type="checkbox"/> Not updated <input type="checkbox"/> After major event <input type="checkbox"/> Every year <input type="checkbox"/> < 6 months <input checked="" type="checkbox"/> Irregular, depending on available time	
Time period of landslide events covered	All geomorphologically recognizable landslides	
Other features than landslides in database	Yes	No
Number of landslides	Exact number not available	
Completeness of the database (estimate)	<input type="checkbox"/> <25% <input checked="" type="checkbox"/> 25-50%	<input type="checkbox"/> 50-75% <input type="checkbox"/> >75%
Landslide inventory map	Scale 1:5,000 to 1:2,000 Reference coordinate system Lambert III (French zone) Information on the positional accuracy Yes No Don't know	
Landslides representation	<input type="checkbox"/> Point <input type="checkbox"/> Line <input checked="" type="checkbox"/> Closed polygon <input type="checkbox"/> Combination of points, lines and polygons <input type="checkbox"/> Other	
Production method	<input checked="" type="checkbox"/> Field survey <input checked="" type="checkbox"/> Historical documents <input type="checkbox"/> Aerial photographs <input type="checkbox"/> LiDAR derivatives <input type="checkbox"/> Satellite remote sensing <input type="checkbox"/> Airborne remote sensing * <input type="checkbox"/> Other	
Representation of landslide location	<input checked="" type="checkbox"/> Coordinates <input checked="" type="checkbox"/> Municipality <input type="checkbox"/> Province/county <input type="checkbox"/> Other	
Landslide classification	Yes	No
Landslide types	Agreement with Cruden and Varnes (1996) Rock fall, shallow slides, large rotational and translational slides, debris flows, earth flows, sackung	
Landslide dimension	<input checked="" type="checkbox"/> Displaced volume <input checked="" type="checkbox"/> Affected area <input checked="" type="checkbox"/> Length <input checked="" type="checkbox"/> Width <input checked="" type="checkbox"/> Travel angle <input checked="" type="checkbox"/> Height (from top to toe) <input checked="" type="checkbox"/> Depth of surface of rupture <input type="checkbox"/> Other	
Geo-environmental characteristics	<input checked="" type="checkbox"/> Lithology <input checked="" type="checkbox"/> Hydrogeology <input checked="" type="checkbox"/> Land use <input checked="" type="checkbox"/> Slope gradient <input checked="" type="checkbox"/> Slope aspect	

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	<input checked="" type="checkbox"/> Slope curvature <input type="checkbox"/> Other	
Completeness of triggering factor	<input type="checkbox"/> 0% <input checked="" type="checkbox"/> 0-25% <input type="checkbox"/> 25-50%	<input type="checkbox"/> 50-75% <input type="checkbox"/> >75%
Landslide data/history	Yes	No
Initiation date	Yes	No
Initiation and reactivation dates	Yes	No
Completeness	<input type="checkbox"/> 0% <input checked="" type="checkbox"/> 0-25% <input type="checkbox"/> 25-50%	<input type="checkbox"/> 50-75% <input type="checkbox"/> >75%
Landslide activity	Yes	No
Activity classes	Active, reactivated, suspended, dormant, relict, inactive	
Consequences	Yes	No
Completeness	<input checked="" type="checkbox"/> 0% <input type="checkbox"/> 0-25% <input type="checkbox"/> 25-50%	<input type="checkbox"/> 50-75% <input type="checkbox"/> >75%
Other information	<input checked="" type="checkbox"/> Photographs <input checked="" type="checkbox"/> Monitoring data or physical properties <input type="checkbox"/> Bibliographic references <input type="checkbox"/> Other	

Format	<input checked="" type="checkbox"/> Digital, spatial database <input type="checkbox"/> Digital, alphanumeric database <input type="checkbox"/> Digital, linked spatial and alphanumeric database <input type="checkbox"/> Digital, other <input checked="" type="checkbox"/> Paper	
Spatial software	<input checked="" type="checkbox"/> ArcGIS <input type="checkbox"/> Other	
Alphanumeric software	<input type="checkbox"/> Oracle <input type="checkbox"/> Microsoft Access <input type="checkbox"/> Other	
Type of paper document	<input type="checkbox"/> Datasheets <input checked="" type="checkbox"/> Map	
Accessibility	<input checked="" type="checkbox"/> General public <input type="checkbox"/> Administration <input type="checkbox"/> Scientific purposes <input type="checkbox"/> Other	
Use	<input type="checkbox"/> For consultation only <input type="checkbox"/> Free of charge under any condition <input type="checkbox"/> After payment <input checked="" type="checkbox"/> Without special conditions <input type="checkbox"/> Under special conditions <input type="checkbox"/> I do not know	

Database metadata complying with INSPIRE metadata regulations	Yes	No I do not know
Database provided through/stored in a network following the INSPIRE network services	Yes	No I do not know
Institute registered as an INSPIRE stakeholder	<input type="checkbox"/> LMO <input type="checkbox"/> SDIC <input type="checkbox"/> I do not know <input checked="" type="checkbox"/> No	
Institute willing to register as an INSPIRE stakeholder	<input type="checkbox"/> LMO <input type="checkbox"/> SDIC <input type="checkbox"/> I do not know <input checked="" type="checkbox"/> No	
Organization willing to participate in the real testing or reviewing of a draft of the INSPIRE Data Specifications related to the spatial data theme "Natural Risk Zones" when it is developed by the Thematic Working Group	Yes	No I do not know

** not included in the overview of national databases as it is not a landslide database, rather a landslide hazard map with additional information of some individual landslides

AUSTRIA: GEORIOS

Name of contact person 1	Arben Kociu
Telephone number	+43 1 7125674390
E-mail	arben.kociu@geologie.ac.at
Institute	Geological Survey of Austria / Department of Engineering Geology
Address	Neulinggasse 38, 1030 Vienna
Official name of database	GEORIOS
Owner of database	Geological Survey of Austria / Department of Engineering Geology
Contact person	Arben Kociu
Producer of database	Geological Survey of Austria
Website	www.geologie.ac.at / http://geomap.geolba.ac.at/MASS/index.cfm

Approximate area covered (km ²)	83,000
Official document	Yes, regulatory No Yes, but not regulatory
Language	German
First creation date	2000
Last update	2010
Recurrence for updating	<input type="checkbox"/> Not updated <input type="checkbox"/> After major event <input type="checkbox"/> Every year <input checked="" type="checkbox"/> < 6 months <input type="checkbox"/> Other
Time period of landslide events covered	/
Other features than landslides in database	Yes, sinkholes, soil erosion, tectonic avalanches No
Number of landslides	25,000
Completeness of the database (estimate)	<input type="checkbox"/> <25% <input type="checkbox"/> 50-75% <input checked="" type="checkbox"/> 25-50% <input type="checkbox"/> >75%
Landslide inventory map Scale	1:10,000 to 1:200,000
Reference coordinate system	MGI_Austria_Lambert
Information on the positional accuracy	Yes No Don't know
Landslides representation	<input type="checkbox"/> Point <input type="checkbox"/> Line <input type="checkbox"/> Closed polygon <input checked="" type="checkbox"/> Combination of points, lines and polygons <input type="checkbox"/> Other
Production method	<input checked="" type="checkbox"/> Field survey <input checked="" type="checkbox"/> Historical documents <input checked="" type="checkbox"/> Aerial photographs <input checked="" type="checkbox"/> LiDAR derivatives <input type="checkbox"/> Satellite remote sensing <input type="checkbox"/> Airborne remote sensing * <input checked="" type="checkbox"/> Other: archives of local authorities
Representation of landslide location	<input type="checkbox"/> Coordinates <input type="checkbox"/> Municipality <input type="checkbox"/> Province/county <input checked="" type="checkbox"/> Other: geometry in ArcGIS
Landslide classification	Yes No Agreement with Cruden and Varnes (1996)
Landslide types	Rock fall/topple, rotational or translational slide, complex landslide
Landslide dimension	<input type="checkbox"/> Displaced volume <input checked="" type="checkbox"/> Affected area <input checked="" type="checkbox"/> Length <input checked="" type="checkbox"/> Width <input type="checkbox"/> Travel angle <input type="checkbox"/> Height (from top to toe) <input type="checkbox"/> Depth of surface of rupture <input type="checkbox"/> Other
Geo-environmental characteristics	<input checked="" type="checkbox"/> Lithology <input type="checkbox"/> Hydrogeology <input checked="" type="checkbox"/> Land use <input checked="" type="checkbox"/> Slope gradient <input checked="" type="checkbox"/> Slope aspect <input checked="" type="checkbox"/> Slope curvature

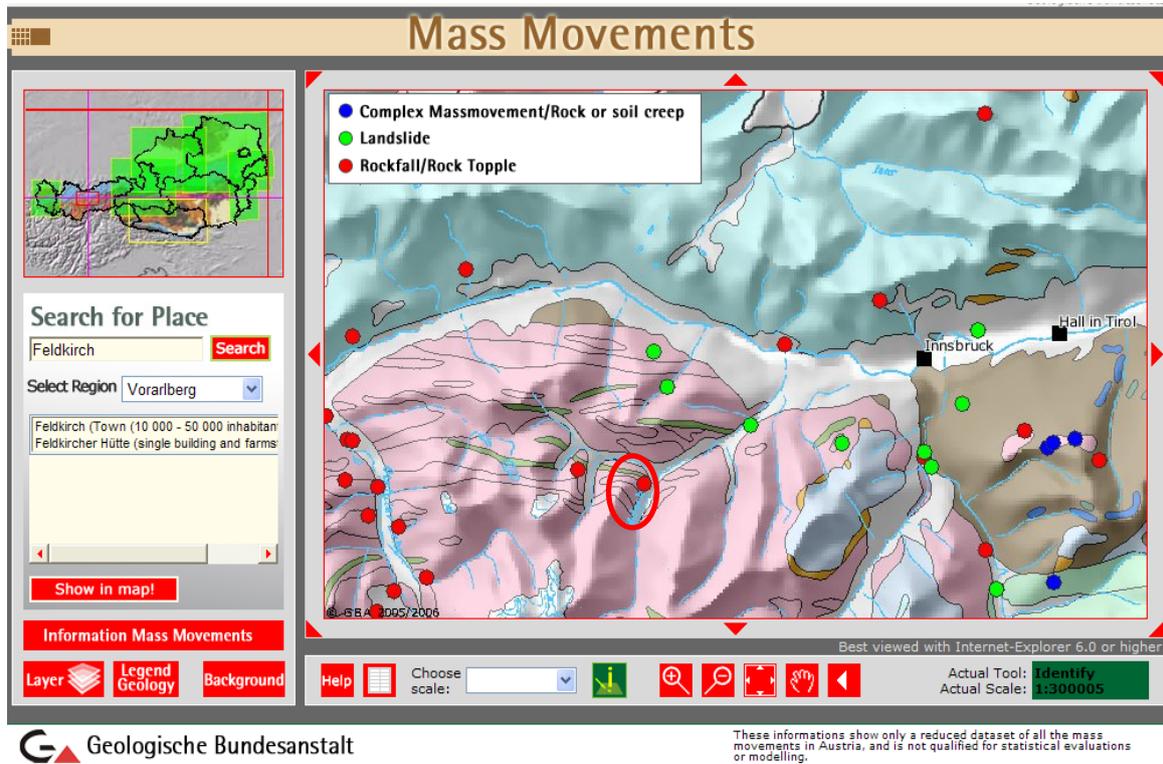
LANDSLIDE INVENTORIES IN EUROPE

	<input type="checkbox"/> Other	
Completeness of triggering factor	<input type="checkbox"/> 0% <input type="checkbox"/> 0-25% <input type="checkbox"/> 25-50%	<input type="checkbox"/> 50-75% <input checked="" type="checkbox"/> >75%
Landslide data/history	Yes	No
Initiation date	Yes	No
Initiation and reactivation dates	Yes	No
Completeness	<input type="checkbox"/> 0% <input checked="" type="checkbox"/> 0-25% <input type="checkbox"/> 25-50%	<input type="checkbox"/> 50-75% <input type="checkbox"/> >75%
Landslide activity	Yes	No
Activity classes		
Consequences	Yes	No
Completeness	<input checked="" type="checkbox"/> 0% <input type="checkbox"/> 0-25% <input type="checkbox"/> 25-50%	<input type="checkbox"/> 50-75% <input type="checkbox"/> >75%
Other information	<input checked="" type="checkbox"/> Photographs <input type="checkbox"/> Monitoring data or physical properties <input checked="" type="checkbox"/> Bibliographic references <input type="checkbox"/> Other	

Format	<input type="checkbox"/> Digital, spatial database <input type="checkbox"/> Digital, alphanumeric database <input checked="" type="checkbox"/> Digital, linked spatial and alphanumeric database <input type="checkbox"/> Digital, other <input type="checkbox"/> Paper	
Spatial software	<input checked="" type="checkbox"/> ArcGIS <input type="checkbox"/> Other	
Alphanumeric software	<input type="checkbox"/> Oracle <input checked="" type="checkbox"/> Microsoft Access <input type="checkbox"/> Other	
Type of paper document	<input type="checkbox"/> Datasheets <input type="checkbox"/> Map	
Accessibility	<input type="checkbox"/> General public <input type="checkbox"/> Administration <input checked="" type="checkbox"/> Scientific purposes <input type="checkbox"/> Other	
Use	<input checked="" type="checkbox"/> For consultation only <input type="checkbox"/> Free of charge under any condition <input type="checkbox"/> After payment <input type="checkbox"/> Without special conditions <input checked="" type="checkbox"/> Under special conditions <input type="checkbox"/> I do not know	

Database metadata complying with INSPIRE metadata regulations	Yes	No
	I do not know	
Database provided through/stored in a network following the INSPIRE network services	Yes	No
	I do not know	
Institute registered as an INSPIRE stakeholder	<input type="checkbox"/> LMO <input type="checkbox"/> SDIC <input type="checkbox"/> I do not know <input checked="" type="checkbox"/> No	
Institute willing to register as an INSPIRE stakeholder	<input type="checkbox"/> LMO <input type="checkbox"/> SDIC <input type="checkbox"/> I do not know <input checked="" type="checkbox"/> No	
Organization willing to participate in the real testing or reviewing of a draft of the INSPIRE Data Specifications related to the spatial data theme "Natural Risk Zones" when it is developed by the Thematic Working Group	Yes	No
	I do not know	

Excerpt of the English version of the Geological Survey of Austria's mass movement (Massenbewegungen) database (<http://geomap.geolba.ac.at/MASS/index.cfm>; July 2012).



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BOSNIA AND HERZEGOVINA: The Engineering-Geology Map

Name of contact person 1	Hazim Hrvatović, Director	
Telephone number	+387 (0) 33621567	
E-mail	zgeobih@bih.net.ba, hazim.hrvatovic@yahoo.com	
Institute	Federal Geology Survey	
Address	Ustanička 11, 71210 Ilidža	
Official name of database	The engineering-geology map Federation of Bosnia and Herzegovina	
Owner of database	Federal Geology Survey	
Contact person	Nermina Omerbegović	
Producer of database	Federal Geology Survey	
Website	/	

Approximate area covered (km ²)	26,080	
Official document	Yes, regulatory	No
	Yes, but not regulatory	
Language	Bosnian	
First creation date	2008	
Last update	2009	
Recurrence for updating	<input type="checkbox"/> Not updated <input type="checkbox"/> After major event <input checked="" type="checkbox"/> Every year <input type="checkbox"/> < 6 months <input type="checkbox"/> Other	
Time period of landslide events covered	1956 - 2009	
Other features than landslides in database	Yes	No
Number of landslides	1500	
Completeness of the database (estimate)	<input type="checkbox"/> <25% <input checked="" type="checkbox"/> 25-50%	<input type="checkbox"/> 50-75% <input type="checkbox"/> >75%
Landslide inventory map		
Scale	1:10,000	
Reference coordinate system	Gauss Kruger Zone 6	
Information on the positional accuracy	Yes	No
	Don't know	
Landslides representation	<input type="checkbox"/> Point <input type="checkbox"/> Line <input type="checkbox"/> Closed polygon <input checked="" type="checkbox"/> Combination of points, lines and polygons <input type="checkbox"/> Other	
Production method	<input checked="" type="checkbox"/> Field survey <input checked="" type="checkbox"/> Historical documents <input type="checkbox"/> Aerial photographs <input type="checkbox"/> LiDAR derivatives <input type="checkbox"/> Satellite remote sensing <input type="checkbox"/> Airborne remote sensing * Other	
Representation of landslide location	<input checked="" type="checkbox"/> Coordinates <input checked="" type="checkbox"/> Municipality <input checked="" type="checkbox"/> Province/county <input type="checkbox"/> Other	
Landslide classification	Yes	No
	Agreement with Cruden and Varnes (1996)	
Landslide types	Shallow, deep, small and large	
Landslide dimension	<input checked="" type="checkbox"/> Displaced volume <input checked="" type="checkbox"/> Affected area <input checked="" type="checkbox"/> Length <input checked="" type="checkbox"/> Width <input checked="" type="checkbox"/> Travel angle <input checked="" type="checkbox"/> Height (from top to toe) <input checked="" type="checkbox"/> Depth of surface of rupture <input type="checkbox"/> Other	
Geo-environmental characteristics	<input checked="" type="checkbox"/> Lithology <input checked="" type="checkbox"/> Hydrogeology <input checked="" type="checkbox"/> Land use <input checked="" type="checkbox"/> Slope gradient <input checked="" type="checkbox"/> Slope aspect <input checked="" type="checkbox"/> Slope curvature <input type="checkbox"/> Other	

LANDSLIDE INVENTORIES IN EUROPE

Completeness of triggering factor	<input type="checkbox"/> 0% <input type="checkbox"/> 0-25% <input checked="" type="checkbox"/> 25-50%	<input type="checkbox"/> 50-75% <input type="checkbox"/> >75%
Landslide data/history	Yes	No
Initiation date	Yes	No
Initiation and reactivation dates	Yes	No
Completeness	<input type="checkbox"/> 0% <input type="checkbox"/> 0-25% <input checked="" type="checkbox"/> 25-50%	<input type="checkbox"/> 50-75% <input type="checkbox"/> >75%
Landslide activity	Yes	No
Activity classes	Active, suspended, dormant inactive	
Consequences	Yes	No
Completeness	<input type="checkbox"/> 0% <input type="checkbox"/> 0-25% <input checked="" type="checkbox"/> 25-50%	<input type="checkbox"/> 50-75% <input type="checkbox"/> >75%
Other information	<input checked="" type="checkbox"/> Photographs <input checked="" type="checkbox"/> Monitoring data or physical properties <input checked="" type="checkbox"/> Bibliographic references <input type="checkbox"/> Other	

Format	<input type="checkbox"/> Digital, spatial database <input type="checkbox"/> Digital, alphanumeric database <input checked="" type="checkbox"/> Digital, linked spatial and alphanumeric database <input type="checkbox"/> Digital, other <input checked="" type="checkbox"/> Paper
Spatial software	<input checked="" type="checkbox"/> ArcGIS <input type="checkbox"/> Other
Alphanumeric software	<input checked="" type="checkbox"/> Oracle <input type="checkbox"/> Microsoft Access <input type="checkbox"/> Other
Type of paper document	<input checked="" type="checkbox"/> Datasheets <input checked="" type="checkbox"/> Map
Accessibility	<input type="checkbox"/> General public <input checked="" type="checkbox"/> Administration <input type="checkbox"/> Scientific purposes <input type="checkbox"/> Other
Use	<input checked="" type="checkbox"/> For consultation only <input type="checkbox"/> Free of charge under any condition <input type="checkbox"/> After payment <input type="checkbox"/> Without special conditions <input type="checkbox"/> Under special conditions <input type="checkbox"/> I do not know

Database metadata complying with INSPIRE metadata regulations	Yes	No
	I do not know	
Database provided through/stored in a network following the INSPIRE network services	Yes	No
	I do not know	
Institute registered as an INSPIRE stakeholder	<input type="checkbox"/> LMO <input type="checkbox"/> SDIC <input type="checkbox"/> I do not know <input checked="" type="checkbox"/> No	
Institute willing to register as an INSPIRE stakeholder	<input type="checkbox"/> LMO <input type="checkbox"/> SDIC <input checked="" type="checkbox"/> I do not know <input type="checkbox"/> No	
Organization willing to participate in the real testing or reviewing of a draft of the INSPIRE Data Specifications related to the spatial data theme "Natural Risk Zones" when it is developed by the Thematic Working Group	Yes	No
	I do not know	

BULGARIA: Map of Landslides

Name of contact person 1	Nikolai D. Dobrev
Telephone number	+359 2 9792292
E-mail	ndd@geology.bas.bg
Institute	Geological Institute, Bulgarian Academy of Sciences
Address	Acad. Georgi Bonchev str., block 24, 1113 Sofia
Name of contact person 2	Kiril Anguelov
Telephone number	++ 359 0888555812
E-mail	angelov@bondys.bg; dimitar@bondys.bg
Institute	BONDYS Ltd
Address	Sofia 1700, Vitosha Residential Estate, 11 "Prof. G. Zlatarski" Str
Official name of database	No official name, Map of Landslides
Owner of database	Geological Institute (by request of The Ministry of Public Works & Regional
Contact person	The Ministry of Public Works & Regional Development
Producer of database	Geological Institute
Website	/

Approximate area covered (km ²)	111,000
Official document	Yes, regulatory No Yes, but not regulatory
Language	Bulgarian
First creation date	1999
Last update	2006
Recurrence for updating	<input checked="" type="checkbox"/> Not updated <input type="checkbox"/> After major event <input type="checkbox"/> Every year <input type="checkbox"/> < 6 months <input type="checkbox"/> Other
Time period of landslide events covered	1896 – 2006
Other features than landslides in database	Yes, soil erosion No
Number of landslides	1107
Completeness of the database (estimate)	<input checked="" type="checkbox"/> <25% <input type="checkbox"/> 50-75% <input type="checkbox"/> 25-50% <input type="checkbox"/> >75%
Landslide inventory map	
Scale	1:500,000
Reference coordinate system	/
Information on the positional accuracy	Yes No
Landslides representation	Don't know <input type="checkbox"/> Point <input type="checkbox"/> Line <input type="checkbox"/> Closed polygon <input checked="" type="checkbox"/> Combination of points, lines and polygons <input type="checkbox"/> Other
Production method	<input checked="" type="checkbox"/> Field survey <input checked="" type="checkbox"/> Historical documents <input type="checkbox"/> Aerial photographs <input type="checkbox"/> LiDAR derivatives <input type="checkbox"/> Satellite remote sensing <input type="checkbox"/> Airborne remote sensing * Other
Representation of landslide location	<input type="checkbox"/> Coordinates <input checked="" type="checkbox"/> Municipality <input checked="" type="checkbox"/> Province/county <input type="checkbox"/> Other
Landslide classification	Yes No
Landslide types	Agreement with Cruden and Varnes (1996) (Rotational and translational) slide, lateral spreads and flows
Landslide dimension	<input checked="" type="checkbox"/> Displaced volume <input checked="" type="checkbox"/> Affected area <input checked="" type="checkbox"/> Length <input checked="" type="checkbox"/> Width <input type="checkbox"/> Travel angle <input type="checkbox"/> Height (from top to toe) <input checked="" type="checkbox"/> Depth of surface of rupture <input type="checkbox"/> Other
Geo-environmental characteristics	<input checked="" type="checkbox"/> Lithology

LANDSLIDE INVENTORIES IN EUROPE

	<input checked="" type="checkbox"/> Hydrogeology <input type="checkbox"/> Land use <input checked="" type="checkbox"/> Slope gradient <input checked="" type="checkbox"/> Slope aspect <input type="checkbox"/> Slope curvature <input type="checkbox"/> Other	
Completeness of triggering factor	<input type="checkbox"/> 0% <input checked="" type="checkbox"/> 0-25% <input type="checkbox"/> 25-50%	<input type="checkbox"/> 50-75% <input type="checkbox"/> >75%
Landslide data/history	Yes	No
Initiation date	Yes	No
Initiation and reactivation dates	Yes	No
Completeness	<input type="checkbox"/> 0% <input type="checkbox"/> 0-25% <input checked="" type="checkbox"/> 25-50%	<input type="checkbox"/> 50-75% <input type="checkbox"/> >75%
Landslide activity	Yes	No
Activity classes	Active, reactivated, suspended, dormant	
Consequences	Yes	No
Completeness	<input type="checkbox"/> 0% <input type="checkbox"/> 0-25% <input type="checkbox"/> 25-50%	<input checked="" type="checkbox"/> 50-75% <input type="checkbox"/> >75%
Other information	<input type="checkbox"/> Photographs <input checked="" type="checkbox"/> Monitoring data or physical properties <input type="checkbox"/> Bibliographic references <input type="checkbox"/> Other	

Format	<input checked="" type="checkbox"/> Digital, spatial database <input checked="" type="checkbox"/> Digital, alphanumeric database <input type="checkbox"/> Digital, linked spatial and alphanumeric database <input type="checkbox"/> Digital, other <input type="checkbox"/> Paper	
Spatial software	<input checked="" type="checkbox"/> ArcGIS <input type="checkbox"/> Other	
Alphanumeric software	<input type="checkbox"/> Oracle <input type="checkbox"/> Microsoft Access <input checked="" type="checkbox"/> Other	
Type of paper document	<input checked="" type="checkbox"/> Datasheets <input checked="" type="checkbox"/> Map	
Accessibility	<input type="checkbox"/> General public <input checked="" type="checkbox"/> Administration <input type="checkbox"/> Scientific purposes <input type="checkbox"/> Other	
Use	<input type="checkbox"/> For consultation only <input type="checkbox"/> Free of charge under any condition <input type="checkbox"/> After payment <input type="checkbox"/> Without special conditions <input type="checkbox"/> Under special conditions <input checked="" type="checkbox"/> I do not know	

Database metadata complying with INSPIRE metadata regulations	Yes	No
	I do not know	
Database provided through/stored in a network following the INSPIRE network services	Yes	No
	I do not know	
Institute registered as an INSPIRE stakeholder	<input type="checkbox"/> LMO <input type="checkbox"/> SDIC <input type="checkbox"/> I do not know <input checked="" type="checkbox"/> No	
Institute willing to register as an INSPIRE stakeholder	<input type="checkbox"/> LMO <input type="checkbox"/> SDIC <input checked="" type="checkbox"/> I do not know <input type="checkbox"/> No	
Organization willing to participate in the real testing or reviewing of a draft of the INSPIRE Data Specifications related to the spatial data theme "Natural Risk Zones" when it is developed by the Thematic Working Group	Yes	No
	I do not know	

CZECH REPUBLIC: National Landslide Register

Name of contact person 1	Zuzana Krejčí
Telephone number	+420 543429220
E-mail	zuzana.krejci@geology.cz
Institute	Czech Geological Survey
Address	Leitnerova 22, Brno 658 69
Official name of database	National Landslide Register
Owner of database	Czech Geological Survey
Contact person	Zuzana Krejčí
Producer of database	Czech Geological Survey
Website	http://www.geology.cz/app/dbsesuvy

Approximate area covered (km ²)	34,000
Official document	Yes, regulatory No Yes, but not regulatory
Language	Czech
First creation date	Data from 1997, database from 2007
Last update	2010
Recurrence for updating	<input type="checkbox"/> Not updated <input checked="" type="checkbox"/> After major event <input type="checkbox"/> Every year <input type="checkbox"/> < 6 months <input type="checkbox"/> Other
Time period of landslide events covered	1997 - 2010
Other features than landslides in database	Yes, soil erosion and floods No
Number of landslides	14,178
Completeness of the database (estimate)	<input type="checkbox"/> <25% <input type="checkbox"/> 50-75% <input checked="" type="checkbox"/> 25-50% <input type="checkbox"/> >75%
Landslide inventory map Scale	1:10,000
Reference coordinate system	S-JTSK, Krovak projection
Information on the positional accuracy	Yes No Don't know
Landslides representation	<input checked="" type="checkbox"/> <input type="checkbox"/> Point <input checked="" type="checkbox"/> <input type="checkbox"/> Line <input checked="" type="checkbox"/> <input type="checkbox"/> Closed polygon <input checked="" type="checkbox"/> <input type="checkbox"/> Combination of points, lines and polygons <input checked="" type="checkbox"/> <input type="checkbox"/> Other
Production method	<input checked="" type="checkbox"/> <input type="checkbox"/> Field survey <input checked="" type="checkbox"/> <input type="checkbox"/> Historical documents <input checked="" type="checkbox"/> <input type="checkbox"/> Aerial photographs <input checked="" type="checkbox"/> <input type="checkbox"/> LiDAR derivatives <input checked="" type="checkbox"/> <input type="checkbox"/> Satellite remote sensing <input checked="" type="checkbox"/> <input type="checkbox"/> Airborne remote sensing * Other
Representation of landslide location	<input checked="" type="checkbox"/> <input type="checkbox"/> Coordinates <input checked="" type="checkbox"/> <input type="checkbox"/> Municipality <input checked="" type="checkbox"/> <input type="checkbox"/> Province/county <input checked="" type="checkbox"/> <input type="checkbox"/> Other
Landslide classification	Yes No CGS 2007, based on Nemcok A., Pasek J. & Rybar J. (1974) - Classification of slope movements. J. Geol. Sci., Hydrogeol. Engng. Geology, R. HIG, (in Czech with English abstract), 11, 77-97
Landslide types	Flow, slide, fall, creep
Landslide dimension	<input checked="" type="checkbox"/> <input type="checkbox"/> Displaced volume <input checked="" type="checkbox"/> <input type="checkbox"/> Affected area <input checked="" type="checkbox"/> <input type="checkbox"/> Length <input checked="" type="checkbox"/> <input type="checkbox"/> Width <input type="checkbox"/> Travel angle <input type="checkbox"/> Height (from top to toe) <input checked="" type="checkbox"/> <input type="checkbox"/> Depth of surface of rupture <input type="checkbox"/> Other
Geo-environmental characteristics	<input checked="" type="checkbox"/> <input type="checkbox"/> Lithology <input checked="" type="checkbox"/> <input type="checkbox"/> Hydrogeology <input type="checkbox"/> Land use <input checked="" type="checkbox"/> <input type="checkbox"/> Slope gradient <input type="checkbox"/> Slope aspect

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	<input type="checkbox"/> Slope curvature <input type="checkbox"/> Other	
Completeness of triggering factor	<input type="checkbox"/> 0% <input type="checkbox"/> 0-25% <input checked="" type="checkbox"/> 25-50%	<input type="checkbox"/> 50-75% <input type="checkbox"/> >75%
Landslide data/history	Yes	No
Initiation date	Yes	No
Initiation and reactivation dates	Yes	No
Completeness	<input type="checkbox"/> 0% <input type="checkbox"/> 0-25% <input checked="" type="checkbox"/> 25-50%	<input type="checkbox"/> 50-75% <input type="checkbox"/> >75%
Landslide activity	Yes	No
Activity classes	Active (3 subcategories), temporary dormant/suspended, stabilized	
Consequences	Yes	No
Completeness	<input type="checkbox"/> 0% <input checked="" type="checkbox"/> 0-25% <input type="checkbox"/> 25-50%	<input type="checkbox"/> 50-75% <input type="checkbox"/> >75%
Other information	<input checked="" type="checkbox"/> Photographs <input checked="" type="checkbox"/> Monitoring data or physical properties <input checked="" type="checkbox"/> Bibliographic references <input type="checkbox"/> Other	

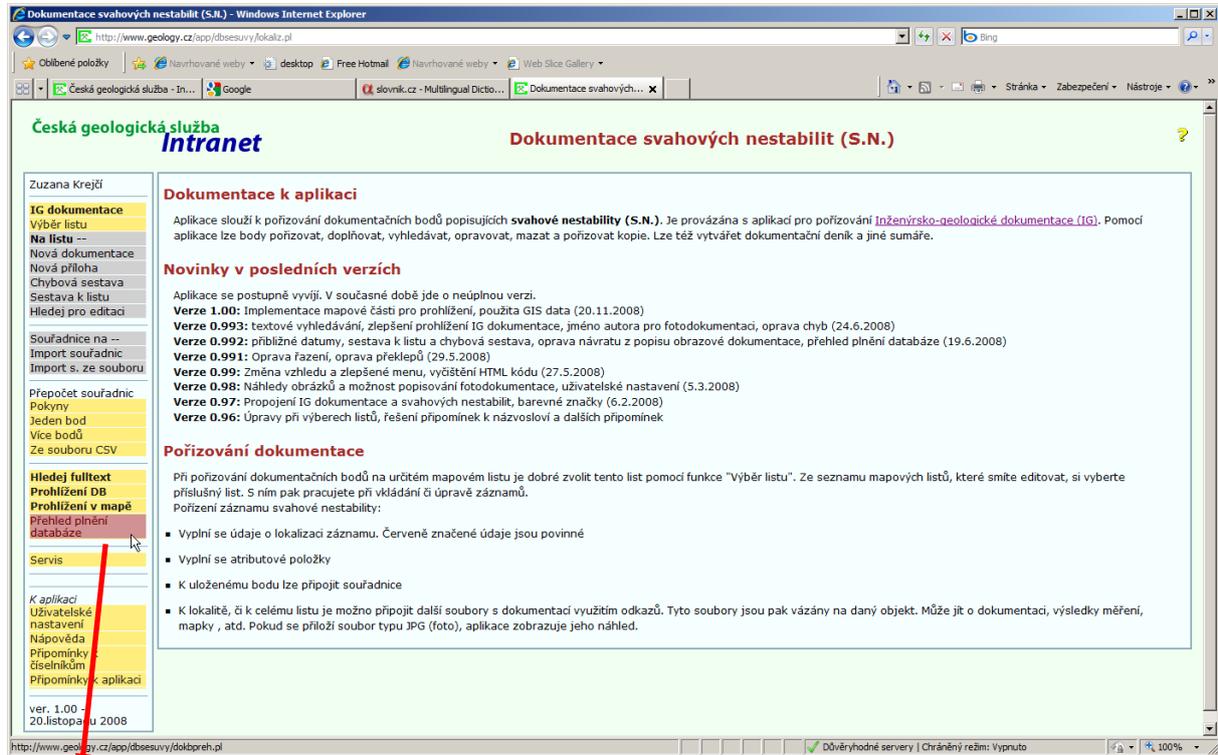
Format	<input type="checkbox"/> Digital, spatial database <input type="checkbox"/> Digital, alphanumeric database <input checked="" type="checkbox"/> Digital, linked spatial and alphanumeric database <input type="checkbox"/> Digital, other <input type="checkbox"/> Paper	
Spatial software	<input checked="" type="checkbox"/> ArcGIS <input type="checkbox"/> Other	
Alphanumeric software	<input checked="" type="checkbox"/> Oracle <input type="checkbox"/> Microsoft Access <input type="checkbox"/> Other	
Type of paper document	<input type="checkbox"/> Datasheets <input checked="" type="checkbox"/> Map	
Accessibility	<input checked="" type="checkbox"/> General public <input checked="" type="checkbox"/> Administration <input checked="" type="checkbox"/> Scientific purposes <input type="checkbox"/> Other	
Use	<input checked="" type="checkbox"/> For consultation only <input type="checkbox"/> Free of charge under any condition <input type="checkbox"/> After payment <input checked="" type="checkbox"/> Without special conditions <input type="checkbox"/> Under special conditions <input type="checkbox"/> I do not know	

Database metadata complying with INSPIRE metadata regulations	Yes	No
	I do not know	
Database provided through/stored in a network following the INSPIRE network services	Yes	No
	I do not know	
Institute registered as an INSPIRE stakeholder	<input checked="" type="checkbox"/> LMO <input type="checkbox"/> SDIC <input type="checkbox"/> I do not know <input type="checkbox"/> No	
Institute willing to register as an INSPIRE stakeholder	<input type="checkbox"/> LMO <input type="checkbox"/> SDIC <input type="checkbox"/> I do not know <input type="checkbox"/> No	
Organization willing to participate in the real testing or reviewing of a draft of the INSPIRE Data Specifications related to the spatial data theme "Natural Risk Zones" when it is developed by the Thematic Working Group	Yes	No
	I do not know	

DETAILED DATASHEET FOR EACH NATIONAL LANDSLIDE DATABASE

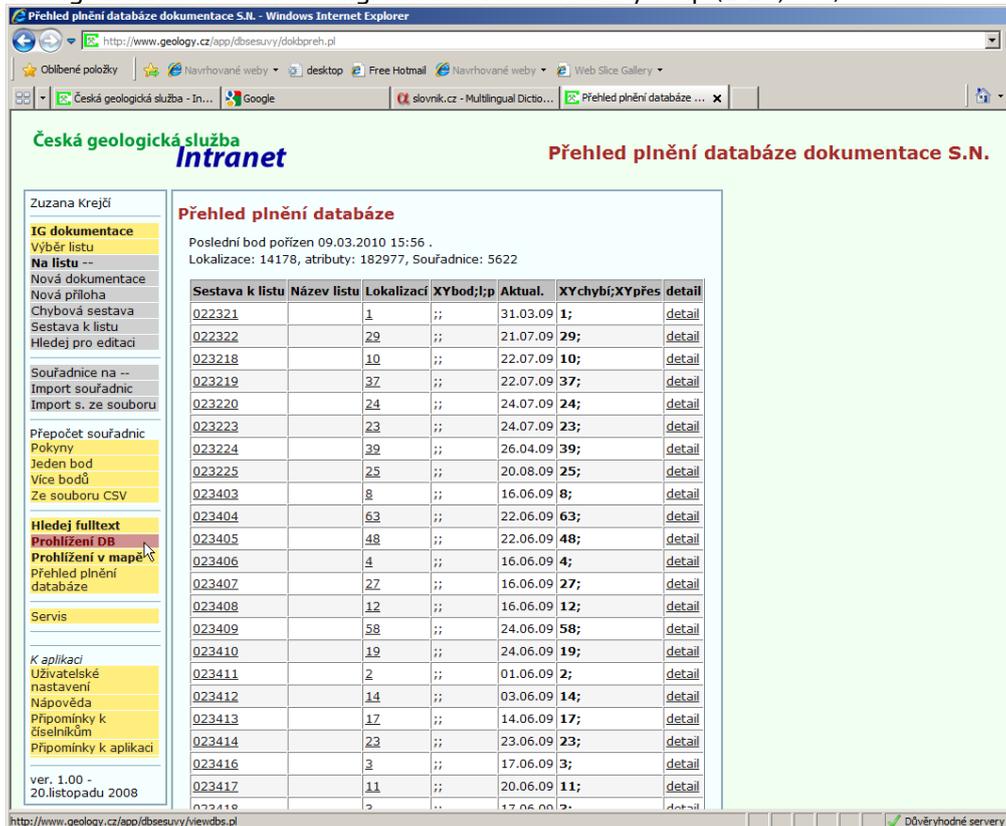
Czech Geological Survey (CGS) Information Portal – Intranet – <http://www.geology.cz/app/dbsesuvy> (no public access, and in national language).

Start page



Statistic

Table including all landslides in the digital landslide inventory map (1:10,000)



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Example of a data sheet

Dokumentace svahové nestability (S.N.) - Windows Internet Explorer

http://www.geology.cz/app/dbseuvy/lokaliz.pl?CBOD=01&MAPA=253307&TYP_BOD=5&CAUTOR=226&tt_e&tt_n=023223

Obilněn položky | Česká geologická služba - In... | 24 Potvrzení přijetí transakce | slovník.cz - Multilingual Dicti... | Dokumentace svahové n... x

Stránka | Zabezpečení | Nástroje

Zuzana Krejčí

IG dokumentace
 Výběr listu
 Na listu 02-32-23
 Nová dokumentace
 Nová příloha
 Chybová sestava
 Sestava k listu
 Hledej pro editaci

Souřadnice na 02-32-23
 Import souřadnic
 Import s. ze souboru

Přepočít souřadnic
 Jeden bod
 Více bodů
 Ze souboru CSV

Hledej fulltext
 Prohlížení DB
 Prohlížení v mapě
 Přehled plnění databáze

Servis

K aplikaci
 Uživatelské nastavení
 nápověda
 Přípomínky k číselníkům
 Přípomínky k aplikaci

ver. 1.00 - 20.listopadu 2008

Aktualizovat **Kopie** **Smaž** Přemenuj Zobrazení bodu (deník) Vložit souřadnice

Kód bodu 01 **Číslo mapového listu (ZM)** 253307 **Mapování sesuvů**
Katastr Halenkovice **Autor** Bil Michal

Lokalizace
 Halenkovice - U Svatých

Popis
 Na okraji obce Halenkovice, ve směru od Spytihněvi, došlo v červenci 2003 k bleskové povodni, která zanesla tuto část obce ornicí do výšky 0,2 m. Extrémní srážky spadly na povodí o ploše do 0,5 km². Voda odtékala suchými údolmi. V obou případech způsobila na lomu spádu, ohraničujícím okraj údolí, erozi až do hloubky 1,5 m. Podloží tvoří vsetinské vrstvy. Rozměry přívalemého proudu od zdrojové po akumulaciční oblast činí 450 x 100 m.

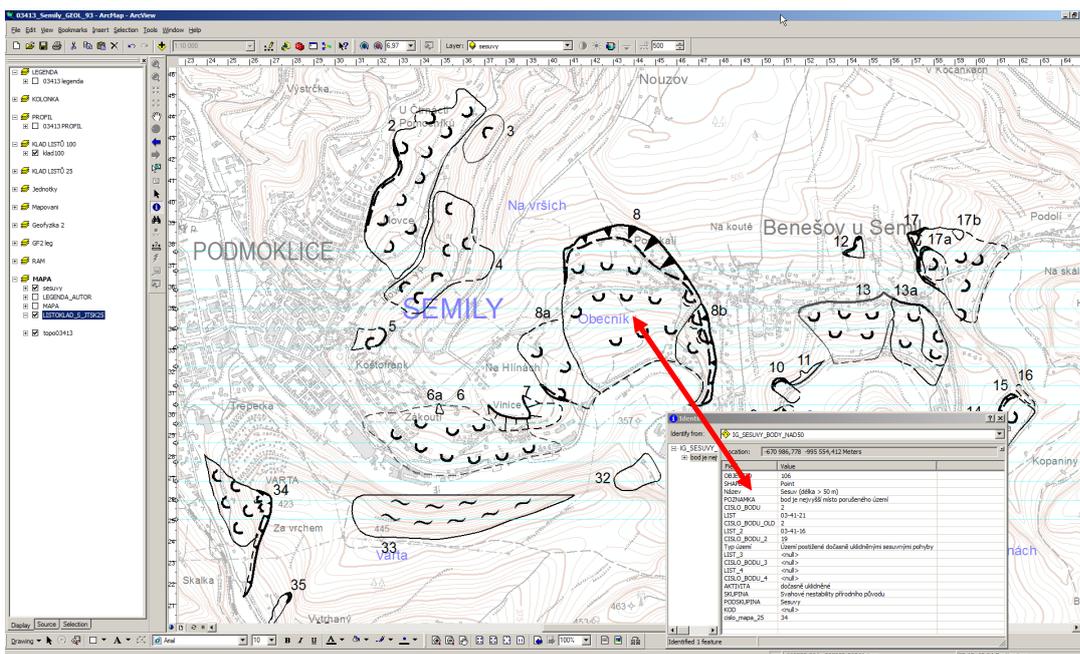
Svahová nestabilita samostatná **Druh svahové nestability** Proudly
Rozměr - délka (m) 450 **Rozměr - šířka (m)** 100
Rozměr - plocha (m²) **Rozměr - objem (m³)**
Výška odlučné stěny (m) **Sklon svahu ve stupních**
Geologické zatřídění **Odhadnutá mocnost S.N.** mělká (1-5 m)
Půdorysný tvar protáhlý (proudový) **Posice S.N.** údolní uzávěr
Typ svahové nestability
 akumulace odvalového říčení **Pasív. faktory-podm. vzniku**
 osyp litologie
 zřícený blok intenzivní zvětrání
 osedající blok stavba území a jeho tektonické porušení
 (sesuv) rotační netektonická (např. charakter vrstevnatosti)
 (sesuv) planární
 (sesuv) rotačně-planární
 těleso hlubinného ploužení
 těleso přívrchového ploužení
 suťový proud (mura, úlomkotok..uvést v definici)
 zemní proud
 bahnotok
 nezcjštěno

Aktivní faktory
 srážky a nasycení vodou **Materiál tělesa S.N.**
 seismické otřesy zvětraliny, svahoviny nebo jiné nezcpevněné horniny
 změna geometrie svahu vodní erozí skalní a poloskalní horniny
 změna geometrie svahu podkopáním antropogenní uložení
 jiná antropogenní činnost jiný materiál

Vývojové stádium / fáze d. iniciální **Relativní stáří deformace** čerstvá - mladší než 10 let v době kontroly
Stupeň aktivity aktivní **Sanační opatření**
Postižené objekty sad, pole, polní cesta **Ohrrožené objekty**
Kategorizace ohrožení **Číslo geofondu**

Dokumentace vlastní **Datum dokumentace v terénu:** 01.01.2003 (tvar DD.MM.RRRR) **Datum přibližné**
 (pro přibližné datum uvádějte 1. v měsíci je-li znám měsíc, případně 1.1., je-li znám pouze rok)

Excerpt of the landslide inventory map



FRANCE: National Database of Ground Movements (BDMvT)

Name of contact person 1	Jean-Philippe Malet	
Telephone number	+33 3 68850036	
E-mail	jeanphilippe.malet@eost.u-strasbg.fr	
Institute	CNRS – School and Observatory of Earth Sciences	
Address	5 rue Descartes, F-67084 Strasbourg Cedex	
Official name of database	National Database of Ground Movements (Base de Données Nationale "Mouvements de Terrain"; BDMvT)	
Owner of database	Bureau des Recherches Géologiques et Minières	
Contact person	mvt@brgm.fr	
Producer of database	Bureau des Recherches Géologiques et Minières, Laboratoire Central des Ponts et Chaussées, Restauration des Terrains en Montagne	
Website	http://www.bdmvt.net	
Approximate area covered (km ²)	675,417	
Official document	Yes, regulatory	No
	Yes, but not regulatory	
Language	French	
First creation date	1994, BDMvT is a clustering of older databases available at the different producers (see above)	
Last update	Jan 2010	
Recurrence for updating	<input type="checkbox"/> Not updated <input type="checkbox"/> After major event <input type="checkbox"/> Every year <input checked="" type="checkbox"/> < 6 months, every 3 months <input type="checkbox"/> Other	
Time period of landslide events covered	1200 - 2010	
Other features than landslides in database	Yes	No
Number of landslides	7,000 to 10,000	
Completeness of the database (estimate)	<input type="checkbox"/> <25% <input type="checkbox"/> 25-50%	<input type="checkbox"/> 50-75% <input checked="" type="checkbox"/> >75%
Landslide inventory map		
Scale	1:25,000	
Reference coordinate system	RGF93	
Information on the positional accuracy	Yes, 3 levels (municipality, local site, exact coordinates)	No
	Don't know	
Landslides representation	<input checked="" type="checkbox"/> Point <input type="checkbox"/> Line <input type="checkbox"/> Closed polygon <input type="checkbox"/> Combination of points, lines and polygons <input type="checkbox"/> Other	
Production method	<input type="checkbox"/> Field survey <input checked="" type="checkbox"/> Historical documents <input type="checkbox"/> Aerial photographs <input type="checkbox"/> LiDAR derivatives <input type="checkbox"/> Satellite remote sensing <input type="checkbox"/> Airborne remote sensing * Other	
Representation of landslide location	<input checked="" type="checkbox"/> Coordinates <input checked="" type="checkbox"/> Municipality <input type="checkbox"/> Province/county <input type="checkbox"/> Other	
Landslide classification	Yes	No
Landslide types	Slide, fall, flow, soil erosion, collapse	
Landslide dimension	<input checked="" type="checkbox"/> Displaced volume <input checked="" type="checkbox"/> Affected area <input checked="" type="checkbox"/> Length <input checked="" type="checkbox"/> Width <input checked="" type="checkbox"/> Travel angle <input checked="" type="checkbox"/> Height (from top to toe) <input checked="" type="checkbox"/> Depth of surface of rupture <input type="checkbox"/> Other	
Geo-environmental characteristics	<input checked="" type="checkbox"/> Lithology <input checked="" type="checkbox"/> Hydrogeology <input type="checkbox"/> Land use	

LANDSLIDE INVENTORIES IN EUROPE

	<input type="checkbox"/> Slope gradient <input type="checkbox"/> Slope aspect <input type="checkbox"/> Slope curvature <input type="checkbox"/> Other	
Completeness of triggering factor	<input type="checkbox"/> 0% <input type="checkbox"/> 0-25% <input checked="" type="checkbox"/> 25-50%	<input type="checkbox"/> 50-75% <input type="checkbox"/> >75%
Landslide data/history	Yes	No
Initiation date	Yes	No
Initiation and reactivation dates	Yes	No
Completeness	<input type="checkbox"/> 0% <input type="checkbox"/> 0-25% <input type="checkbox"/> 25-50%	<input checked="" type="checkbox"/> 50-75% <input type="checkbox"/> >75%
Landslide activity	Yes	No
Activity classes		
Consequences	Yes	No
Completeness	<input type="checkbox"/> 0% <input type="checkbox"/> 0-25% <input checked="" type="checkbox"/> 25-50% Only descriptive, no monetary estimate	<input type="checkbox"/> 50-75% <input type="checkbox"/> >75%
Other information	<input type="checkbox"/> Photographs <input type="checkbox"/> Monitoring data or physical properties <input checked="" type="checkbox"/> Bibliographic references <input type="checkbox"/> Other	

Format	<input type="checkbox"/> Digital, spatial database <input type="checkbox"/> Digital, alphanumeric database <input checked="" type="checkbox"/> Digital, linked spatial and alphanumeric database <input type="checkbox"/> Digital, other <input type="checkbox"/> Paper
Spatial software	<input type="checkbox"/> ArcGIS <input type="checkbox"/> Other
Alphanumeric software	<input type="checkbox"/> Oracle <input type="checkbox"/> Microsoft Access <input type="checkbox"/> Other
Type of paper document	<input type="checkbox"/> Datasheets <input type="checkbox"/> Map
Accessibility	<input checked="" type="checkbox"/> General public <input checked="" type="checkbox"/> Administration <input checked="" type="checkbox"/> Scientific purposes <input type="checkbox"/> Other
Use	<input checked="" type="checkbox"/> For consultation only <input type="checkbox"/> Free of charge under any condition <input type="checkbox"/> After payment <input type="checkbox"/> Without special conditions <input checked="" type="checkbox"/> Under special conditions <input type="checkbox"/> I do not know

Database metadata complying with INSPIRE metadata regulations	Yes	No
	I do not know	
Database provided through/stored in a network following the INSPIRE network services	Yes	No
	I do not know	
Institute registered as an INSPIRE stakeholder	<input checked="" type="checkbox"/> LMO	
	<input type="checkbox"/> SDIC <input type="checkbox"/> I do not know <input type="checkbox"/> No	
Institute willing to register as an INSPIRE stakeholder	<input type="checkbox"/> LMO <input type="checkbox"/> SDIC <input type="checkbox"/> I do not know <input type="checkbox"/> No	
Organization willing to participate in the real testing or reviewing of a draft of the INSPIRE Data Specifications related to the spatial data theme "Natural Risk Zones" when it is developed by the Thematic Working Group	Yes	No
	I do not know	

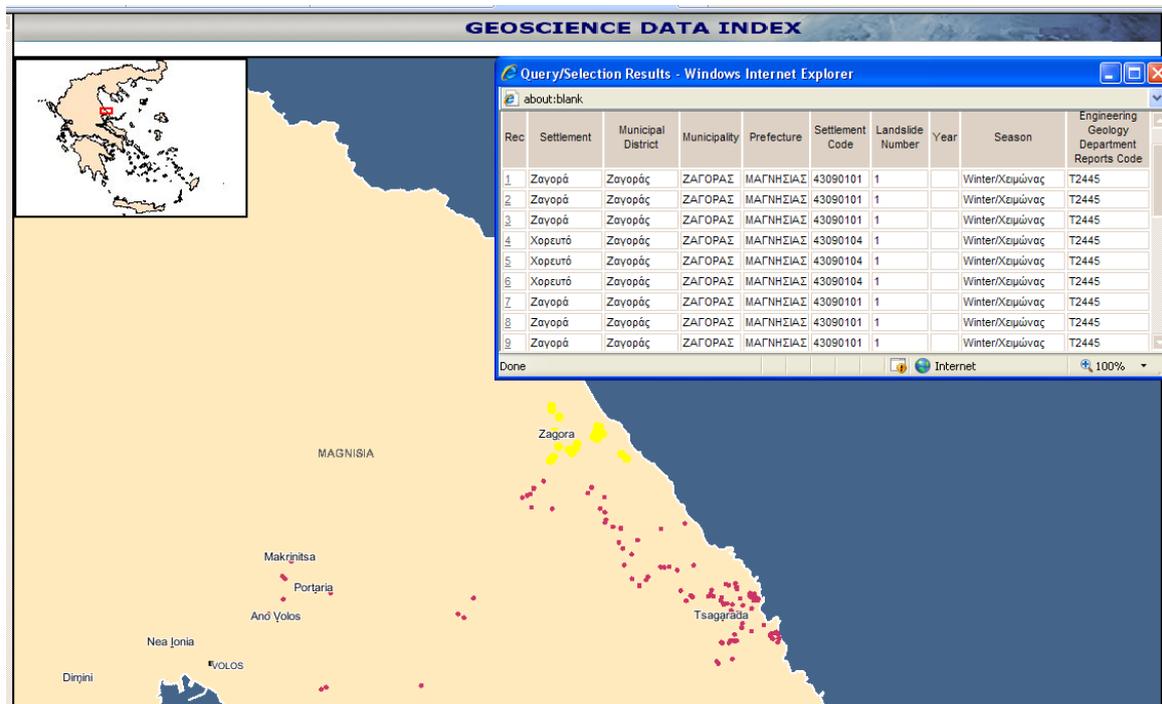
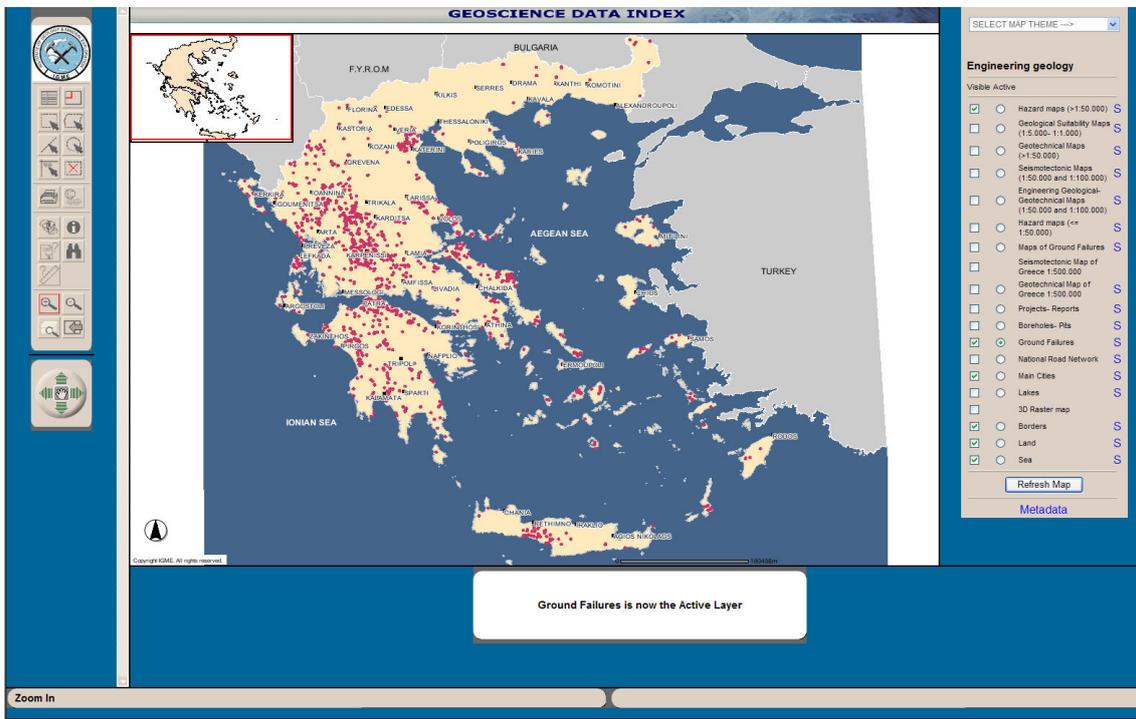
Screenshots of the French Geological Survey (BRGM)'s ground movement database of France (<http://www.bdmvt.net>; July 2012).

Date de mise à jour des données : 21/02/2011

IDENTIFICATION	
Type mouvement :	Glissement
Degré de fiabilité sur le type :	Moyen
Date début :	16/11/2002
Degré de précision sur la date :	Jour
Département :	Hautes-alpes - (05)
Commune principale :	BARCILLONNETTE
Numéro Insee :	05013
Lieu dit :	ROUTE FORESTIERE DES SELLES
Coordonnées X saisi (m) :	885405
Coordonnées Y saisi (m) :	1942711
Type coordonnées :	NTF Lambert 2 Centre carto/étendu
Précision X Y saisi :	Kilomètre
Longitude (°) :	5,9193902015686
Latitude (°) :	44,4268989562988
QUALITÉ : Fiabilité-Précision-Exhaustivité	
Degré de fiabilité de la fiche :	Moyenne
Précision/Exhaustivité de la fiche :	Moyenne (33%)
SOURCE(S)	
Organisme de saisie / Contexte étude :	RTM05 (RTM-Hautes Alpes)
DOMMAGES	
Sur les biens :	Oui
Victimes :	Non
ORIGINE	
Origine :	Inconnue

LANDSLIDE INVENTORIES IN EUROPE

English version of the web interface of the Greek Institute of Geology and Mineral Exploration (IGME)'s ground failure database.
 (http://maps.igme.gr/website_ext/igme_master_ext/viewer.htm?ln=en; July 2011).



GREECE: Ground Failure Map (part of Geodatabase I.G.M.E.)

Name of contact person 1	Eleftheria Poyiadji
Telephone number	+30 210 2413367
E-mail	kynpo@igme.gr
Institute	Institute of Geology and Mineral Exploration (IGME)
Address	1, Sp. Loui, GR 13677 - ACHARNAE
Official name of database	Ground Failure Map (part of Geodatabase I.G.M.E, Engineering Geology)
Owner of database	IGME
Contact person	Eleftheria Poyiadji
Producer of database	IGME
Website	http://maps.igme.gr/website_ext/igme_master_ext/viewer.htm?ln=en

Approximate area covered (km ²)	131,957
Official document	Yes, regulatory No Yes, but not regulatory
Language	Greek and English
First creation date	2008
Last update	2010
Recurrence for updating	<input type="checkbox"/> Not updated <input type="checkbox"/> After major event <input type="checkbox"/> Every year <input checked="" type="checkbox"/> < 6 months, continuous <input type="checkbox"/> Other
Time period of landslide events covered	1950 - 2010
Other features than landslides in database	Yes, settlements and subsidence No
Number of landslides	2200
Completeness of the database (estimate)	<input type="checkbox"/> <25% <input type="checkbox"/> 50-75% <input checked="" type="checkbox"/> 25-50% <input type="checkbox"/> >75%
Landslide inventory map Scale	1:500,000 to 1:50,000
Reference coordinate system	Greek Geodetic Reference System 1987
Information on the positional accuracy	Yes ¹ No Don't know
Landslides representation	<input type="checkbox"/> Point <input type="checkbox"/> Line <input type="checkbox"/> Closed polygon <input checked="" type="checkbox"/> Combination of points, lines and polygons <input type="checkbox"/> Other
Production method	<input checked="" type="checkbox"/> Field survey <input checked="" type="checkbox"/> Historical documents <input type="checkbox"/> Aerial photographs <input type="checkbox"/> LiDAR derivatives <input type="checkbox"/> Satellite remote sensing <input type="checkbox"/> Airborne remote sensing * <input type="checkbox"/> Other
Representation of landslide location	<input checked="" type="checkbox"/> Coordinates <input type="checkbox"/> Municipality <input type="checkbox"/> Province/county <input type="checkbox"/> Other
Landslide classification	Yes No Agreement with Cruden and Varnes (1996)
Landslide types	Translational, rotational, (earth, mud, debris) flow, sand liquefaction, sand outwash, sagging, scree, creep, (soil, rock) topples, (soil, rock) falls, subaqueous slides, squeezing of soft rocks, block slides, lateral spreads, planar, wedge, composite, failure controlled by two surfaces in rocks, sliding and toppling in rocks, failures and inductive stresses in rocks, block sliding on composite surfaces in rocks.
Landslide dimension	<input type="checkbox"/> Displaced volume <input type="checkbox"/> Affected area <input checked="" type="checkbox"/> Length <input checked="" type="checkbox"/> Width <input type="checkbox"/> Travel angle <input type="checkbox"/> Height (from top to toe) <input checked="" type="checkbox"/> Depth of surface of rupture <input type="checkbox"/> Other
Geo-environmental characteristics	<input checked="" type="checkbox"/> Lithology <input checked="" type="checkbox"/> Hydrogeology

LANDSLIDE INVENTORIES IN EUROPE

	<input checked="" type="checkbox"/> Land use <input checked="" type="checkbox"/> Slope gradient <input checked="" type="checkbox"/> Slope aspect <input type="checkbox"/> Slope curvature <input type="checkbox"/> Other	
Completeness of triggering factor	<input type="checkbox"/> 0% <input type="checkbox"/> 0-25% <input type="checkbox"/> 25-50%	<input checked="" type="checkbox"/> 50-75% <input type="checkbox"/> >75%
Landslide data/history	Yes	No
Initiation date	Yes	No
Initiation and reactivation dates	Yes	No
Completeness	<input type="checkbox"/> 0% <input type="checkbox"/> 0-25% <input type="checkbox"/> 25-50%	<input checked="" type="checkbox"/> 50-75% <input type="checkbox"/> >75%
Landslide activity	Yes	No
Activity classes	Active, reactivated, suspended, inactive, dormant, abandoned, stabilized, relict	
Consequences	Yes	No
Completeness	<input type="checkbox"/> 0% <input type="checkbox"/> 0-25% <input type="checkbox"/> 25-50%	<input checked="" type="checkbox"/> 50-75% <input type="checkbox"/> >75%
Other information	<input checked="" type="checkbox"/> Detailed description <input checked="" type="checkbox"/> Photographs <input checked="" type="checkbox"/> Monitoring data or physical properties <input checked="" type="checkbox"/> Bibliographic references <input type="checkbox"/> Other	

Format	<input type="checkbox"/> Digital, spatial database <input type="checkbox"/> Digital, alphanumeric database <input checked="" type="checkbox"/> Digital, linked spatial and alphanumeric database <input type="checkbox"/> Digital, other <input type="checkbox"/> Paper
Spatial software	<input checked="" type="checkbox"/> ArcGIS <input type="checkbox"/> Other
Alphanumeric software	<input checked="" type="checkbox"/> Oracle <input type="checkbox"/> Microsoft Access <input type="checkbox"/> Other
Type of paper document	<input type="checkbox"/> Datasheets <input type="checkbox"/> Map
Accessibility	<input checked="" type="checkbox"/> General public <input checked="" type="checkbox"/> Administration <input checked="" type="checkbox"/> Scientific purposes <input type="checkbox"/> Other
Use	<input type="checkbox"/> For consultation only <input type="checkbox"/> Free of charge under any condition <input type="checkbox"/> After payment <input type="checkbox"/> Without special conditions <input checked="" type="checkbox"/> Under special conditions <input type="checkbox"/> I do not know

Database metadata complying with INSPIRE metadata regulations	Yes	No
	I do not know	
Database provided through/stored in a network following the INSPIRE network services	Yes	No
	I do not know	
Institute registered as an INSPIRE stakeholder	<input checked="" type="checkbox"/> LMO <input type="checkbox"/> SDIC <input type="checkbox"/> I do not know <input type="checkbox"/> No	
Institute willing to register as an INSPIRE stakeholder	<input type="checkbox"/> LMO <input type="checkbox"/> SDIC <input type="checkbox"/> I do not know <input type="checkbox"/> No	
Organization willing to participate in the real testing or reviewing of a draft of the INSPIRE Data Specifications related to the spatial data theme "Natural Risk Zones" when it is developed by the Thematic Working Group	Yes	No
	I do not know	

¹ The position accuracy depends on the category of data: (a) Old data are only descriptive and the landslide position is a point at the closest known geographical feature (e.g. settlement, church, road). (b) the rest are digitized from field maps

HUNGARY: National Landslides Cadaster

Name of contact person 1	Tamas Oszvald
Telephone number	+36 13731834
E-mail	tamas.oszvald@mbfh.hu
Institute	Hungarian Office for Mining and Geology
Address	H-1145 Budapest, COLUMBUS U. 17-23.
Official name of database	National Landslides Cadaster
Owner of database	Hungarian Office for Mining and Geology
Contact person	Tamas Oszvald
Producer of database	Hungarian Office for Mining and Geology and legal predecessors
Website	/

Approximate area covered (km ²)	93,000
Official document	Yes, regulatory No Yes, but not regulatory
Language	Hungarian
First creation date	1971
Last update	2009
Recurrence for updating	<input type="checkbox"/> Not updated <input type="checkbox"/> After major event <input type="checkbox"/> Every year <input checked="" type="checkbox"/> < 6 months, continuous <input type="checkbox"/> Other
Time period of landslide events covered	From the early 1900s
Other features than landslides in database	Yes, sinkholes, mud floods, settlements located above mines No
Number of landslides	More than 400 (370 settlements)
Completeness of the database (estimate)	<input type="checkbox"/> <25% <input checked="" type="checkbox"/> 50-75% <input type="checkbox"/> 25-50% <input type="checkbox"/> >75%
Landslide inventory map	
Scale	1:100,000
Reference coordinate system	EOTR (National Uniform Map System)
Information on the positional accuracy	Yes No Don't know
Landslides representation	<input checked="" type="checkbox"/> Point <input type="checkbox"/> Line <input type="checkbox"/> Closed polygon <input type="checkbox"/> Combination of points, lines and polygons <input type="checkbox"/> Other
Production method	<input checked="" type="checkbox"/> Field survey <input checked="" type="checkbox"/> Historical documents <input checked="" type="checkbox"/> Aerial photographs <input type="checkbox"/> LiDAR derivatives <input type="checkbox"/> Satellite remote sensing <input type="checkbox"/> Airborne remote sensing * Other
Representation of landslide location	<input type="checkbox"/> Coordinates <input checked="" type="checkbox"/> Municipality <input type="checkbox"/> Province/county <input type="checkbox"/> Other
Landslide classification	Yes No Fodor Tamásné—Kleb Béla, 1986. Engineering Geological Review of Hungary, Budapest, 199 p.
Landslide types	(Rock, loess) fall, Slide, Slump (homogeneous and inhomogeneous rocks), Creep, (Mud, debris, rock) flow, (Karst, loess, artificial) collapse
Landslide dimension	<input checked="" type="checkbox"/> Displaced volume <input checked="" type="checkbox"/> Affected area <input checked="" type="checkbox"/> Length <input checked="" type="checkbox"/> Width <input checked="" type="checkbox"/> Travel angle <input checked="" type="checkbox"/> Height (from top to toe) <input type="checkbox"/> Depth of surface of rupture <input type="checkbox"/> Other
Geo-environmental characteristics	<input checked="" type="checkbox"/> Lithology <input checked="" type="checkbox"/> Hydrogeology <input checked="" type="checkbox"/> Land use <input checked="" type="checkbox"/> Slope gradient

LANDSLIDE INVENTORIES IN EUROPE

	<input type="checkbox"/> Slope aspect <input type="checkbox"/> Slope curvature <input type="checkbox"/> Other	
Completeness of triggering factor	<input type="checkbox"/> 0% <input type="checkbox"/> 0-25% <input checked="" type="checkbox"/> 25-50%	<input type="checkbox"/> 50-75% <input type="checkbox"/> >75%
Landslide data/history	Yes	No
Initiation date	Yes	No
Initiation and reactivation dates	Yes	No
Completeness	<input type="checkbox"/> 0% <input type="checkbox"/> 0-25% <input checked="" type="checkbox"/> 25-50%	<input type="checkbox"/> 50-75% <input type="checkbox"/> >75%
Landslide activity	Yes	No
Activity classes	Not structured	
Consequences	Yes	No
Completeness	<input type="checkbox"/> 0% <input checked="" type="checkbox"/> 0-25% <input type="checkbox"/> 25-50% Only descriptive	<input type="checkbox"/> 50-75% <input type="checkbox"/> >75%
Other information	<input checked="" type="checkbox"/> Photographs <input checked="" type="checkbox"/> Monitoring data or physical properties <input type="checkbox"/> Bibliographic references <input type="checkbox"/> Other	

Format	<input type="checkbox"/> Digital, spatial database <input type="checkbox"/> Digital, alphanumeric database <input checked="" type="checkbox"/> Digital, linked spatial and alphanumeric database <input type="checkbox"/> Digital, other <input checked="" type="checkbox"/> Paper	
Spatial software	<input checked="" type="checkbox"/> ArcGIS <input type="checkbox"/> Other	
Alphanumeric software	<input type="checkbox"/> Oracle <input type="checkbox"/> Microsoft Access <input checked="" type="checkbox"/> Other, FOXPRO	
Type of paper document	<input checked="" type="checkbox"/> Datsheets <input checked="" type="checkbox"/> Map	
Accessibility	<input checked="" type="checkbox"/> General public <input checked="" type="checkbox"/> Administration <input checked="" type="checkbox"/> Scientific purposes <input type="checkbox"/> Other	
Use	<input checked="" type="checkbox"/> For consultation only <input type="checkbox"/> Free of charge under any condition <input type="checkbox"/> After payment <input type="checkbox"/> Without special conditions <input checked="" type="checkbox"/> Under special conditions <input type="checkbox"/> I do not know	

Database metadata complying with INSPIRE metadata regulations	Yes	No
	I do not know	
Database provided through/stored in a network following the INSPIRE network services	Yes	No
	I do not know	
Institute registered as an INSPIRE stakeholder	<input type="checkbox"/> LMO <input type="checkbox"/> SDIC <input type="checkbox"/> I do not know <input checked="" type="checkbox"/> No	
Institute willing to register as an INSPIRE stakeholder	<input type="checkbox"/> LMO <input type="checkbox"/> SDIC <input checked="" type="checkbox"/> I do not know <input type="checkbox"/> No	
Organization willing to participate in the real testing or reviewing of a draft of the INSPIRE Data Specifications related to the spatial data theme "Natural Risk Zones" when it is developed by the Thematic Working Group	Yes	No
	I do not know	

ICELAND: OLI

Name of contact person 1	Jón Kristinn Helgason
Telephone number	+354 4503063
E-mail	jonkr@vedur.is
Institute	Icelandic Meteorological Office (IMO)
Address	Suðurgata 12, 400 Ísafjörður
Official name of database	OLI
Owner of database	Icelandic Meteorological Office (IMO) and the Icelandic Institute of Natural History (IINH)
Contact person	Jón Kristinn Helgason and Tómas Jóhannesson
Producer of database	Icelandic Meteorological Office (IMO)
Website	/
Approximate area covered (km ²)	103,000
Official document	Yes, regulatory No Yes, but not regulatory
Language	Icelandic
First creation date	1999
Last update	Jan 2010
Recurrence for updating	<input type="checkbox"/> Not updated <input checked="" type="checkbox"/> After major event <input type="checkbox"/> Every year <input type="checkbox"/> < 6 months <input type="checkbox"/> Other
Time period of landslide events covered	1000 - 2010
Other features than landslides in database	Yes, snow avalanche No
Number of landslides	Around 5,000
Completeness of the database (estimate)	<input checked="" type="checkbox"/> <25% <input type="checkbox"/> 50-75% <input type="checkbox"/> 25-50% <input type="checkbox"/> >75%
Landslide inventory map	
Scale	Not specified
Reference coordinate system	ISNET93 and WGS94
Information on the positional accuracy	Yes, three levels (channel, site, region) No Don't know
Landslides representation	<input checked="" type="checkbox"/> Point <input type="checkbox"/> Line <input type="checkbox"/> Closed polygon <input type="checkbox"/> Combination of points, lines and polygons <input type="checkbox"/> Other
Production method	<input checked="" type="checkbox"/> Field survey <input checked="" type="checkbox"/> Historical documents <input checked="" type="checkbox"/> Aerial photographs <input type="checkbox"/> LiDAR derivatives <input type="checkbox"/> Satellite remote sensing <input type="checkbox"/> Airborne remote sensing * Other
Representation of landslide location	<input checked="" type="checkbox"/> Coordinates <input type="checkbox"/> Municipality <input type="checkbox"/> Province/county <input type="checkbox"/> Other
Landslide classification	Yes No Agreement with Cruden and Varnes (1996)
Landslide types	(Rock) slide, mud flow, rock fall
Landslide dimension	<input checked="" type="checkbox"/> Displaced volume <input checked="" type="checkbox"/> Affected area <input checked="" type="checkbox"/> Length <input checked="" type="checkbox"/> Width <input checked="" type="checkbox"/> Travel angle <input checked="" type="checkbox"/> Height (from top to toe) <input checked="" type="checkbox"/> Depth of surface of rupture <input type="checkbox"/> Other
Geo-environmental characteristics	<input checked="" type="checkbox"/> Lithology <input checked="" type="checkbox"/> Hydrogeology <input checked="" type="checkbox"/> Land use <input checked="" type="checkbox"/> Slope gradient <input checked="" type="checkbox"/> Slope aspect <input checked="" type="checkbox"/> Slope curvature

LANDSLIDE INVENTORIES IN EUROPE

	<input type="checkbox"/> Other	
Completeness of triggering factor	<input type="checkbox"/> 0% <input checked="" type="checkbox"/> 0-25% <input type="checkbox"/> 25-50%	<input type="checkbox"/> 50-75% <input type="checkbox"/> >75%
Landslide data/history	Yes	No
Initiation date	Yes	No
Initiation and reactivation dates	Yes	No
Completeness	<input type="checkbox"/> 0% <input checked="" type="checkbox"/> 0-25% <input type="checkbox"/> 25-50%	<input type="checkbox"/> 50-75% <input type="checkbox"/> >75%
Landslide activity	Yes	No
Activity classes		
Consequences	Yes	No
Completeness	<input type="checkbox"/> 0% <input type="checkbox"/> 0-25% <input type="checkbox"/> 25-50%	<input type="checkbox"/> 50-75% <input checked="" type="checkbox"/> >75%
	Only descriptive, no monetary value	
Other information	<input checked="" type="checkbox"/> Photographs <input type="checkbox"/> Monitoring data or physical properties <input checked="" type="checkbox"/> Bibliographic references <input type="checkbox"/> Other	

Format	<input type="checkbox"/> Digital, spatial database <input type="checkbox"/> Digital, alphanumeric database <input checked="" type="checkbox"/> Digital, linked spatial and alphanumeric database <input type="checkbox"/> Digital, other <input checked="" type="checkbox"/> Paper
Spatial software	<input checked="" type="checkbox"/> ArcGIS <input type="checkbox"/> Other
Alphanumeric software	<input checked="" type="checkbox"/> Oracle (storing) <input checked="" type="checkbox"/> Microsoft Access (displaying) <input type="checkbox"/> Other
Type of paper document	<input type="checkbox"/> Datasheets <input checked="" type="checkbox"/> Map
Accessibility	<input checked="" type="checkbox"/> General public (only at IMO) <input checked="" type="checkbox"/> Administration <input checked="" type="checkbox"/> Scientific purposes <input type="checkbox"/> Other
Use	<input type="checkbox"/> For consultation only <input type="checkbox"/> Free of charge under any condition <input type="checkbox"/> After payment <input checked="" type="checkbox"/> Without special conditions <input type="checkbox"/> Under special conditions <input type="checkbox"/> I do not know

Database metadata complying with INSPIRE metadata regulations	Yes	No I do not know
Database provided through/stored in a network following the INSPIRE network services	Yes	No I do not know
Institute registered as an INSPIRE stakeholder	<input type="checkbox"/> LMO <input type="checkbox"/> SDIC <input type="checkbox"/> I do not know <input checked="" type="checkbox"/> No	
Institute willing to register as an INSPIRE stakeholder	<input type="checkbox"/> LMO <input type="checkbox"/> SDIC <input checked="" type="checkbox"/> I do not know <input type="checkbox"/> No	
Organization willing to participate in the real testing or reviewing of a draft of the INSPIRE Data Specifications related to the spatial data theme "Natural Risk Zones" when it is developed by the Thematic Working Group	Yes	No I do not know

IRELAND: National Landslide Database

Name of contact person 1	Ronnie Creighton
Telephone number	+353 1 6782804
E-mail	ronnie.creighton@gsi.ie
Institute	Geological Survey of Ireland
Address	Beggars Bush, Haddington Road, Dublin 4
Official name of database	National Landslides Database
Owner of database	Geological Survey of Ireland
Contact person	Dr. Ronnie Creighton
Producer of database	Geological Survey of Ireland
Website	http://www.gsi.ie/mapping.htm
Approximate area covered (km ²)	84,429
Official document	Yes, regulatory No Yes, but not regulatory
Language	English
First creation date	2004
Last update	Jan 2010
Recurrence for updating	<input type="checkbox"/> Not updated <input checked="" type="checkbox"/> After major event <input type="checkbox"/> Every year <input type="checkbox"/> < 6 months <input type="checkbox"/> Other
Time period of landslide events covered	1488 - 2010
Other features than landslides in database	Yes No
Number of landslides	422
Completeness of the database (estimate)	<input type="checkbox"/> <25% <input type="checkbox"/> 50-75% <input checked="" type="checkbox"/> 25-50% <input type="checkbox"/> >75%
Landslide inventory map	
Scale	1:500,000
Reference coordinate system	Irish National Grid
Information on the positional accuracy	Yes, metres accuracy based on No Ordnance Survey Ireland mapping in a GIS
Landslides representation	Don't know <input checked="" type="checkbox"/> Point <input type="checkbox"/> Line <input type="checkbox"/> Closed polygon <input type="checkbox"/> Combination of points, lines and polygons <input type="checkbox"/> Other
Production method	<input checked="" type="checkbox"/> Field survey <input checked="" type="checkbox"/> Historical documents <input checked="" type="checkbox"/> Aerial photographs <input type="checkbox"/> LiDAR derivatives <input checked="" type="checkbox"/> Satellite remote sensing <input checked="" type="checkbox"/> Airborne remote sensing * <input type="checkbox"/> Other
Representation of landslide location	<input checked="" type="checkbox"/> Coordinates <input checked="" type="checkbox"/> Municipality <input checked="" type="checkbox"/> Province/county <input type="checkbox"/> Other
Landslide classification	Yes No Waters et al. (1996), agreement with Cruden and Varnes (1996)
Landslide types	Fall, topple, slide, flow, complex
Landslide dimension	<input checked="" type="checkbox"/> Displaced volume <input checked="" type="checkbox"/> Affected area <input checked="" type="checkbox"/> Length <input checked="" type="checkbox"/> Width <input type="checkbox"/> Travel angle <input checked="" type="checkbox"/> Height (from top to toe) <input type="checkbox"/> Depth of surface of rupture <input type="checkbox"/> Other
Geo-environmental characteristics	<input checked="" type="checkbox"/> Lithology <input checked="" type="checkbox"/> Hydrogeology <input checked="" type="checkbox"/> Land use <input checked="" type="checkbox"/> Slope gradient <input checked="" type="checkbox"/> Slope aspect

LANDSLIDE INVENTORIES IN EUROPE

	<input type="checkbox"/> Slope curvature <input type="checkbox"/> Other	
Completeness of triggering factor	<input type="checkbox"/> 0% <input type="checkbox"/> 0-25% <input checked="" type="checkbox"/> 25-50%	<input type="checkbox"/> 50-75% <input type="checkbox"/> >75%
Landslide data/history	Yes	No
Initiation date	Yes	No
Initiation and reactivation dates	Yes	No
Completeness	<input type="checkbox"/> 0% <input type="checkbox"/> 0-25% <input type="checkbox"/> 25-50%	<input checked="" type="checkbox"/> 50-75% <input type="checkbox"/> >75%
Landslide activity	Yes	No
Activity classes		
Consequences	Yes	No
Completeness	<input type="checkbox"/> 0% <input type="checkbox"/> 0-25% <input checked="" type="checkbox"/> 25-50%	<input type="checkbox"/> 50-75% <input type="checkbox"/> >75%
Other information	<input checked="" type="checkbox"/> Photographs <input type="checkbox"/> Monitoring data or physical properties <input checked="" type="checkbox"/> Bibliographic references <input checked="" type="checkbox"/> Other, weather	

Format	<input type="checkbox"/> Digital, spatial database <input type="checkbox"/> Digital, alphanumeric database <input checked="" type="checkbox"/> Digital, linked spatial and alphanumeric database <input type="checkbox"/> Digital, other <input type="checkbox"/> Paper	
Spatial software	<input checked="" type="checkbox"/> ArcGIS <input type="checkbox"/> Other	
Alphanumeric software	<input type="checkbox"/> Oracle <input checked="" type="checkbox"/> Microsoft Access <input type="checkbox"/> Other	
Type of paper document	<input type="checkbox"/> Datasheets <input type="checkbox"/> Map	
Accessibility	<input checked="" type="checkbox"/> General public <input checked="" type="checkbox"/> Administration <input checked="" type="checkbox"/> Scientific purposes <input type="checkbox"/> Other	
Use	<input type="checkbox"/> For consultation only <input checked="" type="checkbox"/> Free of charge under any condition <input type="checkbox"/> After payment <input type="checkbox"/> Without special conditions <input type="checkbox"/> Under special conditions <input type="checkbox"/> I do not know	

Database metadata complying with INSPIRE metadata regulations	Yes	No
	I do not know	
Database provided through/stored in a network following the INSPIRE network services	Yes	No
	I do not know	
Institute registered as an INSPIRE stakeholder	<input type="checkbox"/> LMO <input type="checkbox"/> SDIC <input type="checkbox"/> I do not know <input checked="" type="checkbox"/> No	
Institute willing to register as an INSPIRE stakeholder	<input type="checkbox"/> LMO <input type="checkbox"/> SDIC <input type="checkbox"/> I do not know <input checked="" type="checkbox"/> No	
Organization willing to participate in the real testing or reviewing of a draft of the INSPIRE Data Specifications related to the spatial data theme "Natural Risk Zones" when it is developed by the Thematic Working Group	Yes	No
	I do not know	

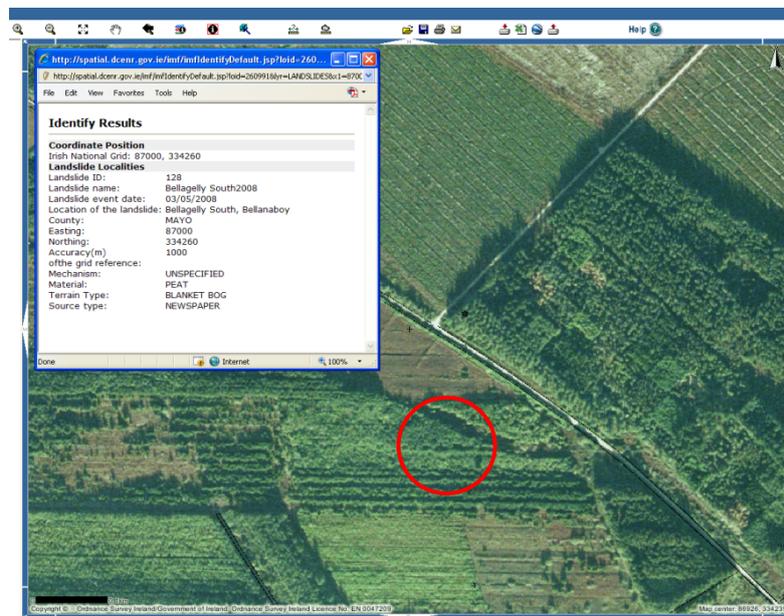
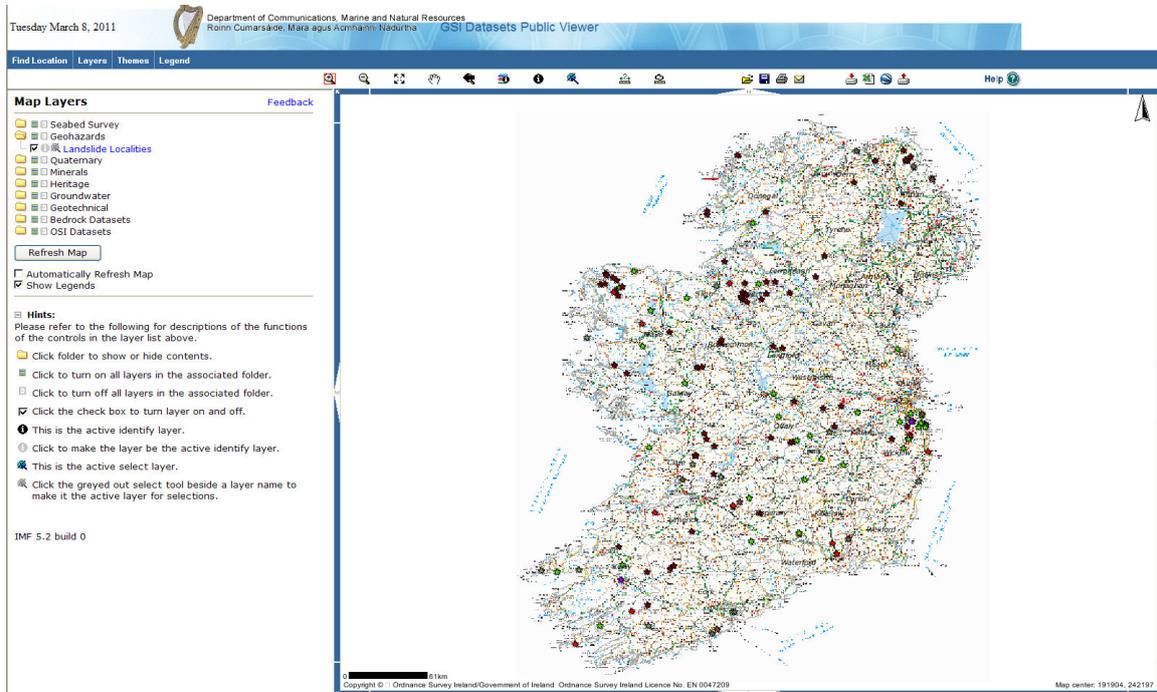
DETAILED DATASHEET FOR EACH NATIONAL LANDSLIDE DATABASE

Some examples of the web interface of the Geological Survey of Ireland (GSI)'s landslide database are shown below.

(http://spatial.dcenr.gov.ie/imf/imf.jsp?site=GSI_Simple ; July 2012).

Information on the database can also be found in:

Creighton R, Irish Landslides Working Group, 2006. Landslides in Ireland. Geological Survey of Ireland, Dublin, Ireland.



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DETAILED DATASHEET FOR EACH NATIONAL LANDSLIDE DATABASE

ITALY: IFFI

Name of contact person 1	Alessandro Trigila
Telephone number	+39 06 50074121
E-mail	alessandro.trigila@isprambiente.it
Institute	Institute for Environmental Protection and Research (Ispra)
Address	Via Vitaliano Brancati , 48 - 00144 Rona
Official name of database	Progetto IFFI (IFFI Project)
Owner of database	ISPRA
Contact person	Alessandro Trigila
Producer of database	ISPRA & Regions/ Self-Governing Provinces
Website	http://www.sinanet.apat.it/progettoiffi

Approximate area covered (km ²)	300,000
Official document	Yes, regulatory No Yes, but not regulatory
Language	Italian, English
First creation date	1999
Last update	2006
Recurrence for updating	<input type="checkbox"/> Not updated <input type="checkbox"/> After major event <input type="checkbox"/> Every year <input type="checkbox"/> < 6 months <input checked="" type="checkbox"/> Other, generally every two years
Time period of landslide events covered	1116 - 2006
Other features than landslides in database	Yes, sinkhole, deep-seated gravitational slope deformation No
Number of landslides	485,004
Completeness of the database (estimate)	<input type="checkbox"/> <25% <input type="checkbox"/> 50-75% <input type="checkbox"/> 25-50% <input checked="" type="checkbox"/> >75%
Landslide inventory map Scale Reference coordinate system Information on the positional accuracy	1:10,000 - 1:25,000 UTM – WGS84 Yes No Don't know
Landslides representation	<input type="checkbox"/> Point <input type="checkbox"/> Line <input type="checkbox"/> Closed polygon <input checked="" type="checkbox"/> Combination of points, lines and polygons <input type="checkbox"/> Other
Production method	<input checked="" type="checkbox"/> Field survey <input checked="" type="checkbox"/> Historical documents <input checked="" type="checkbox"/> Aerial photographs <input type="checkbox"/> LiDAR derivatives <input type="checkbox"/> Satellite remote sensing <input type="checkbox"/> Airborne remote sensing * <input type="checkbox"/> Other: regional and local inventories
Representation of landslide location	<input checked="" type="checkbox"/> Coordinates <input checked="" type="checkbox"/> Municipality <input checked="" type="checkbox"/> Province/county <input type="checkbox"/> Other
Landslide classification	Yes No Agreement with Cruden and Varnes (1996)
Landslide types	Fall, topple, (rotational and translational) slide, lateral spread, (slow and rapid) earth flow, sinkhole, complex landslide, deep-seated gravitational slope deformation, area with numerous falls/topples, numerous sinkholes, numerous shallow slides
Landslide dimension	<input checked="" type="checkbox"/> Displaced volume <input checked="" type="checkbox"/> Affected area <input checked="" type="checkbox"/> Length <input checked="" type="checkbox"/> Width <input type="checkbox"/> Travel angle <input checked="" type="checkbox"/> Height (from top to toe) <input checked="" type="checkbox"/> Depth of surface of rupture <input type="checkbox"/> Other
Geo-environmental characteristics	<input checked="" type="checkbox"/> Lithology <input checked="" type="checkbox"/> Hydrogeology <input checked="" type="checkbox"/> Land use

LANDSLIDE INVENTORIES IN EUROPE

	<input checked="" type="checkbox"/> Slope gradient <input checked="" type="checkbox"/> Slope aspect <input type="checkbox"/> Slope curvature <input type="checkbox"/> Other	
Completeness of triggering factor	<input type="checkbox"/> 0% <input checked="" type="checkbox"/> 0-25% <input type="checkbox"/> 25-50%	<input type="checkbox"/> 50-75% <input type="checkbox"/> >75%
Landslide data/history	Yes	No
Initiation date	Yes	No
Initiation and reactivation dates	Yes	No
Completeness	<input type="checkbox"/> 0% <input checked="" type="checkbox"/> 0-25% <input type="checkbox"/> 25-50%	<input type="checkbox"/> 50-75% <input type="checkbox"/> >75%
Landslide activity	Yes	No
Activity classes	Active, reactivated, suspended, dormant, stabilized, relict	
Consequences	Yes	No
Completeness	<input type="checkbox"/> 0% <input checked="" type="checkbox"/> 0-25% <input type="checkbox"/> 25-50%	<input type="checkbox"/> 50-75% <input type="checkbox"/> >75%
Other information	<input checked="" type="checkbox"/> Only descriptive <input checked="" type="checkbox"/> Photographs <input checked="" type="checkbox"/> Monitoring data or physical properties <input checked="" type="checkbox"/> Bibliographic references <input checked="" type="checkbox"/> Other: videos	
Format	<input type="checkbox"/> Digital, spatial database <input type="checkbox"/> Digital, alphanumeric database <input checked="" type="checkbox"/> Digital, linked spatial and alphanumeric database <input type="checkbox"/> Digital, other <input type="checkbox"/> Paper	
Spatial software	<input checked="" type="checkbox"/> ArcGIS <input type="checkbox"/> Other	
Alphanumeric software	<input type="checkbox"/> Oracle <input checked="" type="checkbox"/> Microsoft Access <input type="checkbox"/> Other	
Type of paper document	<input type="checkbox"/> Datasheets <input type="checkbox"/> Map	
Accessibility	<input checked="" type="checkbox"/> General public <input checked="" type="checkbox"/> Administration <input checked="" type="checkbox"/> Scientific purposes <input type="checkbox"/> Other	
Use	<input checked="" type="checkbox"/> For consultation only <input type="checkbox"/> Free of charge under any condition <input type="checkbox"/> After payment <input type="checkbox"/> Without special conditions <input type="checkbox"/> Under special conditions <input type="checkbox"/> I do not know	
Database metadata complying with INSPIRE metadata regulations	Yes	No
Database provided through/stored in a network following the INSPIRE network services	Yes	No
Institute registered as an INSPIRE stakeholder	<input checked="" type="checkbox"/> LMO <input type="checkbox"/> SDIC <input type="checkbox"/> I do not know <input type="checkbox"/> No	
Institute willing to register as an INSPIRE stakeholder	<input type="checkbox"/> LMO <input type="checkbox"/> SDIC <input type="checkbox"/> I do not know <input type="checkbox"/> No	
Organization willing to participate in the real testing or reviewing of a draft of the INSPIRE Data Specifications related to the spatial data theme "Natural Risk Zones" when it is developed by the Thematic Working Group	Yes	No
	I do not know	

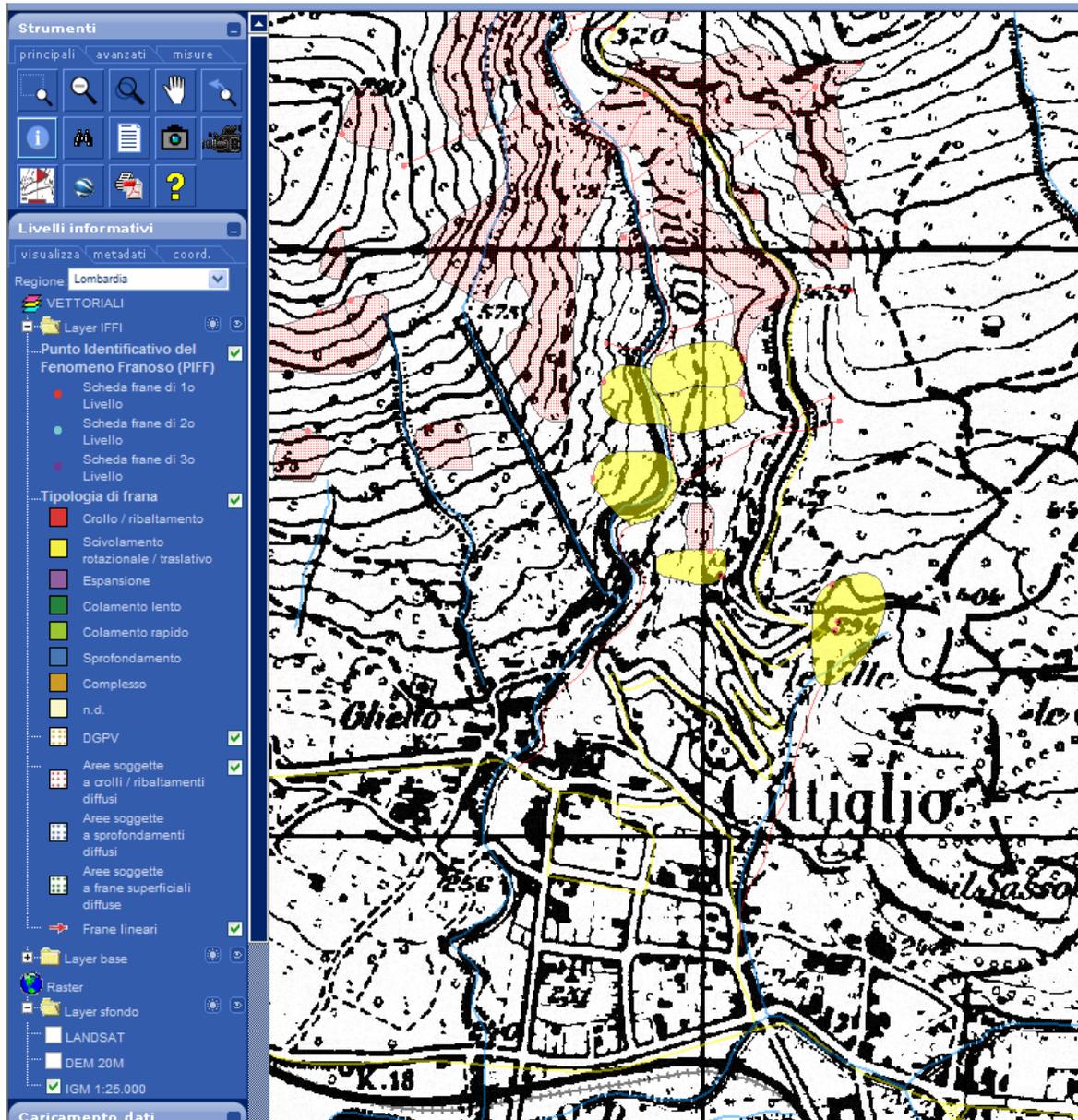
DETAILED DATASHEET FOR EACH NATIONAL LANDSLIDE DATABASE

Examples of web screenshots and datasheets of the Italian Landslide Inventory database (IFFI) by the Institute for Environmental Protection and Research (ISPRA) are given below. (<http://www.sinanet.apat.it/progettoiffi>; July 2012).

Information on the database can also be found in: Trigila, A., Iadanza, C., Spizzichino, D., 2010. Quality assessment of the Italian Landslide inventory using GIS processing. Landslides 7, 455-470.

PROGETTO		 Italian Presidency of Council of Ministers Department of National Technical Services Italian Geological Survey		LANDSLIDE DATA SHEET Vers. 2.33 (2001) by: Amanti M., Bertolini G., Ceccone G., Chiessi V., De Nardo M.T., Ercolani L., Gasparo F., Guzzetti F., Landrini C., Martini M. G., Ramasco M., Redini M., Venditti A., Translated by: Trigila A. & Iadanza C. (2007). <small>Modified from: Guida al censimento dei fenomeni frastosi ed alle loro archiviazioni. AMANTI M., CASAGLI N., CATANI F., D'ORFEO M. & MOTTERAN G. (1996). Miscel. VII Serv. Geol. d'IR. Roma.</small>							
*Alphanumeric code				Landslide ID							
GENERAL INFORMATION											
*Date of report		*Region		Location							
*Reporter's Name		*Municipality		*Province							
*Public institution		*River Basin Authority		IGM place name							
*Topographic Map		Scale		Number		Place name					
GEOMETRY					SLOPE POSITION						
Crown elevation (m)		Azimuth α (°)		*Crown		Ridge		*Toe			
Toe elevation (m)		Total area A (m ²)				Upper					
Horizontal length L ₀ (m)		Length L _a (m)				Middle					
Difference in height H (m)		Volume of displaced material V _r (m ³)				Lower					
Slope angle β (°)		Depth of surface of rupture D _r (m)				Flood plain					
GEOLOGY											
*Geologic unit 1			Geologic unit 2			1 2 *Lithology					
Description 1			Description 2			<input type="checkbox"/> limestone <input type="checkbox"/> travertine <input type="checkbox"/> marl <input type="checkbox"/> limestones-marl flysch <input type="checkbox"/> sandstone, arenaceous flysch <input type="checkbox"/> shale, pelitic flysch <input type="checkbox"/> acid extrusive rock <input type="checkbox"/> basic extrusive rock <input type="checkbox"/> pyroclastic rock <input type="checkbox"/> acid intrusive rock <input type="checkbox"/> basic intrusive rock <input type="checkbox"/> metamorphic rock weakly foliated <input type="checkbox"/> metamorphic rock foliated <input type="checkbox"/> evaporite <input type="checkbox"/> sedimentary siliceous rock <input type="checkbox"/> conglomerate or breccia <input type="checkbox"/> debris <input type="checkbox"/> gravel <input type="checkbox"/> sand <input type="checkbox"/> silt <input type="checkbox"/> clay <input type="checkbox"/> mixed soil <input type="checkbox"/> made ground					
Discontinuity 1: dip direction/ dip		Discontinuity 2: dip direction/ dip		1 2 Bedding attitude							
1 2 Rock mass structure		1 2 *Geotechnical properties		<input type="checkbox"/> horizontal <input type="checkbox"/> dipping into the slope (anaclinal) <input type="checkbox"/> obliquely relative to the slope <input type="checkbox"/> obliquely (orthoclinal) <input type="checkbox"/> obliquely (plagioclinal) <input type="checkbox"/> downslope (cataclinal) <input type="checkbox"/> downslope steeper than slope <input type="checkbox"/> dipping out of the slope <input type="checkbox"/> parallel to slope 1 2 Weathering <input type="checkbox"/> fresh <input type="checkbox"/> slightly weathered <input type="checkbox"/> moderately weathered <input type="checkbox"/> highly weathered <input type="checkbox"/> completely weathered Notes <input type="checkbox"/> mixed soil <input type="checkbox"/> made ground							
1 2 Joint spacing		<input type="checkbox"/> massive <input type="checkbox"/> stratified <input type="checkbox"/> fissile <input type="checkbox"/> moderately jointed <input type="checkbox"/> fractured <input type="checkbox"/> schistose <input type="checkbox"/> vacuolar <input type="checkbox"/> chaotic		<input type="checkbox"/> rock <input type="checkbox"/> lapideous rock <input type="checkbox"/> weak rock <input type="checkbox"/> debris <input type="checkbox"/> grained soil <input type="checkbox"/> dense grained soil <input type="checkbox"/> loose grained soil <input type="checkbox"/> cohesive soil <input type="checkbox"/> firm cohesive soil <input type="checkbox"/> soft cohesive soil <input type="checkbox"/> organic soil <input type="checkbox"/> complex unit <input type="checkbox"/> alternating beds <input type="checkbox"/> mélange							
<input type="checkbox"/> very wide (> 2m) <input type="checkbox"/> wide (60cm - 2m) <input type="checkbox"/> moderate (20cm - 60cm) <input type="checkbox"/> close (6cm - 20cm) <input type="checkbox"/> very close (<6cm)											
*LAND COVER					*SLOPE ASPECT						
<input type="checkbox"/> urban areas <input type="checkbox"/> mineral extraction sites <input type="checkbox"/> arable land <input type="checkbox"/> Annual crops associated with permanent crops <input type="checkbox"/> permanent crops <input type="checkbox"/> riparian vegetation <input type="checkbox"/> reforestation <input type="checkbox"/> coppice woodland <input type="checkbox"/> forest trees <input type="checkbox"/> sparsely vegetated areas <input type="checkbox"/> bush <input type="checkbox"/> pastures					<input type="checkbox"/> N <input type="checkbox"/> NE <input type="checkbox"/> E <input type="checkbox"/> SE <input type="checkbox"/> S <input type="checkbox"/> SW <input type="checkbox"/> W <input type="checkbox"/> NW						
HYDROGEOLOGY			CLASSIFICATION								
<input type="checkbox"/> absent <input type="checkbox"/> stagnant <input type="checkbox"/> diffuse runoff <input type="checkbox"/> concentrate runoff		<input type="checkbox"/> *1 liv <input type="checkbox"/> 1 2 *Type of movement		<input type="checkbox"/> unclassified <input type="checkbox"/> 1 2 Rate of movement		<input type="checkbox"/> 1 2 Material		<input type="checkbox"/> 1 2 Water content			
<input type="checkbox"/> absent <input type="checkbox"/> diffuse <input type="checkbox"/> local		<input type="checkbox"/> absent <input type="checkbox"/> unconfined <input type="checkbox"/> confined		<input type="checkbox"/> lateral spread <input type="checkbox"/> slow earth flow <input type="checkbox"/> rapid debris flow <input type="checkbox"/> sinkhole		<input type="checkbox"/> extremely slow (< 5*10 ⁻¹⁰ m/s) <input type="checkbox"/> very slow (< 5*10 ⁻⁸ m/s) <input type="checkbox"/> slow (< 5*10 ⁻⁶ m/s) <input type="checkbox"/> moderate (< 5*10 ⁻⁴ m/s) <input type="checkbox"/> rapid (< 5*10 ⁻² m/s) <input type="checkbox"/> very rapid (< 5 m/s) <input type="checkbox"/> extremely rapid (> 5 m/s)		<input type="checkbox"/> rock <input type="checkbox"/> debris <input type="checkbox"/> earth <input type="checkbox"/> dry <input type="checkbox"/> moist <input type="checkbox"/> wet <input type="checkbox"/> very wet			
N°		Depth (m)		<input type="checkbox"/> complex landslide <input type="checkbox"/> deep-seated gravitational slope deformation <input type="checkbox"/> area affected by numerous rockfalls/topples <input type="checkbox"/> area affected by numerous sinkholes <input type="checkbox"/> area affected by numerous shallow landslides		Notes:					
ACTIVITY											
*State			Distribution			Style					
<input type="checkbox"/> active <input type="checkbox"/> reactivated <input type="checkbox"/> suspended			<input type="checkbox"/> dormant <input type="checkbox"/> stabilized <input type="checkbox"/> artificially stabilized <input type="checkbox"/> abandoned			<input type="checkbox"/> moving <input type="checkbox"/> retrogressive <input type="checkbox"/> widening <input type="checkbox"/> enlarging			<input type="checkbox"/> advancing <input type="checkbox"/> diminishing <input type="checkbox"/> confined		
						<input type="checkbox"/> single <input type="checkbox"/> complex <input type="checkbox"/> composite					
						<input type="checkbox"/> multiple <input type="checkbox"/> successive					

An example of the database for a village in Lombardy is shown in the screenshots below.



DATI ALFANUMERICI DEGLI ELEMENTI RELATIVI ALLA CARTOGRAFIA IFFI													
Frana 1													
IDFrana	Regione	Provincia	Comune	Autorita' di Bacino	Tipo di movimento	Attivita	Litologia	Uso del suolo	Metodo usato per la valutazione del movimento e dell'attivita'	Danno	Area della frana (m ²)	Data evento (gg/mm/aaaa)	Causa Interventi
0120019100	Lombardia	Varese	Cittiglio	Po	Svilramento rotazionale/traslattivo	Quiescente			Fotointerpretazione	n.d.	14136		

ITALY: Areas Affected by Landslides and Floods in Italy (AVI)

Name of contact person 1	F. Guzzetti	
Telephone number	+39 075 5014402	
E-mail	fausto.guzzetti@irpi.cnr.it	
Institute	National Research Council, Research Institute for Hydrogeological Protection (CNR-IRPI)	
Address	Via Madonna Alta 126; 06128 Perugia	
Official name of database	Areas Affected by Landslides and Floods in Italy, AVI (Aree Vulnerate Italiane)	
Owner of database	CNR-IRPI / Minister of Civil Protection	
Contact person	F. Guzzetti	
Producer of database	CNR-IRPI	
Website	http://avi.gndci.cnr.it; http://sici.irpi.cnr.it	
Approximate area covered (km ²)	300,000	
Official document	Yes, regulatory	No
	Yes, but not regulatory	
Language	Italian	
First creation date	1990	
Last update	2001	
Recurrence for updating	<input checked="" type="checkbox"/> Not updated <input type="checkbox"/> After major event <input type="checkbox"/> Every year <input type="checkbox"/> < 6 months <input type="checkbox"/> Other	
Time period of landslide events covered	1009 - 2001	
Other features than landslides in database	Yes, floods	No
Number of landslides	21,159	
Completeness of the database (estimate)	<input checked="" type="checkbox"/> <25% <input type="checkbox"/> 50-75% <input type="checkbox"/> 25-50% <input type="checkbox"/> >75%	
Landslide inventory map		
Scale	/	
Reference coordinate system	/	
Information on the positional accuracy	Yes, two levels (exact location, municipality centre)	No
	Don't know	
Landslides representation	<input checked="" type="checkbox"/> Point <input type="checkbox"/> Line <input type="checkbox"/> Closed polygon <input type="checkbox"/> Combination of points, lines and polygons <input type="checkbox"/> Other	
Production method	<input type="checkbox"/> Field survey <input checked="" type="checkbox"/> Historical documents <input type="checkbox"/> Aerial photographs <input type="checkbox"/> LiDAR derivatives <input type="checkbox"/> Satellite remote sensing <input type="checkbox"/> Airborne remote sensing * <input checked="" type="checkbox"/> Other: Interviews with experts, regional catalogues	
Representation of landslide location	<input checked="" type="checkbox"/> Coordinates <input checked="" type="checkbox"/> Municipality <input checked="" type="checkbox"/> Province/county <input checked="" type="checkbox"/> Other: River basin	
Landslide classification	Yes	No
	Agreement with Cruden and Varnes (1996)	
Landslide types	Complex landslides, slides, fall, flows	
Landslide dimension	<input checked="" type="checkbox"/> Displaced volume <input checked="" type="checkbox"/> Affected area <input checked="" type="checkbox"/> Length <input checked="" type="checkbox"/> Width <input type="checkbox"/> Travel angle <input checked="" type="checkbox"/> Height (from top to toe) <input checked="" type="checkbox"/> Depth of surface of rupture <input type="checkbox"/> Other	
Geo-environmental characteristics	<input checked="" type="checkbox"/> Lithology <input type="checkbox"/> Hydrogeology <input checked="" type="checkbox"/> Land use <input checked="" type="checkbox"/> Slope gradient <input checked="" type="checkbox"/> Slope aspect	

LANDSLIDE INVENTORIES IN EUROPE

	<input type="checkbox"/> Slope curvature <input checked="" type="checkbox"/> Other: Physiographic unit	
Completeness of triggering factor	<input type="checkbox"/> 0% <input type="checkbox"/> 0-25% <input type="checkbox"/> 25-50%	<input type="checkbox"/> 50-75% <input type="checkbox"/> >75%
	No estimate available	
Landslide data/history	Yes	No
Initiation date	Yes	No
Initiation and reactivation dates	Yes	No
Completeness	<input type="checkbox"/> 0% <input type="checkbox"/> 0-25% <input type="checkbox"/> 25-50%	<input checked="" type="checkbox"/> 50-75% <input type="checkbox"/> >75%
Landslide activity	Yes	No
Activity classes		
Consequences	Yes, but no estimate available	No
Completeness	<input type="checkbox"/> 0% <input type="checkbox"/> 0-25% <input type="checkbox"/> 25-50%	<input type="checkbox"/> 50-75% <input type="checkbox"/> >75%
	Monetary value for 330 landslides, for the rest descriptive	
Other information	<input checked="" type="checkbox"/> Photographs <input type="checkbox"/> Monitoring data or physical properties <input checked="" type="checkbox"/> Bibliographic references <input type="checkbox"/> Other	

Format	<input type="checkbox"/> Digital, spatial database <input type="checkbox"/> Digital, alphanumeric database <input checked="" type="checkbox"/> Digital, linked spatial and alphanumeric database <input type="checkbox"/> Digital, other <input type="checkbox"/> Paper	
Spatial software	<input checked="" type="checkbox"/> ArcGIS <input type="checkbox"/> Other	
Alphanumeric software	<input type="checkbox"/> Oracle <input type="checkbox"/> Microsoft Access <input checked="" type="checkbox"/> Other: PostgreSQL	
Type of paper document	<input type="checkbox"/> Datasheets <input type="checkbox"/> Map	
Accessibility	<input checked="" type="checkbox"/> General public <input checked="" type="checkbox"/> Administration <input checked="" type="checkbox"/> Scientific purposes <input type="checkbox"/> Other	
Use	<input type="checkbox"/> For consultation only <input type="checkbox"/> Free of charge under any condition <input type="checkbox"/> After payment <input type="checkbox"/> Without special conditions <input checked="" type="checkbox"/> Under special conditions <input type="checkbox"/> I do not know	

Database metadata complying with INSPIRE metadata regulations	Yes	No I do not know
Database provided through/stored in a network following the INSPIRE network services	Yes	No I do not know
Institute registered as an INSPIRE stakeholder	<input type="checkbox"/> LMO <input type="checkbox"/> SDIC <input type="checkbox"/> I do not know	<input checked="" type="checkbox"/> No
Institute willing to register as an INSPIRE stakeholder	<input type="checkbox"/> LMO <input type="checkbox"/> SDIC	<input checked="" type="checkbox"/> I do not know <input type="checkbox"/> No
Organization willing to participate in the real testing or reviewing of a draft of the INSPIRE Data Specifications related to the spatial data theme "Natural Risk Zones" when it is developed by the Thematic Working Group	Yes	No I do not know

FORMER YUGOSLAV REP. OF MACEDONIA: Landslide Cadastre

Name of contact person 1	Milorad Jovanovski
Telephone number	+389 (0) 70236962
E-mail	jovanovski@gf.ukim.edu.mk
Institute	University Sts. Cyril and Methodius, Civil Engineering Faculty
Address	blvd Partizanski odredi 24 P.O.Box 560, 1000, Skopje
Official name of database	Landslide Cadastre
Owner of database	Ministry of Economy, sector for mineral resources
Contact person	No specific contact person at ministry
Producer of database	Different companies
Website	/

Approximate area covered (km ²)	24,000
Official document	Yes, regulatory No Yes, but not regulatory
Language	Macedonian
First creation date	1979
Last update	I do not know
Recurrence for updating	<input type="checkbox"/> Not updated <input type="checkbox"/> After major event <input type="checkbox"/> Every year <input type="checkbox"/> < 6 months <input checked="" type="checkbox"/> Other: irregular
Time period of landslide events covered	1979 - 2010
Other features than landslides in database	Yes No
Number of landslides	More than 150
Completeness of the database (estimate)	<input type="checkbox"/> <25% <input checked="" type="checkbox"/> 50-75% <input type="checkbox"/> 25-50% <input type="checkbox"/> >75%
Landslide inventory map	
Scale	1:100,000
Reference coordinate system	Gauss Kruger
Information on the positional accuracy	Yes No Don't know
Landslides representation	<input type="checkbox"/> Point <input type="checkbox"/> Line <input type="checkbox"/> Closed polygon <input checked="" type="checkbox"/> Combination of points, lines and polygons <input type="checkbox"/> Other
Production method	<input checked="" type="checkbox"/> Field survey <input type="checkbox"/> Historical documents <input type="checkbox"/> Aerial photographs <input type="checkbox"/> LiDAR derivatives <input type="checkbox"/> Satellite remote sensing <input type="checkbox"/> Airborne remote sensing * <input type="checkbox"/> Other
Representation of landslide location	<input type="checkbox"/> Coordinates <input type="checkbox"/> Municipality <input checked="" type="checkbox"/> Province/county <input type="checkbox"/> Other
Landslide classification	Yes No Agreement with Cruden and Varnes (1996) and Zolotarev
Landslide types	
Landslide dimension	<input checked="" type="checkbox"/> Displaced volume <input checked="" type="checkbox"/> Affected area <input checked="" type="checkbox"/> Length <input checked="" type="checkbox"/> Width <input type="checkbox"/> Travel angle <input checked="" type="checkbox"/> Height (from top to toe) <input checked="" type="checkbox"/> Depth of surface of rupture <input type="checkbox"/> Other
Geo-environmental characteristics	<input checked="" type="checkbox"/> Lithology <input checked="" type="checkbox"/> Hydrogeology <input type="checkbox"/> Land use <input checked="" type="checkbox"/> Slope gradient <input checked="" type="checkbox"/> Slope aspect <input type="checkbox"/> Slope curvature <input type="checkbox"/> Other

LANDSLIDE INVENTORIES IN EUROPE

Completeness of triggering factor	<input checked="" type="checkbox"/> 0% <input type="checkbox"/> 0-25% <input type="checkbox"/> 25-50%	<input type="checkbox"/> 50-75% <input type="checkbox"/> >75%
Landslide data/history	Yes	No
Initiation date	Yes	No
Initiation and reactivation dates	Yes	No
Completeness	<input type="checkbox"/> 0% <input checked="" type="checkbox"/> 0-25% <input type="checkbox"/> 25-50%	<input type="checkbox"/> 50-75% <input type="checkbox"/> >75%
Landslide activity	Yes	No
Activity classes	Active, reactivated, dormant, relict, temporary inactive	
Consequences	Yes	No
Completeness	<input type="checkbox"/> 0% <input checked="" type="checkbox"/> 0-25% <input type="checkbox"/> 25-50%	<input type="checkbox"/> 50-75% <input type="checkbox"/> >75%
Other information	<input checked="" type="checkbox"/> Photographs <input checked="" type="checkbox"/> Monitoring data or physical properties <input checked="" type="checkbox"/> Bibliographic references <input type="checkbox"/> Other	

Format	<input type="checkbox"/> Digital, spatial database <input type="checkbox"/> Digital, alphanumeric database <input type="checkbox"/> Digital, linked spatial and alphanumeric database <input type="checkbox"/> Digital, other <input checked="" type="checkbox"/> Paper
Spatial software	<input type="checkbox"/> ArcGIS <input type="checkbox"/> Other
Alphanumeric software	<input type="checkbox"/> Oracle <input type="checkbox"/> Microsoft Access <input type="checkbox"/> Other
Type of paper document	<input checked="" type="checkbox"/> Datasheets <input checked="" type="checkbox"/> Map
Accessibility	<input type="checkbox"/> General public <input checked="" type="checkbox"/> Administration <input checked="" type="checkbox"/> Scientific purposes <input checked="" type="checkbox"/> Other: Agency of state roads, companies (remediation works)
Use	<input checked="" type="checkbox"/> For consultation only <input type="checkbox"/> Free of charge under any condition <input type="checkbox"/> After payment <input type="checkbox"/> Without special conditions <input type="checkbox"/> Under special conditions <input type="checkbox"/> I do not know

Database metadata complying with INSPIRE metadata regulations	Yes	No
	I do not know	
Database provided through/stored in a network following the INSPIRE network services	Yes	No
	I do not know	
Institute registered as an INSPIRE stakeholder	<input type="checkbox"/> LMO <input type="checkbox"/> SDIC <input type="checkbox"/> I do not know <input checked="" type="checkbox"/> No	
Institute willing to register as an INSPIRE stakeholder	<input checked="" type="checkbox"/> LMO <input type="checkbox"/> SDIC <input type="checkbox"/> I do not know <input type="checkbox"/> No	
Organization willing to participate in the real testing or reviewing of a draft of the INSPIRE Data Specifications related to the spatial data theme "Natural Risk Zones" when it is developed by the Thematic Working Group	Yes	No
	I do not know	

NORWAY: National Landslide Database

Name of contact person 1	Thierry Oppikofer
Telephone number	+47 73904189
E-mail	thierry.oppikofer@ngu.no
Institute	Geological Survey of Norway (NGU)
Address	Leiv Eirikssons vei 39, Postboks 6315 Sluppen, NO-7491 Trondheim
Official name of database	National landslide database
Owner of database	Geological Survey of Norway (NGU)
Contact person	Kari Sletten (kari.sletten@ngu.no)
Producer of database	Geological Survey of Norway (NGU)
Website	www.skrednett.no

Approximate area covered (km ²)	385,252
Official document	Yes, regulatory No Yes, but not regulatory
Language	Norwegian
First creation date	2001
Last update	2010
Recurrence for updating	<input type="checkbox"/> Not updated <input type="checkbox"/> After major event <input type="checkbox"/> Every year <input checked="" type="checkbox"/> < 6 months <input type="checkbox"/> Other
Time period of landslide events covered	Major events since 12th century, systematic since 1970s (focus on roads and railroads)
Other features than landslides in database	Yes, snow avalanches, icefall No
Number of landslides	31,500 (including snow avalanches)
Completeness of the database (estimate)	<input checked="" type="checkbox"/> <25% <input type="checkbox"/> 50-75% <input type="checkbox"/> 25-50% <input type="checkbox"/> >75%
Landslide inventory map	
Scale	Variable
Reference coordinate system	WGS84 UTM33N
Information on the positional accuracy	Yes, three levels (numeric value in metres, certain, uncertain) No Don't know
Landslides representation	<input checked="" type="checkbox"/> Point <input type="checkbox"/> Line <input type="checkbox"/> Closed polygon <input type="checkbox"/> Combination of points, lines and polygons <input type="checkbox"/> Other
Production method	<input checked="" type="checkbox"/> Field survey <input checked="" type="checkbox"/> Historical documents <input type="checkbox"/> Aerial photographs <input type="checkbox"/> LiDAR derivatives <input type="checkbox"/> Satellite remote sensing <input type="checkbox"/> Airborne remote sensing * <input checked="" type="checkbox"/> Other: Observations by road authorities and railroad companies
Representation of landslide location	<input checked="" type="checkbox"/> Coordinates <input checked="" type="checkbox"/> Municipality <input checked="" type="checkbox"/> Province/county <input checked="" type="checkbox"/> Other: Address of destroyed object
Landslide classification	Yes No
Landslide types	Norwegian classification Rock fall, rock avalanche, landslide in loose material, debris flow, debris flood, submarine slides
Landslide dimension	<input checked="" type="checkbox"/> Displaced volume <input type="checkbox"/> Affected area <input type="checkbox"/> Length <input type="checkbox"/> Width <input type="checkbox"/> Travel angle <input checked="" type="checkbox"/> Height (from top to toe) <input type="checkbox"/> Depth of surface of rupture <input type="checkbox"/> Other
Geo-environmental characteristics	<input type="checkbox"/> Lithology <input type="checkbox"/> Hydrogeology <input type="checkbox"/> Land use <input type="checkbox"/> Slope gradient

LANDSLIDE INVENTORIES IN EUROPE

	<input type="checkbox"/> Slope aspect <input type="checkbox"/> Slope curvature <input type="checkbox"/> Other	
Completeness of triggering factor	<input checked="" type="checkbox"/> 0% <input type="checkbox"/> 0-25% <input type="checkbox"/> 25-50%	<input type="checkbox"/> 50-75% <input type="checkbox"/> >75%
Landslide data/history	Yes	No
Initiation date	Yes	No
Initiation and reactivation dates	Yes	No
Completeness	<input type="checkbox"/> 0% <input checked="" type="checkbox"/> 0-25% <input type="checkbox"/> 25-50%	<input type="checkbox"/> 50-75% <input type="checkbox"/> >75%
Landslide activity	Yes	No
Activity classes		
Consequences	Yes	No
Completeness	<input type="checkbox"/> 0% <input type="checkbox"/> 0-25% <input type="checkbox"/> 25-50%	<input checked="" type="checkbox"/> 50-75% <input checked="" type="checkbox"/> >75%
Other information	<input type="checkbox"/> Photographs <input type="checkbox"/> Monitoring data or physical properties <input checked="" type="checkbox"/> Bibliographic references <input checked="" type="checkbox"/> Other: Event description	
Format	<input checked="" type="checkbox"/> Digital, spatial database <input type="checkbox"/> Digital, alphanumeric database <input type="checkbox"/> Digital, linked spatial and alphanumeric database <input type="checkbox"/> Digital, other <input type="checkbox"/> Paper	
Spatial software	<input type="checkbox"/> ArcGIS <input checked="" type="checkbox"/> Other: ArcSD/Oracle	
Alphanumeric software	<input type="checkbox"/> Oracle <input type="checkbox"/> Microsoft Access <input type="checkbox"/> Other	
Type of paper document	<input type="checkbox"/> Datasheets <input type="checkbox"/> Map	
Accessibility	<input checked="" type="checkbox"/> General public <input checked="" type="checkbox"/> Administration <input checked="" type="checkbox"/> Scientific purposes <input type="checkbox"/> Other	
Use	<input checked="" type="checkbox"/> For consultation only <input type="checkbox"/> Free of charge under any condition <input type="checkbox"/> After payment <input type="checkbox"/> Without special conditions <input checked="" type="checkbox"/> Under special conditions <input type="checkbox"/> I do not know	
Database metadata complying with INSPIRE metadata regulations	Yes	No
	I do not know	
Database provided through/stored in a network following the INSPIRE network services	Yes	No
	I do not know	
Institute registered as an INSPIRE stakeholder	<input type="checkbox"/> LMO <input type="checkbox"/> SDIC <input type="checkbox"/> I do not know <input checked="" type="checkbox"/> No	
Institute willing to register as an INSPIRE stakeholder	<input checked="" type="checkbox"/> LMO <input type="checkbox"/> SDIC <input type="checkbox"/> I do not know <input type="checkbox"/> No	
Organization willing to participate in the real testing or reviewing of a draft of the INSPIRE Data Specifications related to the spatial data theme "Natural Risk Zones" when it is developed by the Thematic Working Group	Yes	No
	I do not know	

DETAILED DATASHEET FOR EACH NATIONAL LANDSLIDE DATABASE

Example of web screenshot of the 'Areas Affected by Landslides and Floods in Italy' database (AVI) by the CNR-IRPI are given below (<http://avi.gndci.cnr.it/>; August 2012).

The screenshot shows the AVI website interface. The main heading is 'PROGETTO AVI' in large yellow letters. Below it, there is a navigation menu with buttons for 'Home page', 'Il progetto', 'Attività', 'Unità operative', 'Pubblicazioni', 'L'archivio', 'Prodotti', and 'Eventi'. A secondary menu includes 'GNDCI', 'Mappa del sito', 'Posta', 'Aiuto', and 'English version'. The central content area displays the date 'Thursday 09 August 2012' and the title 'Progetto AVI - Catalogo delle informazioni sugli Eventi di Frana'. A search bar labeled 'Ricerca per Comune' is present, with a dropdown menu currently showing 'Seleziona il Comune'. Below the search bar, a text line states: 'Nel Comune di Orvieto sono state censite 115 eventi di frana in 62 Località'. A table follows, listing landslide events with columns for 'Numero Sito', 'Località', 'Data', 'Scheda S4:', and 'Certezza'. A red arrow points to the '100105' entry in the 'Scheda S4:' column.

Numero Sito	Località	Data	Scheda S4:	Certezza
10055023029	Abbadia - Lungo la SP n. 111		2001493	MA
10055023029	Abbadia - Lungo la SP n. 111 per Porano al km 4+500	3/4/1992	6100062	Z
10055023034	Baschi Scalo - Lungo la linea FS Firenze-Roma	3/2/1986	4100106	L
10055023028	Baschi Scalo - Lungo la SS n. 205 Amerina al km 47+500	4/11/1939	2100162	Z
10055023028	Baschi Scalo - Lungo la SS n. 205 Amerina al km 47+500		100290	MA
10055023031	Benano		102019	MA
10055023999	Biagio	21/10/1993	6100068	G
10055023030	Botto	21/10/1993	6100067	Z
10055023999	Camorana	21/10/1993	6100057	G
10055023999	Cerchiara - Lungo la SC nei pressi di Sugara (vicino campo sportivo)	20/11/1991	6100058	G
10055023999	Fossatello - Lungo la SC	21/10/1993	6100071	G
10055023032	Il Poggio		100295	MA
10055023999	La Roccaccia		100296	GMA
10055023033	Monte Cavallo		100297	MA
10055023025	Orsarella	21/10/1993	6100069	Z
10055023056	Orvieto		2200525	MA
10055023056	Orvieto		100008	MA
10055023056	Orvieto	16/12/1999	10100762	Z
10055023056	Orvieto	17/9/1985	100105	Z
10055023056	Orvieto	8/9/1987	4100126	Z
10055023056	Orvieto - Buon Gesù	1982	100044	HM
10055023044	Orvieto - Cannicella	14/2/1984	100041	Z
10055023044	Orvieto - Cannicella	10/1/1961	4100075	Z
10055023049	Orvieto - Caserma Piave		100047	MA
10055023056	Orvieto - Dispensario	2/10/70	4100110	H

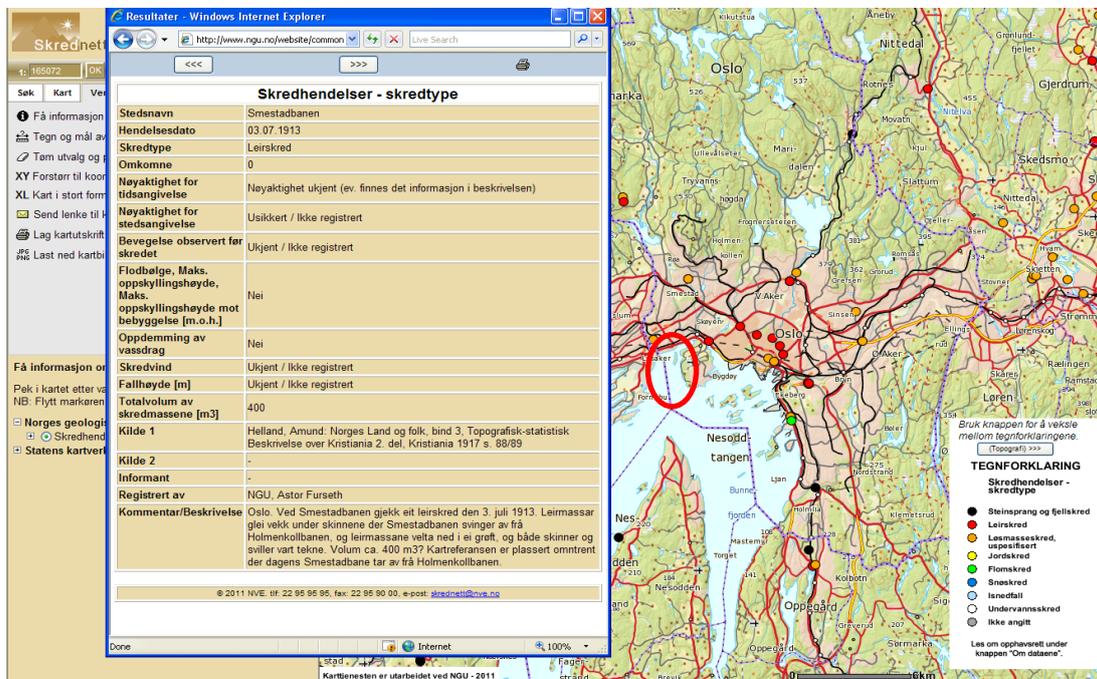
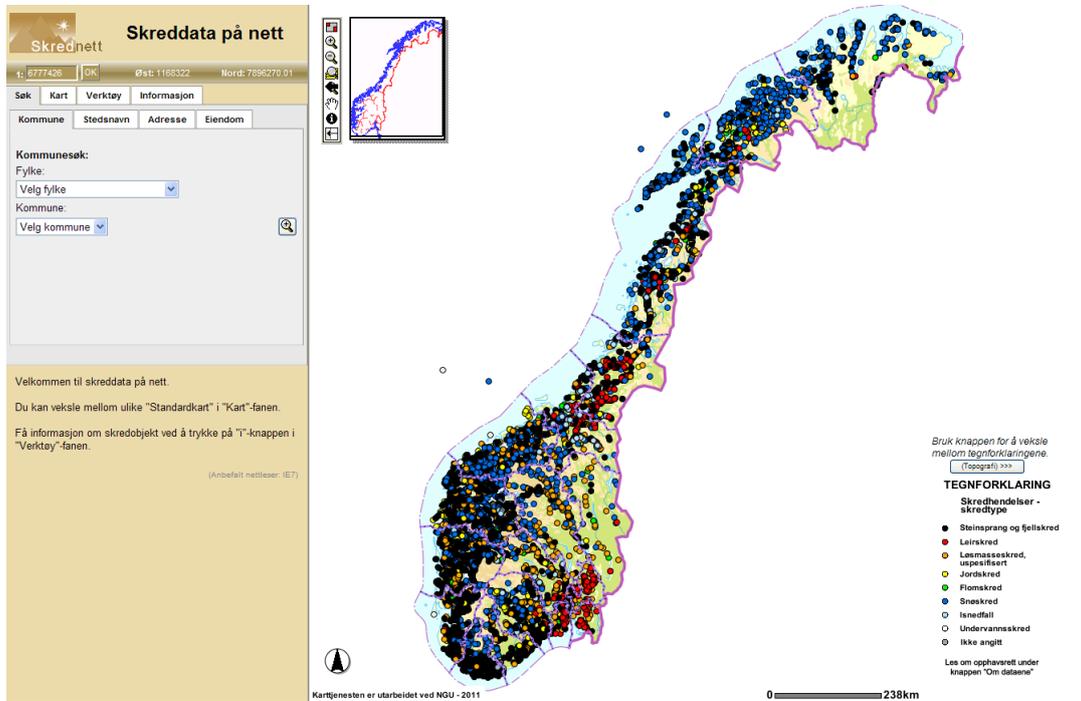
With a mouse click, the detailed datasheet of the landslide is obtained

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Two screenshots of the Norwegian Landslide Database by the Geological Survey of Norway (NGU) are given below. (www.skrednett.no; July 2012).

Information on the database can also be found in:

Jaedicke, C., Lied, K., Kronholm, K., 2009. Integrated database for rapid mass movements in Norway. *Nat. Hazards Earth Syst. Sci.* 9, 469-479.



POLAND: SOPO

Name of contact person 1	Dariusz Grabowski
Telephone number	
E-mail	dariusz.grabowski@pgi.gov.pl
Institute	Polish Geological Institute
Address	Rakowiecka 4 Street, 00-975 Warsaw
Official name of database	SOPO
Owner of database	Polish Geological Institute
Contact person	Dariusz Grabowski
Producer of database	Polish Geological Institute and other geological institutions
Website	/

Approximate area covered (km ²)	312,000
Official document	Yes, regulatory No Yes, but not regulatory
Language	Polish
First creation date	2007
Last update	2010
Recurrence for updating	<input type="checkbox"/> Not updated <input type="checkbox"/> After major event <input type="checkbox"/> Every year <input type="checkbox"/> < 6 months <input checked="" type="checkbox"/> Other
Time period of landslide events covered	
Other features than landslides in database	Yes No
Number of landslides	12,150
Completeness of the database (estimate)	<input checked="" type="checkbox"/> <25% <input type="checkbox"/> 50-75% <input type="checkbox"/> 25-50% <input type="checkbox"/> >75%
Landslide inventory map	
Scale	1:10,000
Reference coordinate system	/
Information on the positional accuracy	Yes No Don't know
Landslides representation	<input type="checkbox"/> Point <input type="checkbox"/> Line <input type="checkbox"/> Closed polygon <input checked="" type="checkbox"/> Combination of points, lines and polygons <input type="checkbox"/> Other
Production method	<input checked="" type="checkbox"/> Field survey <input checked="" type="checkbox"/> Historical documents <input checked="" type="checkbox"/> Aerial photographs <input type="checkbox"/> LiDAR derivatives <input type="checkbox"/> Satellite remote sensing <input type="checkbox"/> Airborne remote sensing * <input type="checkbox"/> Other
Representation of landslide location	<input checked="" type="checkbox"/> Coordinates <input checked="" type="checkbox"/> Municipality <input checked="" type="checkbox"/> Province/county <input type="checkbox"/> Other
Landslide classification	Yes No Agreement with Cruden and Varnes (1996)
Landslide types	
Landslide dimension	<input checked="" type="checkbox"/> Displaced volume <input checked="" type="checkbox"/> Affected area <input checked="" type="checkbox"/> Length <input checked="" type="checkbox"/> Width <input checked="" type="checkbox"/> Travel angle <input checked="" type="checkbox"/> Height (from top to toe) <input checked="" type="checkbox"/> Depth of surface of rupture <input type="checkbox"/> Other
Geo-environmental characteristics	<input checked="" type="checkbox"/> Lithology <input checked="" type="checkbox"/> Hydrogeology <input checked="" type="checkbox"/> Land use <input checked="" type="checkbox"/> Slope gradient <input checked="" type="checkbox"/> Slope aspect <input type="checkbox"/> Slope curvature <input type="checkbox"/> Other

LANDSLIDE INVENTORIES IN EUROPE

Completeness of triggering factor	<input checked="" type="checkbox"/> 0% <input type="checkbox"/> 0-25% <input type="checkbox"/> 25-50%	<input type="checkbox"/> 50-75% <input type="checkbox"/> >75%
Landslide data/history	Yes	No
Initiation date	Yes	No
Initiation and reactivation dates	Yes	No
Completeness	<input type="checkbox"/> 0% <input type="checkbox"/> 0-25% <input type="checkbox"/> 25-50%	<input type="checkbox"/> 50-75% <input type="checkbox"/> >75%
Landslide activity	Yes	No
Activity classes		
Consequences	Yes	No
Completeness	<input checked="" type="checkbox"/> 0% <input type="checkbox"/> 0-25% <input type="checkbox"/> 25-50%	<input type="checkbox"/> 50-75% <input type="checkbox"/> >75%
Other information	<input checked="" type="checkbox"/> Photographs <input checked="" type="checkbox"/> Monitoring data or physical properties <input checked="" type="checkbox"/> Bibliographic references <input type="checkbox"/> Other	

Format	<input type="checkbox"/> Digital, spatial database <input type="checkbox"/> Digital, alphanumeric database <input checked="" type="checkbox"/> Digital, linked spatial and alphanumeric database <input type="checkbox"/> Digital, other <input checked="" type="checkbox"/> Paper
Spatial software	<input checked="" type="checkbox"/> ArcGIS <input type="checkbox"/> Other
Alphanumeric software	<input checked="" type="checkbox"/> Oracle <input type="checkbox"/> Microsoft Access <input type="checkbox"/> Other
Type of paper document	<input checked="" type="checkbox"/> Datasheets <input checked="" type="checkbox"/> Map
Accessibility	<input checked="" type="checkbox"/> General public <input checked="" type="checkbox"/> Administration <input checked="" type="checkbox"/> Scientific purposes <input type="checkbox"/> Other
Use	<input type="checkbox"/> For consultation only <input type="checkbox"/> Free of charge under any condition <input type="checkbox"/> After payment <input type="checkbox"/> Without special conditions <input type="checkbox"/> Under special conditions <input checked="" type="checkbox"/> I do not know

Database metadata complying with INSPIRE metadata regulations	Yes	No
	I do not know	
Database provided through/stored in a network following the INSPIRE network services	Yes	No
	I do not know	
Institute registered as an INSPIRE stakeholder	<input type="checkbox"/> LMO <input checked="" type="checkbox"/> SDIC <input type="checkbox"/> I do not know <input type="checkbox"/> No	
Institute willing to register as an INSPIRE stakeholder	<input type="checkbox"/> LMO <input type="checkbox"/> SDIC <input type="checkbox"/> I do not know <input type="checkbox"/> No	
Organization willing to participate in the real testing or reviewing of a draft of the INSPIRE Data Specifications related to the spatial data theme "Natural Risk Zones" when it is developed by the Thematic Working Group	Yes	No
	I do not know	

PORTUGAL: Disaster Database

Name of contact person 1	Jose Luis Zêzere
Telephone number	+351 217965469
E-mail	zezere@campus.ul.pt
Institute	Centre of Geographical Studies, University of Lisbon
Address	Alameda da Universidade, 1600-214 Lisboa
Official name of database	Disaster database
Owner of database	Centre of Geographical Studies
Contact person	Jose Luis Zêzere
Producer of database	Centre of Geographical Studies
Website	/

Approximate area covered (km ²)	92,090
Official document	Yes, regulatory No Yes, but not regulatory
Language	Portuguese
First creation date	2008
Last update	2011
Recurrence for updating	<input type="checkbox"/> Not updated <input type="checkbox"/> After major event <input checked="" type="checkbox"/> Every year <input type="checkbox"/> < 6 months <input type="checkbox"/> Other
Time period of landslide events covered	1900 - 2011
Other features than landslides in database	Yes, floods No
Number of landslides	163
Completeness of the database (estimate)	<input checked="" type="checkbox"/> <25% <input type="checkbox"/> 50-75% <input type="checkbox"/> 25-50% <input type="checkbox"/> >75%
Landslide inventory map	
Scale	1:1,000,000
Reference coordinate system	UTM National Grid
Information on the positional accuracy	Yes No Don't know
Landslides representation	<input checked="" type="checkbox"/> Point <input type="checkbox"/> Line <input type="checkbox"/> Closed polygon <input type="checkbox"/> Combination of points, lines and polygons <input type="checkbox"/> Other
Production method	<input type="checkbox"/> Field survey <input checked="" type="checkbox"/> Historical documents <input type="checkbox"/> Aerial photographs <input type="checkbox"/> LiDAR derivatives <input type="checkbox"/> Satellite remote sensing <input type="checkbox"/> Airborne remote sensing * <input type="checkbox"/> Other
Representation of landslide location	<input checked="" type="checkbox"/> Coordinates <input checked="" type="checkbox"/> Municipality <input type="checkbox"/> Province/county <input type="checkbox"/> Other
Landslide classification	Yes No
Landslide types	
Landslide dimension	<input type="checkbox"/> Displaced volume <input type="checkbox"/> Affected area <input type="checkbox"/> Length <input type="checkbox"/> Width <input type="checkbox"/> Travel angle <input type="checkbox"/> Height (from top to toe) <input type="checkbox"/> Depth of surface of rupture <input type="checkbox"/> Other
Geo-environmental characteristics	<input type="checkbox"/> Lithology <input type="checkbox"/> Hydrogeology <input type="checkbox"/> Land use <input type="checkbox"/> Slope gradient <input type="checkbox"/> Slope aspect <input type="checkbox"/> Slope curvature <input type="checkbox"/> Other

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Completeness of triggering factor	<input type="checkbox"/> 0% <input type="checkbox"/> 0-25% <input type="checkbox"/> 25-50%	<input type="checkbox"/> 50-75% <input type="checkbox"/> >75%
Landslide data/history	Yes	No
Initiation date	Yes	No
Initiation and reactivation dates	Yes	No
Completeness	<input type="checkbox"/> 0% <input checked="" type="checkbox"/> 0-25% <input type="checkbox"/> 25-50%	<input type="checkbox"/> 50-75% <input type="checkbox"/> >75%
Landslide activity	Yes	No
Activity classes		
Consequences	Yes	No
Completeness	<input type="checkbox"/> 0% <input type="checkbox"/> 0-25% <input type="checkbox"/> 25-50%	<input type="checkbox"/> 50-75% <input checked="" type="checkbox"/> >75%
	Only descriptive	
Other information	<input type="checkbox"/> Photographs <input type="checkbox"/> Monitoring data or physical properties <input checked="" type="checkbox"/> Bibliographic references <input type="checkbox"/> Other	

Format	<input checked="" type="checkbox"/> Digital, spatial database <input checked="" type="checkbox"/> Digital, alphanumeric database <input type="checkbox"/> Digital, linked spatial and alphanumeric database <input type="checkbox"/> Digital, other <input type="checkbox"/> Paper
Spatial software	<input checked="" type="checkbox"/> ArcGIS <input type="checkbox"/> Other
Alphanumeric software	<input type="checkbox"/> Oracle <input type="checkbox"/> Microsoft Access <input checked="" type="checkbox"/> Other: Excel
Type of paper document	<input type="checkbox"/> Datasheets <input type="checkbox"/> Map
Accessibility	<input type="checkbox"/> General public <input type="checkbox"/> Administration <input checked="" type="checkbox"/> Scientific purposes <input type="checkbox"/> Other
Use	<input type="checkbox"/> For consultation only <input type="checkbox"/> Free of charge under any condition <input type="checkbox"/> After payment <input type="checkbox"/> Without special conditions <input type="checkbox"/> Under special conditions <input type="checkbox"/> I do not know

Database metadata complying with INSPIRE metadata regulations	Yes	No I do not know
Database provided through/stored in a network following the INSPIRE network services	Yes	No I do not know
Institute registered as an INSPIRE stakeholder	<input type="checkbox"/> LMO <input type="checkbox"/> SDIC <input type="checkbox"/> I do not know	<input checked="" type="checkbox"/> No
Institute willing to register as an INSPIRE stakeholder	<input type="checkbox"/> LMO <input type="checkbox"/> SDIC	<input checked="" type="checkbox"/> I do not know <input type="checkbox"/> No
Organization willing to participate in the real testing or reviewing of a draft of the INSPIRE Data Specifications related to the spatial data theme "Natural Risk Zones" when it is developed by the Thematic Working Group	Yes	No I do not know

SLOVAKIA: Landslide (Zosunov) Atlas / Register

Name of contact person 1	Pavel Liščák
Telephone number	+421 259375160
E-mail	pavel.liscak@geology.sk; Liscak@fns.uniba.sk
Institute	Geological Survey of the Slovak Republic, SGUDS
Address	Mlynská dolina 1, 817 04 Bratislava 11, Slovakia
Official name of database	Landslide (Zosunov) Atlas / Register
Owner of database	SGUDS
Contact person	Pavel Liščák
Producer of database	Consortium of 5 entities (2 universities, 1 institute and 2 private companies)
Website	http://mapserver.geology.sk/zosuvy/

Approximate area covered (km ²)	2,575,912
Official document	Yes, regulatory No Yes, but not regulatory
Language	Slovak
First creation date	2006
Last update	March 2010
Recurrence for updating	<input type="checkbox"/> Not updated <input type="checkbox"/> After major event <input type="checkbox"/> Every year <input type="checkbox"/> < 6 months <input checked="" type="checkbox"/> Other, landslides detected in the scope of geological projects are included after these projects
Time period of landslide events covered	1960 - 2010
Other features than landslides in database	Yes No
Number of landslides	21,190
Completeness of the database (estimate)	<input type="checkbox"/> <25% <input type="checkbox"/> 50-75% <input type="checkbox"/> 25-50% <input checked="" type="checkbox"/> >75%
Landslide inventory map	
Scale	1:50,000, some originally at 1:10,000
Reference coordinate system	JTSK
Information on the positional accuracy	Yes No Don't know
Landslides representation	<input checked="" type="checkbox"/> Point <input type="checkbox"/> Line <input checked="" type="checkbox"/> Closed polygon <input type="checkbox"/> Combination of points, lines and polygons <input type="checkbox"/> Other
Production method	<input checked="" type="checkbox"/> Field survey <input checked="" type="checkbox"/> Historical documents <input checked="" type="checkbox"/> Aerial photographs <input type="checkbox"/> LiDAR derivatives <input type="checkbox"/> Satellite remote sensing <input type="checkbox"/> Airborne remote sensing * <input type="checkbox"/> Other
Representation of landslide location	<input checked="" type="checkbox"/> Coordinates <input checked="" type="checkbox"/> Municipality <input checked="" type="checkbox"/> Province/county <input checked="" type="checkbox"/> Other: Regional geomorphic and engineering geological divisions
Landslide classification	Yes No Based on Nemcok A., Pasek J., Rybar J. (1974) - Classification of slope movements. J. Geol. Sci., Hydrogeol. Engng. Geology, R. HIG, (in Czech with English abstract) 11, 77-97
Landslide types	Massive disintegration, block ridges, block field, landslides, earth flows, rock falls, (block) slides due to undermining, combinations of the previous types
Landslide dimension	<input type="checkbox"/> Displaced volume <input checked="" type="checkbox"/> Affected area <input checked="" type="checkbox"/> Length <input checked="" type="checkbox"/> Width <input checked="" type="checkbox"/> Travel angle <input type="checkbox"/> Height (from top to toe) <input checked="" type="checkbox"/> Depth of surface of rupture <input type="checkbox"/> Other
Geo-environmental characteristics	<input checked="" type="checkbox"/> Lithology <input checked="" type="checkbox"/> Hydrogeology

LANDSLIDE INVENTORIES IN EUROPE

	<input type="checkbox"/> Land use <input checked="" type="checkbox"/> Slope gradient <input checked="" type="checkbox"/> Slope aspect <input checked="" type="checkbox"/> Slope curvature <input type="checkbox"/> Other	
Completeness of triggering factor	<input type="checkbox"/> 0% <input type="checkbox"/> 0-25% <input type="checkbox"/> 25-50%	<input type="checkbox"/> 50-75% <input checked="" type="checkbox"/> >75%
Landslide data/history	Yes	No
Initiation date	Yes	No
Initiation and reactivation dates	Yes	No
Completeness	<input type="checkbox"/> 0% <input checked="" type="checkbox"/> 0-25% <input type="checkbox"/> 25-50%	<input type="checkbox"/> 50-75% <input type="checkbox"/> >75%
Landslide activity	Yes	No
Activity classes	Active, potentially active, stabilized, with potentially active and active zones, with potentially active and stabilized zones, with active and stabilized zones, with active, potentially active and stabilized zones	
Consequences	Yes	No
Completeness	<input checked="" type="checkbox"/> 0% <input type="checkbox"/> 0-25% <input type="checkbox"/> 25-50%	<input type="checkbox"/> 50-75% <input type="checkbox"/> >75%
Other information	<input type="checkbox"/> Photographs <input type="checkbox"/> Monitoring data or physical properties <input checked="" type="checkbox"/> Bibliographic references <input type="checkbox"/> Other	
Format	<input type="checkbox"/> Digital, spatial database <input type="checkbox"/> Digital, alphanumeric database <input checked="" type="checkbox"/> Digital, linked spatial and alphanumeric database <input type="checkbox"/> Digital, other <input checked="" type="checkbox"/> Paper	
Spatial software	<input checked="" type="checkbox"/> ArcGIS <input type="checkbox"/> Other	
Alphanumeric software	<input checked="" type="checkbox"/> Oracle <input checked="" type="checkbox"/> Microsoft Access <input type="checkbox"/> Other	
Type of paper document	<input checked="" type="checkbox"/> Datasheets <input checked="" type="checkbox"/> Map	
Accessibility	<input checked="" type="checkbox"/> General public <input checked="" type="checkbox"/> Administration <input checked="" type="checkbox"/> Scientific purposes <input type="checkbox"/> Other	
Use	<input type="checkbox"/> For consultation only <input type="checkbox"/> Free of charge under any condition <input type="checkbox"/> After payment <input checked="" type="checkbox"/> Without special conditions from cd in GEOFOND <input type="checkbox"/> Under special conditions <input type="checkbox"/> I do not know	
Database metadata complying with INSPIRE metadata regulations	Yes	No I do not know
Database provided through/stored in a network following the INSPIRE network services	Yes	No I do not know
Institute registered as an INSPIRE stakeholder	<input type="checkbox"/> LMO <input type="checkbox"/> SDIC <input type="checkbox"/> I do not know <input checked="" type="checkbox"/> No	
Institute willing to register as an INSPIRE stakeholder	<input checked="" type="checkbox"/> LMO <input type="checkbox"/> SDIC <input type="checkbox"/> I do not know <input type="checkbox"/> No	
Organization willing to participate in the real testing or reviewing of a draft of the INSPIRE Data Specifications related to the spatial data theme "Natural Risk Zones" when it is developed by the Thematic Working Group	Yes	No I do not know

SLOVENIA: Landslide Database

Name of contact person 1	Marko Komac
Telephone number	+386 1 2809702
E-mail	marko.komac@geo-zs.si
Institute	Geological Survey of Slovenia
Address	Dimičeva ulica 14, SI - 1001 Ljubljana
Official name of database	Landslide Database (part of a larger database GIS_UJME)
Owner of database	Ministry for the Defence
Contact person	urszr@urszr.si
Producer of database	Geological Survey of Slovenia
Weblink	/

Approximate area covered (km ²)	20,270
Official document	Yes, regulatory No Yes, but not regulatory
Language	Slovene
First creation date	1990's
Last update	2005
Recurrence for updating	<input checked="" type="checkbox"/> Not updated <input type="checkbox"/> After major event <input type="checkbox"/> Every year <input type="checkbox"/> < 6 months <input type="checkbox"/> Other
Time period of landslide events covered	1950's - 2005
Other features than landslides in database	Yes No
Number of landslides	6602 (only 3257 with known coordinates)
Completeness of the database (estimate)	<input type="checkbox"/> <25% <input type="checkbox"/> 50-75% <input checked="" type="checkbox"/> 25-50% <input type="checkbox"/> >75%
Landslide inventory map	
Scale	1:25,000
Reference coordinate system	Gauss Kruger
Information on the positional accuracy	Yes No Don't know
Landslides representation	<input checked="" type="checkbox"/> Point <input type="checkbox"/> Line <input type="checkbox"/> Closed polygon <input type="checkbox"/> Combination of points, lines and polygons <input type="checkbox"/> Other
Production method	<input checked="" type="checkbox"/> Field survey <input checked="" type="checkbox"/> Historical documents <input type="checkbox"/> Aerial photographs <input type="checkbox"/> LiDAR derivatives <input type="checkbox"/> Satellite remote sensing <input type="checkbox"/> Airborne remote sensing * <input type="checkbox"/> Other
Representation of landslide location	<input checked="" type="checkbox"/> Coordinates <input checked="" type="checkbox"/> Municipality <input type="checkbox"/> Province/county <input checked="" type="checkbox"/> Other: road kilometers along road section
Landslide classification	Yes No Only surveys from geologists is in agreement with Cruden and Varnes (1996), municipal surveys not
Landslide types	
Landslide dimension	<input type="checkbox"/> Displaced volume <input type="checkbox"/> Affected area <input checked="" type="checkbox"/> Length <input checked="" type="checkbox"/> Width <input type="checkbox"/> Travel angle <input checked="" type="checkbox"/> Height (from top to toe) <input checked="" type="checkbox"/> Depth of surface of rupture <input type="checkbox"/> Other
Geo-environmental characteristics	<input checked="" type="checkbox"/> Lithology <input checked="" type="checkbox"/> Hydrogeology <input type="checkbox"/> Land use <input checked="" type="checkbox"/> Slope gradient <input type="checkbox"/> Slope aspect <input type="checkbox"/> Slope curvature

LANDSLIDE INVENTORIES IN EUROPE

	<input type="checkbox"/> Other	
Completeness of triggering factor	<input type="checkbox"/> 0% <input checked="" type="checkbox"/> 0-25% <input type="checkbox"/> 25-50%	<input type="checkbox"/> 50-75% <input type="checkbox"/> >75%
Landslide data/history	Yes	No
Initiation date	Yes	No
Initiation and reactivation dates	Yes	No
Completeness	<input type="checkbox"/> 0% <input checked="" type="checkbox"/> 0-25% <input type="checkbox"/> 25-50%	<input type="checkbox"/> 50-75% <input type="checkbox"/> >75%
Landslide activity	Yes	No
Activity classes	Active, reactivated, suspended, dormant, relict, inactive	
Consequences	Yes	No
Completeness	<input type="checkbox"/> 0% <input checked="" type="checkbox"/> 0-25% <input type="checkbox"/> 25-50%	<input type="checkbox"/> 50-75% <input type="checkbox"/> >75%
Other information	Only descriptive <input checked="" type="checkbox"/> Photographs <input checked="" type="checkbox"/> Monitoring data or physical properties <input checked="" type="checkbox"/> Bibliographic references <input type="checkbox"/> Other	

Format	<input type="checkbox"/> Digital, spatial database <input type="checkbox"/> Digital, alphanumeric database <input checked="" type="checkbox"/> Digital, linked spatial and alphanumeric database <input type="checkbox"/> Digital, other <input checked="" type="checkbox"/> Paper
Spatial software	<input checked="" type="checkbox"/> ArcGIS <input type="checkbox"/> Other
Alphanumeric software	<input checked="" type="checkbox"/> Oracle <input type="checkbox"/> Microsoft Access <input type="checkbox"/> Other
Type of paper document	<input type="checkbox"/> Datasheets <input checked="" type="checkbox"/> Map
Accessibility	<input type="checkbox"/> General public <input checked="" type="checkbox"/> Administration <input checked="" type="checkbox"/> Scientific purposes <input type="checkbox"/> Other
Use	<input type="checkbox"/> For consultation only <input type="checkbox"/> Free of charge under any condition <input type="checkbox"/> After payment <input type="checkbox"/> Without special conditions <input type="checkbox"/> Under special conditions <input checked="" type="checkbox"/> I do not know

Database metadata complying with INSPIRE metadata regulations	Yes	No
	I do not know	
Database provided through/stored in a network following the INSPIRE network services	Yes	No
	I do not know	
Institute registered as an INSPIRE stakeholder	<input type="checkbox"/> LMO <input checked="" type="checkbox"/> SDIC <input type="checkbox"/> I do not know <input type="checkbox"/> No	
Institute willing to register as an INSPIRE stakeholder	<input type="checkbox"/> LMO <input type="checkbox"/> SDIC <input type="checkbox"/> I do not know <input type="checkbox"/> No	
Organization willing to participate in the real testing or reviewing of a draft of the INSPIRE Data Specifications related to the spatial data theme "Natural Risk Zones" when it is developed by the Thematic Working Group	Yes	No
	I do not know	

SPAIN: Database of Geological Hazards

Name of contact person 1	Juan Carlos García López-Davalillo
Telephone number	+34 963943474
E-mail	jc.garcia@igme.es
Institute	Spanish Geological and Mining Service (IGME).
Address	c/ Ciril Amorós 42 Entrepantia; 46004 Valencia
Official name of database	Spanish Database of Geological Hazards
Owner of database	IGME
Contact person	Mercedes Ferrer Gijón
Producer of database	IGME and Consorcio de Compensación de Seguros
Website	/

Approximate area covered (km ²)	505,000
Official document	Yes, regulatory No Yes, but not regulatory
Language	Spanish
First creation date	1987
Last update	2004
Recurrence for updating	<input checked="" type="checkbox"/> Not updated <input type="checkbox"/> After major event <input type="checkbox"/> Every year <input type="checkbox"/> < 6 months <input type="checkbox"/> Other
Time period of landslide events covered	1714 - 2004
Other features than landslides in database	Yes, floods and earthquakes No
Number of landslides	569
Completeness of the database (estimate)	<input checked="" type="checkbox"/> <25% <input type="checkbox"/> 50-75% <input type="checkbox"/> 25-50% <input type="checkbox"/> >75%
Landslide inventory map	No map available
Scale	
Reference coordinate system	
Information on the positional accuracy	Yes No Don't know
Landslides representation	<input type="checkbox"/> Point <input type="checkbox"/> Line <input type="checkbox"/> Closed polygon <input type="checkbox"/> Combination of points, lines and polygons <input type="checkbox"/> Other
Production method	<input type="checkbox"/> Field survey <input checked="" type="checkbox"/> Historical documents <input type="checkbox"/> Aerial photographs <input type="checkbox"/> LiDAR derivatives <input type="checkbox"/> Satellite remote sensing <input type="checkbox"/> Airborne remote sensing * <input type="checkbox"/> Other
Representation of landslide location	<input checked="" type="checkbox"/> Coordinates <input checked="" type="checkbox"/> Municipality <input checked="" type="checkbox"/> Province/county <input checked="" type="checkbox"/> Other: Camp sites
Landslide classification	Yes No Agreement with Cruden and Varnes (1996)
Landslide types	Falls, rotational slide, translational slide, flows, lateral spread, complex landslides
Landslide dimension	<input checked="" type="checkbox"/> Displaced volume <input checked="" type="checkbox"/> Affected area <input checked="" type="checkbox"/> Length <input checked="" type="checkbox"/> Width <input checked="" type="checkbox"/> Travel angle <input type="checkbox"/> Height (from top to toe) <input checked="" type="checkbox"/> Depth of surface of rupture <input type="checkbox"/> Other
Geo-environmental characteristics	<input checked="" type="checkbox"/> Lithology <input checked="" type="checkbox"/> Hydrogeology <input type="checkbox"/> Land use <input checked="" type="checkbox"/> Slope gradient <input type="checkbox"/> Slope aspect <input type="checkbox"/> Slope curvature

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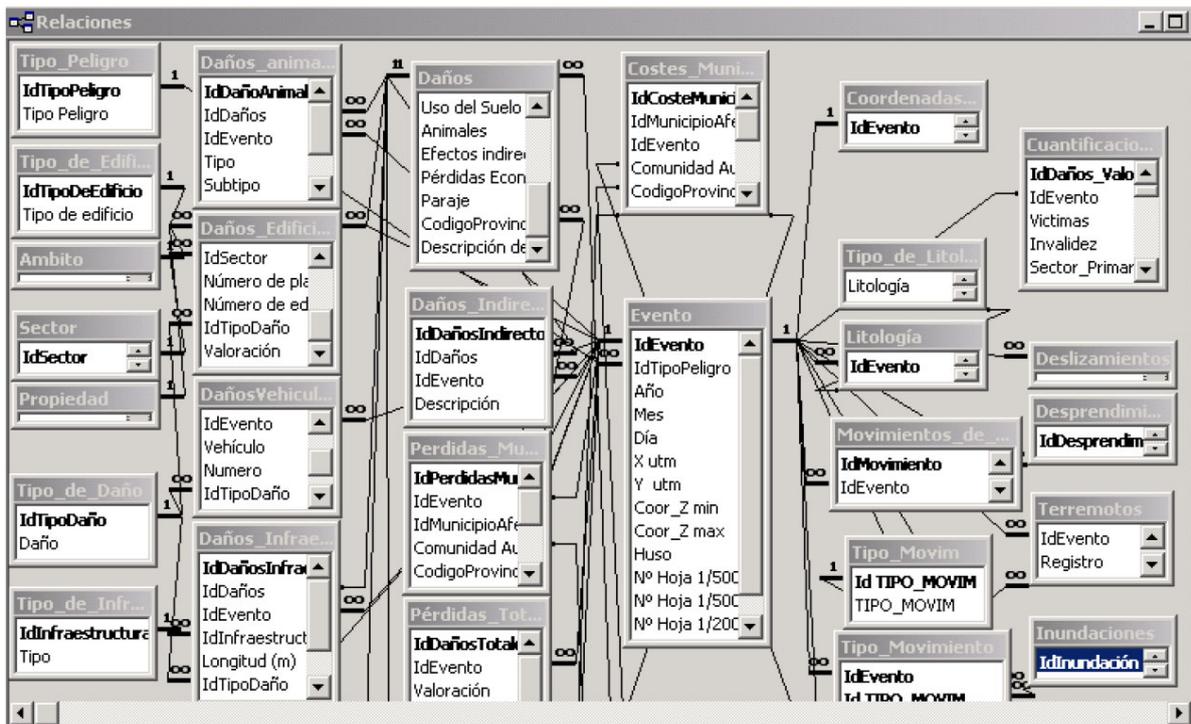
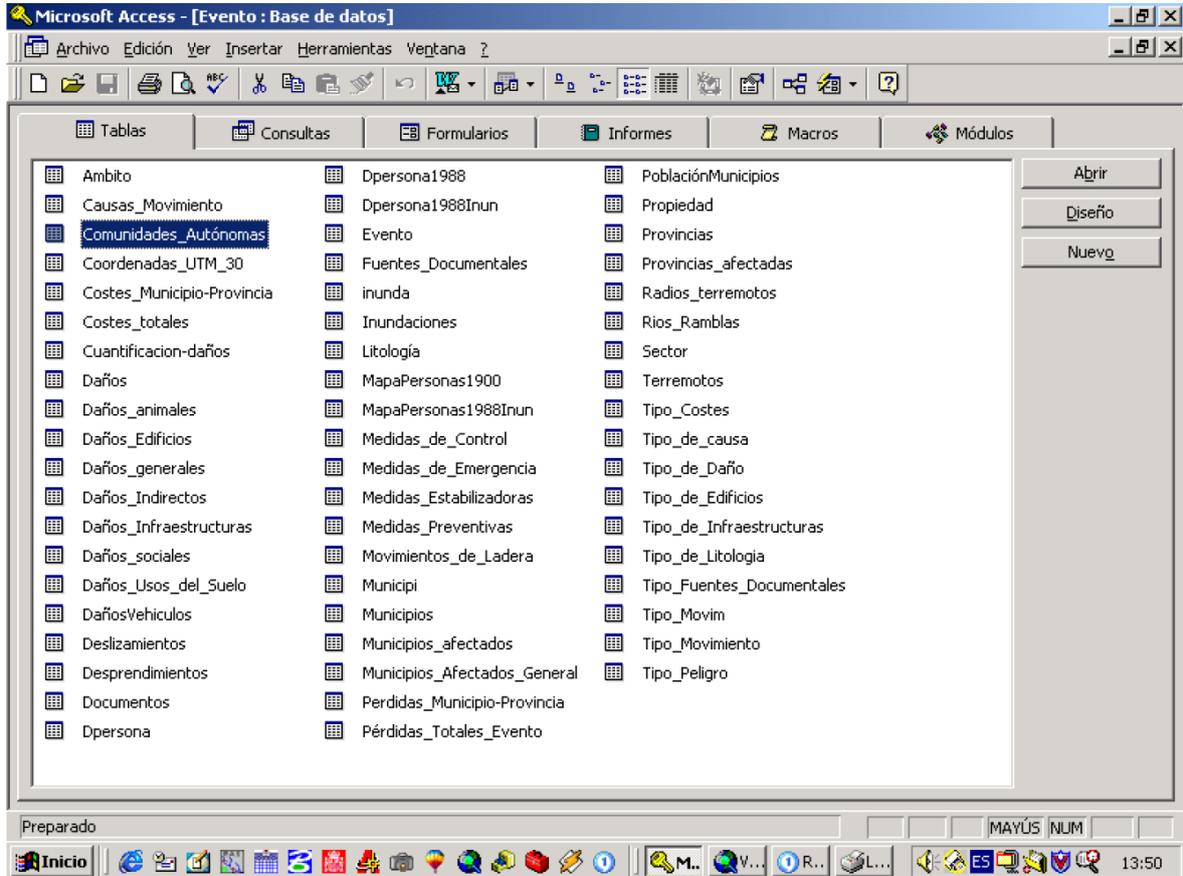
	<input type="checkbox"/> Other	
Completeness of triggering factor	<input type="checkbox"/> 0% <input type="checkbox"/> 0-25% <input type="checkbox"/> 25-50%	<input checked="" type="checkbox"/> 50-75% <input type="checkbox"/> >75%
Landslide data/history	Yes	No
Initiation date	Yes	No
Initiation and reactivation dates	Yes	No
Completeness	<input type="checkbox"/> 0% <input checked="" type="checkbox"/> 0-25% <input type="checkbox"/> 25-50%	<input type="checkbox"/> 50-75% <input type="checkbox"/> >75%
Landslide activity	Yes	No
Activity classes	Active, inactive	
Consequences	Yes	No
Completeness	<input type="checkbox"/> 0% <input type="checkbox"/> 0-25% <input type="checkbox"/> 25-50%	<input type="checkbox"/> 50-75% <input checked="" type="checkbox"/> >75%
	Monetary description of damage and/or reparation cost only in some cases, rest descriptive	
Other information	<input type="checkbox"/> Photographs <input checked="" type="checkbox"/> Monitoring data or physical properties <input checked="" type="checkbox"/> Bibliographic references <input type="checkbox"/> Other	

Format	<input type="checkbox"/> Digital, spatial database <input checked="" type="checkbox"/> Digital, alphanumeric database <input type="checkbox"/> Digital, linked spatial and alphanumeric database <input type="checkbox"/> Digital, other <input type="checkbox"/> Paper	
Spatial software	<input type="checkbox"/> ArcGIS <input type="checkbox"/> Other	
Alphanumeric software	<input type="checkbox"/> Oracle <input checked="" type="checkbox"/> Microsoft Access <input type="checkbox"/> Other	
Type of paper document	<input type="checkbox"/> Datasheets <input type="checkbox"/> Map	
Accessibility	<input type="checkbox"/> General public <input type="checkbox"/> Administration <input checked="" type="checkbox"/> Scientific purposes <input type="checkbox"/> Other	
Use	<input type="checkbox"/> For consultation only <input type="checkbox"/> Free of charge under any condition <input type="checkbox"/> After payment <input type="checkbox"/> Without special conditions <input checked="" type="checkbox"/> Under special conditions <input type="checkbox"/> I do not know	

Database metadata complying with INSPIRE metadata regulations	Yes	No
	I do not know	
Database provided through/stored in a network following the INSPIRE network services	Yes	No
	I do not know	
Institute registered as an INSPIRE stakeholder	<input checked="" type="checkbox"/> LMO <input type="checkbox"/> SDIC <input type="checkbox"/> I do not know <input type="checkbox"/> No	
Institute willing to register as an INSPIRE stakeholder	<input type="checkbox"/> LMO <input type="checkbox"/> SDIC <input type="checkbox"/> I do not know <input type="checkbox"/> No	
Organization willing to participate in the real testing or reviewing of a draft of the INSPIRE Data Specifications related to the spatial data theme "Natural Risk Zones" when it is developed by the Thematic Working Group	Yes	No
	I do not know	

DETAILED DATASHEET FOR EACH NATIONAL LANDSLIDE DATABASE

Excerpts of the Geological and Mining Institute of Spain (IGME)'s geohazards database (in Microsoft Access) are provided below.



Evento1

IdEvento: 300558 IdTipoPeligro: Movimiento de Ladera

Día: 31 Mes: 3 Año: 2002 Fecha última modificación: 29/08/2002

Inundaciones Terremotos Movimientos de Ladera

X_utm_30: -803779
 Y_utm_30: 3221776
 Z_msnm: 4

Registro: [navegación]

Munic. afectados General Municipios afectados

Costes totales Costes Municipio-Provincia

Perdidas Totales Perdidas Municipio-Provincia

Daños Generales Daños por Municipio

Metadatos [icono]

Registro: [navegación] 1526 de 1529

SWEDEN: Swedish Natural Hazards Information System

Name of contact person 1	Magnus Johansson	
Telephone number	+46 730362696	
E-mail	magnus.johansson@msb.se	
Institute	Swedish Civil Contingencies Agency, Sector for Lessons Learning	
Address	MSB, 651 81 Karlstad	
Official name of database	Swedish Natural Hazards Information System (Naturolyksdatabasen)	
Owner of database	MSB	
Contact person	Magnus Johansson	
Producer of database	MSB	
Website	http://www.msb.se/sv/Kunskapsbank/Erfarenheter-fran-olyckor--kriser/Naturolyksdatabasen/	
Approximate area covered (km ²)	449,964	
Official document	Yes, regulatory	No
	Yes, but not regulatory	
Language	Swedish and English (in preparation)	
First creation date	2007	
Last update	2010	
Recurrence for updating	<input type="checkbox"/> Not updated <input checked="" type="checkbox"/> After major event <input type="checkbox"/> Every year <input type="checkbox"/> < 6 months <input type="checkbox"/> Other	
Time period of landslide events covered	1950 – 2010	
Other features than landslides in database	Yes, floods, avalanches, coastal erosion, storms, extreme precipitation or temperature	No
Number of landslides	15	
Completeness of the database (estimate)	<input checked="" type="checkbox"/> <25% <input type="checkbox"/> 25-50%	<input type="checkbox"/> 50-75% <input type="checkbox"/> >75%
Landslide inventory map		
Scale		
Reference coordinate system	SWEREF	
Information on the positional accuracy	Yes	No
	Don't know	
Landslides representation	<input type="checkbox"/> Point <input type="checkbox"/> Line <input type="checkbox"/> Closed polygon <input checked="" type="checkbox"/> Combination of points, lines and polygons <input type="checkbox"/> Other	
Production method	<input type="checkbox"/> Field survey <input checked="" type="checkbox"/> Historical documents <input type="checkbox"/> Aerial photographs <input type="checkbox"/> LiDAR derivatives <input type="checkbox"/> Satellite remote sensing <input type="checkbox"/> Airborne remote sensing * <input type="checkbox"/> Other	
Representation of landslide location	<input checked="" type="checkbox"/> Coordinates <input checked="" type="checkbox"/> Municipality <input type="checkbox"/> Province/county <input type="checkbox"/> Other	
Landslide classification	Yes	No
Landslide types		
Landslide dimension	<input checked="" type="checkbox"/> Displaced volume <input checked="" type="checkbox"/> Affected area <input checked="" type="checkbox"/> Length <input checked="" type="checkbox"/> Width <input type="checkbox"/> Travel angle <input type="checkbox"/> Height (from top to toe) <input checked="" type="checkbox"/> Depth of surface of rupture <input type="checkbox"/> Other	
Geo-environmental characteristics	<input checked="" type="checkbox"/> Lithology <input checked="" type="checkbox"/> Hydrogeology <input checked="" type="checkbox"/> Land use <input checked="" type="checkbox"/> Slope gradient	

LANDSLIDE INVENTORIES IN EUROPE

	<input type="checkbox"/> Slope aspect <input type="checkbox"/> Slope curvature <input type="checkbox"/> Other	
Completeness of triggering factor	<input type="checkbox"/> 0% <input type="checkbox"/> 0-25% <input type="checkbox"/> 25-50%	<input type="checkbox"/> 50-75% <input checked="" type="checkbox"/> >75%
Landslide data/history	Yes	No
Initiation date	Yes	No
Initiation and reactivation dates	Yes	No
Completeness	<input type="checkbox"/> 0% <input type="checkbox"/> 0-25% <input type="checkbox"/> 25-50%	<input type="checkbox"/> 50-75% <input checked="" type="checkbox"/> >75%
Landslide activity	Yes	No
Activity classes		
Consequences	Yes	No
Completeness	<input type="checkbox"/> 0% <input type="checkbox"/> 0-25% <input type="checkbox"/> 25-50% Very detailed	<input type="checkbox"/> 50-75% <input checked="" type="checkbox"/> >75%
Other information	<input checked="" type="checkbox"/> Photographs <input type="checkbox"/> Monitoring data or physical properties <input checked="" type="checkbox"/> Bibliographic references <input type="checkbox"/> Other	

Format	<input checked="" type="checkbox"/> Digital, spatial database <input type="checkbox"/> Digital, alphanumeric database <input type="checkbox"/> Digital, linked spatial and alphanumeric database <input type="checkbox"/> Digital, other <input checked="" type="checkbox"/> Paper	
Spatial software	<input checked="" type="checkbox"/> ArcGIS <input type="checkbox"/> Other	
Alphanumeric software	<input type="checkbox"/> Oracle <input type="checkbox"/> Microsoft Access <input type="checkbox"/> Other	
Type of paper document	<input checked="" type="checkbox"/> Datasheets <input checked="" type="checkbox"/> Map	
Accessibility	<input checked="" type="checkbox"/> General public <input checked="" type="checkbox"/> Administration <input checked="" type="checkbox"/> Scientific purposes <input type="checkbox"/> Other	
Use	<input type="checkbox"/> For consultation only <input checked="" type="checkbox"/> Free of charge under any condition <input type="checkbox"/> After payment <input type="checkbox"/> Without special conditions <input type="checkbox"/> Under special conditions <input type="checkbox"/> I do not know	

Database metadata complying with INSPIRE metadata regulations	Yes	No
	I do not know	
Database provided through/stored in a network following the INSPIRE network services	Yes	No
	I do not know	
Institute registered as an INSPIRE stakeholder	<input checked="" type="checkbox"/> LMO <input type="checkbox"/> SDIC <input type="checkbox"/> I do not know <input type="checkbox"/> No	
Institute willing to register as an INSPIRE stakeholder	<input type="checkbox"/> LMO <input type="checkbox"/> SDIC <input type="checkbox"/> I do not know <input checked="" type="checkbox"/> No	
Organization willing to participate in the real testing or reviewing of a draft of the INSPIRE Data Specifications related to the spatial data theme "Natural Risk Zones" when it is developed by the Thematic Working Group	Yes	No
	I do not know	

SWEDEN: SGI Landslide Database

Name of contact person 1	Ann-Christine Hågeryd
Telephone number	+46 13201848
E-mail	ann-christine.hageryd@swedgeo.se; mats.oberg@swedgeo
Institute	Swedish geotechnical institute (SGI)
Address	Olaus Magnus väg 35, 581 93 Linköping
Official name of database	SGI Landslide database
Owner of database	Swedish geotechnical institute (SGI)
Contact person	Ann-Christine Hågeryd
Producer of database	Swedish geotechnical institute (SGI)
Website	http://gis.swedgeo.se/skred/ , http://www.geodata.se/

Approximate area covered (km ²)	449,964
Official document	Yes, regulatory No Yes, but not regulatory
Language	Swedish
First creation date	1999
Last update	2009
Recurrence for updating	<input type="checkbox"/> Not updated <input checked="" type="checkbox"/> After major event <input type="checkbox"/> Every year <input type="checkbox"/> < 6 months <input type="checkbox"/> Other
Time period of landslide events covered	1900 - 2007
Other features than landslides in database	Yes No
Number of landslides	416
Completeness of the database (estimate)	<input type="checkbox"/> <25% <input checked="" type="checkbox"/> 50-75% <input type="checkbox"/> 25-50% <input type="checkbox"/> >75%
Landslide inventory map	
Scale	1:10,000 to 1:50,000
Reference coordinate system	RT 90
Information on the positional accuracy	Yes No Don't know
Landslides representation	<input checked="" type="checkbox"/> Point <input type="checkbox"/> Line <input type="checkbox"/> Closed polygon <input type="checkbox"/> Combination of points, lines and polygons <input type="checkbox"/> Other
Production method	<input type="checkbox"/> Field survey <input checked="" type="checkbox"/> Historical documents <input type="checkbox"/> Aerial photographs <input type="checkbox"/> LiDAR derivatives <input type="checkbox"/> Satellite remote sensing <input type="checkbox"/> Airborne remote sensing * <input type="checkbox"/> Other
Representation of landslide location	<input checked="" type="checkbox"/> Coordinates <input checked="" type="checkbox"/> Municipality <input checked="" type="checkbox"/> Province/county <input type="checkbox"/> Other
Landslide classification	Yes No
Landslide types	
Landslide dimension	<input checked="" type="checkbox"/> Displaced volume <input checked="" type="checkbox"/> Affected area <input checked="" type="checkbox"/> Length <input checked="" type="checkbox"/> Width <input type="checkbox"/> Travel angle <input type="checkbox"/> Height (from top to toe) <input type="checkbox"/> Depth of surface of rupture <input type="checkbox"/> Other
Geo-environmental characteristics	<input type="checkbox"/> Lithology <input checked="" type="checkbox"/> Hydrogeology <input checked="" type="checkbox"/> Land use <input type="checkbox"/> Slope gradient <input type="checkbox"/> Slope aspect <input type="checkbox"/> Slope curvature <input type="checkbox"/> Other

LANDSLIDE INVENTORIES IN EUROPE

Completeness of triggering factor	<input type="checkbox"/> 0% <input checked="" type="checkbox"/> 0-25% <input type="checkbox"/> 25-50%	<input type="checkbox"/> 50-75% <input type="checkbox"/> >75%
Landslide data/history	Yes	No
Initiation date	Yes	No
Initiation and reactivation dates	Yes	No
Completeness	<input type="checkbox"/> 0% <input type="checkbox"/> 0-25% <input type="checkbox"/> 25-50%	<input checked="" type="checkbox"/> 50-75% <input type="checkbox"/> >75%
Landslide activity	Yes	No
Activity classes		
Consequences	Yes	No
Completeness	<input type="checkbox"/> 0% <input type="checkbox"/> 0-25% <input checked="" type="checkbox"/> 25-50%	<input type="checkbox"/> 50-75% <input type="checkbox"/> >75%
Other information	<input type="checkbox"/> Photographs <input type="checkbox"/> Monitoring data or physical properties <input checked="" type="checkbox"/> Bibliographic references <input type="checkbox"/> Other	

Format	<input checked="" type="checkbox"/> Digital, spatial database <input checked="" type="checkbox"/> Digital, alphanumeric database <input type="checkbox"/> Digital, linked spatial and alphanumeric database <input type="checkbox"/> Digital, other <input type="checkbox"/> Paper	
Spatial software	<input type="checkbox"/> ArcGIS <input type="checkbox"/> Other	
Alphanumeric software	<input type="checkbox"/> Oracle <input checked="" type="checkbox"/> Microsoft Access <input type="checkbox"/> Other	
Type of paper document	<input type="checkbox"/> Datasheets <input type="checkbox"/> Map	
Accessibility	<input type="checkbox"/> General public <input type="checkbox"/> Administration <input checked="" type="checkbox"/> Scientific purposes <input type="checkbox"/> Other	
Use	<input type="checkbox"/> For consultation only <input type="checkbox"/> Free of charge under any condition <input type="checkbox"/> After payment <input type="checkbox"/> Without special conditions <input checked="" type="checkbox"/> Under special conditions <input type="checkbox"/> I do not know	

Database metadata complying with INSPIRE metadata regulations	Yes	No
	I do not know	
Database provided through/stored in a network following the INSPIRE network services	Yes	No
	I do not know	
Institute registered as an INSPIRE stakeholder	<input checked="" type="checkbox"/> LMO <input type="checkbox"/> SDIC <input type="checkbox"/> I do not know <input type="checkbox"/> No	
Institute willing to register as an INSPIRE stakeholder	<input type="checkbox"/> LMO <input type="checkbox"/> SDIC <input type="checkbox"/> I do not know <input type="checkbox"/> No	
Organization willing to participate in the real testing or reviewing of a draft of the INSPIRE Data Specifications related to the spatial data theme "Natural Risk Zones" when it is developed by the Thematic Working Group	Yes	No
	I do not know	

SWITZERLAND: Infoslide

Name of contact person 1	Hugo Raetzo / Bernard Loup	
Telephone number	+41 313255098	
E-mail	bernard.loup@bafu.admin.ch	
Institute	Federal Environmental Office (FOEN/BAFU/OFEV)	
Address	3003 Berne	
Official name of database	Infoslide	
Owner of database	OFEV	
Contact person	Hugo Raetzo / Bernard Loup	
Producer of database	OFEV	
Website	/	

Approximate area covered (km ²)	44,000	
Official document	Yes, regulatory	No
	Yes, but not regulatory	
Language	German and French	
First creation date	1996	
Last update	2002	
Recurrence for updating	<input checked="" type="checkbox"/> Not updated <input type="checkbox"/> After major event <input type="checkbox"/> Every year <input type="checkbox"/> < 6 months <input type="checkbox"/> Other	
Time period of landslide events covered	12,000 BP (post-glacial) - 2002	
Other features than landslides in database	Yes	No
Number of landslides	317 (representative landslides)	
Completeness of the database (estimate)	<input checked="" type="checkbox"/> <25% <input type="checkbox"/> 25-50%	<input type="checkbox"/> 50-75% <input type="checkbox"/> >75%
Landslide inventory map	No inventory map available	
Scale		
Reference coordinate system		
Information on the positional accuracy	Yes	No
	Don't know	
Landslides representation	<input type="checkbox"/> Point <input type="checkbox"/> Line <input type="checkbox"/> Closed polygon <input type="checkbox"/> Combination of points, lines and polygons <input type="checkbox"/> Other	
Production method	<input type="checkbox"/> Field survey <input type="checkbox"/> Historical documents <input type="checkbox"/> Aerial photographs <input type="checkbox"/> LiDAR derivatives <input type="checkbox"/> Satellite remote sensing <input type="checkbox"/> Airborne remote sensing * <input type="checkbox"/> Other	
Representation of landslide location	<input checked="" type="checkbox"/> Coordinates <input type="checkbox"/> Municipality <input type="checkbox"/> Province/county <input checked="" type="checkbox"/> Other: Local name	
Landslide classification	Yes	No
	Agreement with Cruden and Varnes (1996)	
Landslide types	Rock fall, rock slide, (earth and debris) slide, (earth and debris) flow	
Landslide dimension	<input type="checkbox"/> Displaced volume <input type="checkbox"/> Affected area <input checked="" type="checkbox"/> Length <input checked="" type="checkbox"/> Width <input checked="" type="checkbox"/> Travel angle <input checked="" type="checkbox"/> Height (from top to toe) <input type="checkbox"/> Depth of surface of rupture <input type="checkbox"/> Other	
Geo-environmental characteristics	<input checked="" type="checkbox"/> Lithology <input type="checkbox"/> Hydrogeology <input type="checkbox"/> Land use <input type="checkbox"/> Slope gradient <input type="checkbox"/> Slope aspect <input type="checkbox"/> Slope curvature <input type="checkbox"/> Other	

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Completeness of triggering factor	<input type="checkbox"/> 0% <input checked="" type="checkbox"/> 0-25% <input type="checkbox"/> 25-50%	<input type="checkbox"/> 50-75% <input type="checkbox"/> >75%
Landslide data/history	Yes	No
Initiation date	Yes	No
Initiation and reactivation dates	Yes	No
Completeness	<input type="checkbox"/> 0% <input checked="" type="checkbox"/> 0-25% <input type="checkbox"/> 25-50%	<input type="checkbox"/> 50-75% <input type="checkbox"/> >75%
Landslide activity	Yes	No
Activity classes		
Consequences	Yes	No
Completeness	<input type="checkbox"/> 0% <input checked="" type="checkbox"/> 0-25% <input type="checkbox"/> 25-50%	<input type="checkbox"/> 50-75% <input type="checkbox"/> >75%
Other information	<input type="checkbox"/> Photographs <input type="checkbox"/> Monitoring data or physical properties <input checked="" type="checkbox"/> Bibliographic references <input type="checkbox"/> Other	

Format	<input type="checkbox"/> Digital, spatial database <input checked="" type="checkbox"/> Digital, alphanumeric database <input type="checkbox"/> Digital, linked spatial and alphanumeric database <input type="checkbox"/> Digital, other <input type="checkbox"/> Paper	
Spatial software	<input type="checkbox"/> ArcGIS <input type="checkbox"/> Other	
Alphanumeric software	<input type="checkbox"/> Oracle <input type="checkbox"/> Microsoft Access <input checked="" type="checkbox"/> Other: Excel	
Type of paper document	<input type="checkbox"/> Datasheets <input type="checkbox"/> Map	
Accessibility	<input type="checkbox"/> General public <input checked="" type="checkbox"/> Administration, for internal purposes of OFEV only <input type="checkbox"/> Scientific purposes <input type="checkbox"/> Other	
Use	<input type="checkbox"/> For consultation only <input type="checkbox"/> Free of charge under any condition <input type="checkbox"/> After payment <input type="checkbox"/> Without special conditions <input type="checkbox"/> Under special conditions <input type="checkbox"/> I do not know	

Database metadata complying with INSPIRE metadata regulations	Yes	No
	I do not know	
Database provided through/stored in a network following the INSPIRE network services	Yes	No
	I do not know	
Institute registered as an INSPIRE stakeholder	<input checked="" type="checkbox"/> LMO	
	<input type="checkbox"/> SDIC <input type="checkbox"/> I do not know <input type="checkbox"/> No	
Institute willing to register as an INSPIRE stakeholder	<input type="checkbox"/> LMO <input type="checkbox"/> SDIC <input type="checkbox"/> I do not know <input type="checkbox"/> No	
Organization willing to participate in the real testing or reviewing of a draft of the INSPIRE Data Specifications related to the spatial data theme "Natural Risk Zones" when it is developed by the Thematic Working Group	Yes	No
	I do not know	

UNITED KINGDOM: National Landslide Database

Name of contact person 1	Claire Dashwood
Telephone number	+44 (0) 1159363404
E-mail	cfooster@bgs.ac.uk
Institute	British Geological Survey
Address	Kingsley Dunham Centre, Keyworth, Nottingham, Nottinghamshire, NG12 5GG
Official name of database	National Landslide Database
Owner of database	British Geological Survey
Contact person	Claire Foster/Catherine Pennington
Producer of database	British Geological Survey
Website	/

Approximate area covered (km ²)	219,000
Official document	Yes, regulatory No Yes, but not regulatory
Language	English
First creation date	2000
Last update	Continuously
Recurrence for updating	<input type="checkbox"/> Not updated <input type="checkbox"/> After major event <input type="checkbox"/> Every year <input checked="" type="checkbox"/> < 6 months, continuously <input type="checkbox"/> Other
Time period of landslide events covered	All, ancient to recent
Other features than landslides in database	Yes No
Number of landslides	15,210
Completeness of the database (estimate)	<input type="checkbox"/> <25% <input type="checkbox"/> 50-75% <input type="checkbox"/> 25-50% <input type="checkbox"/> >75%
Landslide inventory map Scale	
Reference coordinate system	British National Grid
Information on the positional accuracy	Yes, additional field shows accuracy No in metres Don't know
Landslides representation	<input checked="" type="checkbox"/> Point <input type="checkbox"/> Line <input type="checkbox"/> Closed polygon <input type="checkbox"/> Combination of points, lines and polygons <input type="checkbox"/> Other
Production method	<input checked="" type="checkbox"/> Field survey <input checked="" type="checkbox"/> Historical documents <input checked="" type="checkbox"/> Aerial photographs <input type="checkbox"/> LiDAR derivatives <input type="checkbox"/> Satellite remote sensing <input type="checkbox"/> Airborne remote sensing * <input type="checkbox"/> Other
Representation of landslide location	<input checked="" type="checkbox"/> Coordinates <input type="checkbox"/> Municipality <input type="checkbox"/> Province/county <input type="checkbox"/> Other
Landslide classification	Yes No Agreement with Cruden and Varnes (1996)
Landslide types	Fall, topple, flow, (rotational and translational) slide, spread
Landslide dimension	<input type="checkbox"/> Displaced volume <input type="checkbox"/> Affected area <input checked="" type="checkbox"/> Length <input checked="" type="checkbox"/> Width <input type="checkbox"/> Travel angle <input checked="" type="checkbox"/> Height (from top to toe) <input checked="" type="checkbox"/> Depth of surface of rupture <input type="checkbox"/> Other
Geo-environmental characteristics	<input checked="" type="checkbox"/> Lithology <input checked="" type="checkbox"/> Hydrogeology <input checked="" type="checkbox"/> Land use <input checked="" type="checkbox"/> Slope gradient <input checked="" type="checkbox"/> Slope aspect <input checked="" type="checkbox"/> Slope curvature

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	<input type="checkbox"/> Other	
Completeness of triggering factor	<input type="checkbox"/> 0% <input checked="" type="checkbox"/> 0-25% <input type="checkbox"/> 25-50%	<input type="checkbox"/> 50-75% <input type="checkbox"/> >75%
Landslide data/history	Yes	No
Initiation date	Yes	No
Initiation and reactivation dates	Yes	No
Completeness	<input type="checkbox"/> 0% <input checked="" type="checkbox"/> 0-25% <input type="checkbox"/> 25-50%	<input type="checkbox"/> 50-75% <input type="checkbox"/> >75%
Landslide activity	Yes	No
Activity classes	Stability: active, inactive, stabilized, stability Development: advance, degrade, incipient	
Consequences	Yes	No
Completeness	<input type="checkbox"/> 0% <input checked="" type="checkbox"/> 0-25% <input type="checkbox"/> 25-50%	<input type="checkbox"/> 50-75% <input type="checkbox"/> >75%
Detailed costs are only available for about 5 slides. Generally damage is reported to have occurred or not		
Other information	<input type="checkbox"/> Photographs <input type="checkbox"/> Monitoring data or physical properties <input checked="" type="checkbox"/> Bibliographic references <input type="checkbox"/> Other	

Format	<input type="checkbox"/> Digital, spatial database <input type="checkbox"/> Digital, alphanumeric database <input checked="" type="checkbox"/> Digital, linked spatial and alphanumeric database <input type="checkbox"/> Digital, other <input type="checkbox"/> Paper	
Spatial software	<input checked="" type="checkbox"/> ArcGIS <input type="checkbox"/> Other	
Alphanumeric software	<input type="checkbox"/> Oracle <input checked="" type="checkbox"/> Microsoft Access <input type="checkbox"/> Other	
Type of paper document	<input type="checkbox"/> Datasheets <input type="checkbox"/> Map	
Accessibility	<input checked="" type="checkbox"/> General public <input checked="" type="checkbox"/> Administration <input checked="" type="checkbox"/> Scientific purposes <input type="checkbox"/> Other	
Use	<input checked="" type="checkbox"/> For consultation only (reduced set of information per landslide) <input type="checkbox"/> Free of charge under any condition <input checked="" type="checkbox"/> After payment (complete information) <input type="checkbox"/> Without special conditions <input type="checkbox"/> Under special conditions <input type="checkbox"/> I do not know	

Database metadata complying with INSPIRE metadata regulations	Yes	No
	I do not know	
Database provided through/stored in a network following the INSPIRE network services	Yes	No
	I do not know	
Institute registered as an INSPIRE stakeholder	<input checked="" type="checkbox"/> LMO <input type="checkbox"/> SDIC <input type="checkbox"/> I do not know <input type="checkbox"/> No	
Institute willing to register as an INSPIRE stakeholder	<input type="checkbox"/> LMO <input type="checkbox"/> SDIC <input type="checkbox"/> I do not know <input type="checkbox"/> No	
Organization willing to participate in the real testing or reviewing of a draft of the INSPIRE Data Specifications related to the spatial data theme "Natural Risk Zones" when it is developed by the Thematic Working Group	Yes	No
	I do not know	

Examples of the British National Landslide Database by the British Geological Survey (BGS) are given below.

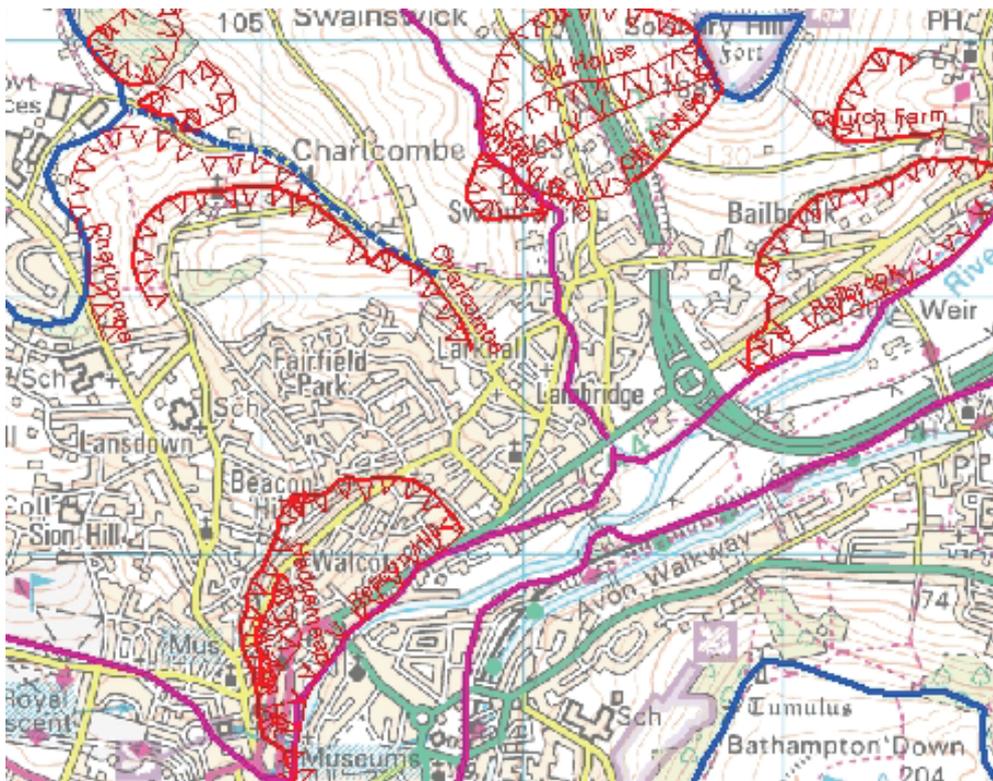
Information on the database can also be found in:

Hobbs, P., 2007. BGS landslide data and mapping in Britain. In: Hervás, J. (Ed.), Guidelines for Mapping Areas at Risk of Landslides in Europe. Proc. Experts Meeting, Ispra, Italy, 23-24 October 2007. JRC Report EUR 23093 EN, Office for Official Publications of the European Communities, Luxembourg, pp. 11-14.

Foster, C., Gibson, A. Wildman, G., 2008. The new national landslide database and landslide hazard assessment of Great Britain. Proceedings of the First World Landslide Forum, Tokyo, 18-21 November 2008, pp. 203-206.

Evans, H., Pennington, C., Jordan, C., Foster, C., in press. Mapping a nation's landslides: a novel multi-stage methodology. In: Margottini, C., Canuti, P., Sassa, K. (Eds.), Landslide Science and Practice, Vol. 1: Landslide Inventory and Susceptibility and Hazard Zoning, Springer, Heidelberg.

Part of an urban landslide map of Bath, Avon. The figure shows relict landslide backscarps and toes (red; Hobbs, 2007).



Example of datasheet in landslide database (Hobbs, 2007).

The image displays two forms from the British Geological Survey (BGS) Landslide Pro-Forma series. Form P1 (left) is titled 'BGS Landslide Pro-Forma P1' and includes fields for 'Location' (NGR Easting, Northing, OS Sheet, Survey Date, Pro Forma Geologist), 'Section B: Landslide Dimensions' (Total Slide Length, Rupture Max Depth, Displacement, etc.), 'Section C: Landslide Detail' (Slide Material, Stability, etc.), and 'Causal Factors'. Form P2 (right) is titled 'BGS Landslide Pro-Forma P2' and includes 'Section D: Slope Detail' (Slope Angle, Height, etc.), 'Damage' (Landuse Code, Damage Y/N), 'Geology' (Lithology, Strat / Form, etc.), 'Section E: Additional Comments', and 'Sources'. Handwritten labels in various colors are overlaid on the forms to identify key sections: 'Location' (green), 'Slope' (purple), 'Damage' (green), 'Geology' (orange), 'Mechanism' (grey), 'Cause' (yellow), 'Notes' (blue), and 'Sources' (black).

“British Geological Survey © NERC. IPR/137-83C”.

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ANNEX C: DETAILED DATASHEET FOR EACH REGIONAL LANDSLIDE DATABASE

This annex shows the responses on the questionnaire (Annex A) for each regional landslide database in the survey. These data were mainly collected between spring and autumn of 2010. Afterwards a limited number of updates were made (e.g. for Portugal).

This annex further includes selected extracts of the regional landslide databases sent by the contact persons or taken from the publically accessible website interface. These extracts are not provided for all regional databases.

CARINTHIA, AUSTRIA: Landslide Event Cadastre

Name of contact person 1	Franz Goldschmidt	
Telephone number		
E-mail	Franz.Goldschmidt@ktn.gv.at	
Institute	Amt der Kärntner Landesregierung; Abt. 15 Umwelt, Uabt. Geologie und Bodenschutz	
Address	Flatschacherstraße 70, 9021 Klagenfurt	
Official name of database	Landslide Event Cadastre (Ereigniskataster)	
Owner of database	Amt der Kärntner Landesregierung	
Contact person	Richard Bäk	
Producer of database	Amt der Kärntner Landesregierung	
Website	/	
Approximate area covered (km ²)	10,000	
Official document	Yes, regulatory	No
	Yes, but not regulatory	
Language	German	
First creation date	Paper format from 1965, digital database 2001	
Last update	2009	
Recurrence for updating	<input type="checkbox"/> Not updated <input type="checkbox"/> After major event <input type="checkbox"/> Every year <input checked="" type="checkbox"/> < 6 months (monthly if possible) <input type="checkbox"/> Other	
Time period of landslide events covered	1970s - 2010	
Other features than landslides in database	Yes	No, but a common one is planned
Number of landslides	1000	
Completeness of the database (estimate)	<input type="checkbox"/> <25% <input type="checkbox"/> 25-50% <input type="checkbox"/> 50-75% <input checked="" type="checkbox"/> >75% (not accounting the very small ones)	
Landslide inventory map		
Scale	1:5,000	
Reference coordinate system	M31/ M34 BMN	
Information on the positional accuracy	Yes, MAXO ¹	No
	Don't know	
Landslides representation	<input checked="" type="checkbox"/> Point <input type="checkbox"/> Line <input type="checkbox"/> Closed polygon <input type="checkbox"/> Combination of points, lines and polygons <input type="checkbox"/> Other	
Production method	<input checked="" type="checkbox"/> Field survey <input type="checkbox"/> Historical documents <input type="checkbox"/> Aerial photographs <input type="checkbox"/> LiDAR derivatives <input type="checkbox"/> Satellite remote sensing <input type="checkbox"/> Airborne remote sensing * <input type="checkbox"/> Other	
Representation of landslide location	<input checked="" type="checkbox"/> Coordinates <input checked="" type="checkbox"/> Municipality <input checked="" type="checkbox"/> Province/county <input type="checkbox"/> Other	
Landslide classification	Yes	No
	Agreement with Cruden and Varnes (1996)	
Landslide types	Rock fall, (land)slide	
Landslide dimension	<input checked="" type="checkbox"/> Displaced volume <input type="checkbox"/> Affected area <input checked="" type="checkbox"/> Length <input checked="" type="checkbox"/> Width <input type="checkbox"/> Travel angle <input type="checkbox"/> Height (from top to toe) <input type="checkbox"/> Depth of surface of rupture <input type="checkbox"/> Other	
Geo-environmental characteristics	<input type="checkbox"/> Lithology <input type="checkbox"/> Hydrogeology <input type="checkbox"/> Land use <input checked="" type="checkbox"/> Slope gradient <input type="checkbox"/> Slope aspect	

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	<input type="checkbox"/> Slope curvature <input type="checkbox"/> Other	
Completeness of triggering factor	<input type="checkbox"/> 0% <input type="checkbox"/> 0-25% <input type="checkbox"/> 25-50%	<input checked="" type="checkbox"/> 50-75% <input type="checkbox"/> >75%
Landslide data/history	Yes	No
Initiation date	Yes	No
Initiation and reactivation dates	Yes	No
Completeness	<input type="checkbox"/> 0% <input checked="" type="checkbox"/> 0-25% <input type="checkbox"/> 25-50%	<input type="checkbox"/> 50-75% <input type="checkbox"/> >75%
Landslide activity	Yes	No
Activity classes		
Consequences	Yes	No
Completeness	<input checked="" type="checkbox"/> 0% <input type="checkbox"/> 0-25% <input type="checkbox"/> 25-50%	<input type="checkbox"/> 50-75% <input type="checkbox"/> >75%
Other information	<input checked="" type="checkbox"/> Photographs <input type="checkbox"/> Monitoring data or physical properties <input type="checkbox"/> Bibliographic references <input type="checkbox"/> Other	

Format	<input type="checkbox"/> Digital, spatial database <input type="checkbox"/> Digital, alphanumeric database <input checked="" type="checkbox"/> Digital, linked spatial and alphanumeric database <input type="checkbox"/> Digital, other <input type="checkbox"/> Paper	
Spatial software	<input checked="" type="checkbox"/> ArcGIS <input type="checkbox"/> Other	
Alphanumeric software	<input checked="" type="checkbox"/> Oracle <input type="checkbox"/> Microsoft Access <input type="checkbox"/> Other	
Type of paper document	<input type="checkbox"/> Datasheets <input type="checkbox"/> Map	
Accessibility	<input type="checkbox"/> General public <input checked="" type="checkbox"/> Administration <input type="checkbox"/> Scientific purposes <input type="checkbox"/> Other	
Use	<input checked="" type="checkbox"/> For consultation only <input type="checkbox"/> Free of charge under any condition <input type="checkbox"/> After payment <input type="checkbox"/> Without special conditions <input type="checkbox"/> Under special conditions <input type="checkbox"/> I do not know	

Database metadata complying with INSPIRE metadata regulations	Yes	No
	I do not know	
Database provided through/stored in a network following the INSPIRE network services	Yes	No
	I do not know	
Institute registered as an INSPIRE stakeholder	<input type="checkbox"/> LMO <input type="checkbox"/> SDIC <input type="checkbox"/> I do not know <input checked="" type="checkbox"/> No	
Institute willing to register as an INSPIRE stakeholder	<input type="checkbox"/> LMO <input type="checkbox"/> SDIC <input checked="" type="checkbox"/> I do not know <input type="checkbox"/> No	
Organization willing to participate in the real testing or reviewing of a draft of the INSPIRE Data Specifications related to the spatial data theme "Natural Risk Zones" when it is developed by the Thematic Working Group	Yes	No
	I do not know	

¹ MAXO with M for measured data (geodetic, coordinates), A for location taken from map, X for not sure about position, and O for position not known (e.g. when described in historical document)

FLANDERS, BELGIUM: Mapped Landslides in Flanders

Name of contact person 1	Liesbeth Vandekerckhove
Telephone number	+32 (0) 25532195
E-mail	liesbeth.vandekerckhove@lne.vlaanderen.be
Institute	Environment, Nature and Energy, Flemish Government
Address	Koning Albert II-laan 20, bus 20, Brussels
Official name of database	Mapped landslides in Flanders
Owner of database	Department of Environment, Nature and Energy, Flemish Government
Contact person	Liesbeth Vandekerckhove
Producer of database	Division of Geography, Earth and environment Department, KU Leuven
Website	http://dov.vlaanderen.be/dov/DOVInternet/default.htm

Approximate area covered (km ²)	2,914 (hilly regions west of Brussels)	
Official document	Yes, regulatory	No
	Yes, but not regulatory	
Language	Dutch	
First creation date	2005	
Last update	2009 (extended to larger area)	
Recurrence for updating	<input checked="" type="checkbox"/> Not updated (unless it appears necessary in the future) <input type="checkbox"/> After major event <input type="checkbox"/> Every year <input type="checkbox"/> < 6 months <input type="checkbox"/> Other	
Time period of landslide events covered	Holocene - 2009	
Other features than landslides in database	Yes	No
Number of landslides	291	
Completeness of the database (estimate)	<input type="checkbox"/> <25% <input checked="" type="checkbox"/> 25-50%	<input type="checkbox"/> 50-75% <input type="checkbox"/> >75%
Landslide inventory map		
Scale	1:10,000	
Reference coordinate system	Belgian Lambert 72	
Information on the positional accuracy	Yes	No
	Don't know	
Landslides representation	<input type="checkbox"/> Point <input type="checkbox"/> Line <input checked="" type="checkbox"/> Closed polygon <input type="checkbox"/> Combination of points, lines and polygons <input type="checkbox"/> Other	
Production method	<input checked="" type="checkbox"/> Field survey <input checked="" type="checkbox"/> Historical documents <input type="checkbox"/> Aerial photographs <input checked="" type="checkbox"/> LIDAR derivatives <input type="checkbox"/> Satellite remote sensing <input type="checkbox"/> Airborne remote sensing * <input type="checkbox"/> Other	
Representation of landslide location	<input checked="" type="checkbox"/> Coordinates <input checked="" type="checkbox"/> Municipality <input type="checkbox"/> Province/county <input checked="" type="checkbox"/> Other: Local name	
Landslide classification	Yes	No
	Agreement with Cruden and Varnes (1996)	
Landslide types	Deep-seated (rotational and complex) earth slides, shallow complex slides, river bank slide, possible landslide	
Landslide dimension	<input type="checkbox"/> Displaced volume <input checked="" type="checkbox"/> Affected area <input checked="" type="checkbox"/> Length <input checked="" type="checkbox"/> Width <input checked="" type="checkbox"/> Travel angle <input type="checkbox"/> Height (from top to toe) <input checked="" type="checkbox"/> Depth of surface of rupture (< or > 3 m) <input type="checkbox"/> Other	
Geo-environmental characteristics	<input checked="" type="checkbox"/> Lithology <input checked="" type="checkbox"/> Hydrogeology <input checked="" type="checkbox"/> Land use <input checked="" type="checkbox"/> Slope gradient <input checked="" type="checkbox"/> Slope aspect <input checked="" type="checkbox"/> Slope curvature	

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	<input type="checkbox"/> Other	
Completeness of triggering factor	<input type="checkbox"/> 0% <input checked="" type="checkbox"/> 0-25% <input type="checkbox"/> 25-50%	<input type="checkbox"/> 50-75% <input type="checkbox"/> >75%
Landslide data/history	Yes	No
Initiation date	Yes	No
Initiation and reactivation dates	Yes	No
Completeness	<input type="checkbox"/> 0% <input checked="" type="checkbox"/> 0-25% <input type="checkbox"/> 25-50%	<input type="checkbox"/> 50-75% <input type="checkbox"/> >75%
Landslide activity	Yes	No
Activity classes		
Consequences	Yes	No
Completeness	<input type="checkbox"/> 0% <input checked="" type="checkbox"/> 0-25% <input type="checkbox"/> 25-50%	<input type="checkbox"/> 50-75% <input type="checkbox"/> >75%
Other information	<input checked="" type="checkbox"/> Only descriptive <input checked="" type="checkbox"/> Photographs <input checked="" type="checkbox"/> Monitoring data or physical properties <input checked="" type="checkbox"/> Bibliographic references <input type="checkbox"/> Other	

Format	<input checked="" type="checkbox"/> Digital, spatial database <input type="checkbox"/> Digital, alphanumeric database <input type="checkbox"/> Digital, linked spatial and alphanumeric database <input type="checkbox"/> Digital, other <input type="checkbox"/> Paper	
Spatial software	<input checked="" type="checkbox"/> ArcGIS (ArcSDE 9.3 + ArcIMS 9.3 + AGS 9.3) <input type="checkbox"/> Other	
Alphanumeric software	<input type="checkbox"/> Oracle <input type="checkbox"/> Microsoft Access <input checked="" type="checkbox"/> Other: Information per landslide in Pdf file that is linked to the map	
Type of paper document	<input type="checkbox"/> Datasheets <input type="checkbox"/> Map	
Accessibility	<input checked="" type="checkbox"/> General public <input checked="" type="checkbox"/> Administration <input checked="" type="checkbox"/> Scientific purposes <input type="checkbox"/> Other	
Use	<input checked="" type="checkbox"/> For consultation only <input type="checkbox"/> Free of charge under any condition <input type="checkbox"/> After payment <input checked="" type="checkbox"/> Without special conditions <input type="checkbox"/> Under special conditions <input type="checkbox"/> I do not know	

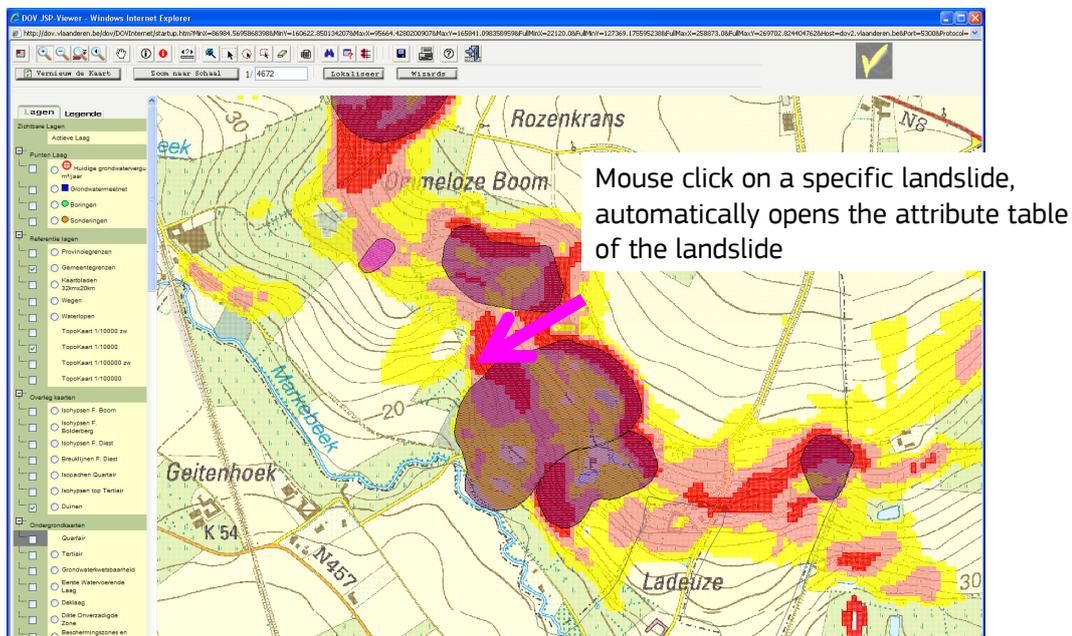
Database metadata complying with INSPIRE metadata regulations	Yes	Not yet
	I do not know	
Database provided through/stored in a network following the INSPIRE network services	Yes	No
	I do not know	
Institute registered as an INSPIRE stakeholder	<input checked="" type="checkbox"/> LMO <input type="checkbox"/> SDIC <input type="checkbox"/> I do not know <input type="checkbox"/> No	
Institute willing to register as an INSPIRE stakeholder	<input type="checkbox"/> LMO <input type="checkbox"/> SDIC <input type="checkbox"/> I do not know <input type="checkbox"/> No	
Organization willing to participate in the real testing or reviewing of a draft of the INSPIRE Data Specifications related to the spatial data theme "Natural Risk Zones" when it is developed by the Thematic Working Group	Yes	No
	I do not know	

As in about half of the EU countries, the landslide database (and classified landslide susceptibility map) are included in a larger database, i.e. the database for the subsoil of Flanders “Databank Ondergrond Vlaanderen; DOV” (<http://dov.vlaanderen.be/dov/DOVInternet/default.htm>).

Information on the database can also be found in:

Vandekerckhove, L., Vanthournout, L., Van Den Eeckhaut, M., Poesen, J., Vanwesenbeeck, V., Van Damme, M., Boel, K., De Nil, K., De Rouck, T., Vergauwen, I., 2009. Integrating landslide information in the Flemish Subsoil Database (DOV). 6th EUREGEO European Congress on Regional GEOscientific Cartography and Information Systems, Munich (Germany), 9-12 June, 2009, pp. 4.

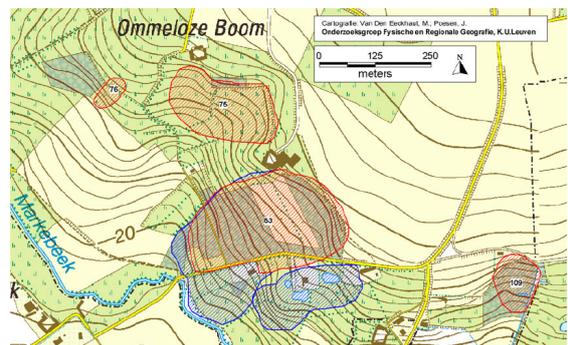
Van Den Eeckhaut, M., Poesen, J., Vandekerckhove, L., Van Gils, M., Van Rompaey, A., 2010. Human-environment interactions in residential areas susceptible to landsliding: the Flemish Ardennes case-study. *Area* 42 (3), 339–358.



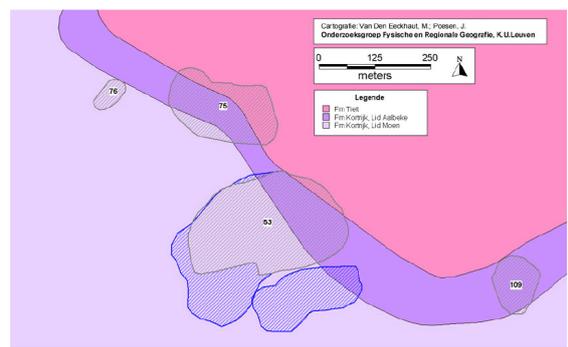
Excerpt of topographical and geological map.

Code:	53	
Ligging:	Hekkebrugstraat Gemeente: Oudenaarde X = 97390 Y = 168430	
Type:	Duidelijke grondverschuiving met een diep schuifvlak Rotationale verglijding type 1	
Morfologische Kenmerken van de massabeweging:	Oppervlakte (ha): 6,3 Lengte (m): 350 Breedte (m): 240 Hoogte steilrand (m): 8 Diepte glijvlak (m): > 3	
Topografische kenmerken van de site:	Gemiddelde helling site (m/m): 0,14 Oriëntatie: ZW Kromming in plan: Recht Kromming in profiel: Concaaf	
Lithologie:	Steilrand: Tt / KoAa Grondverschuiving: KoAa / KoMo	
Bodem:	Vergraven of verschoven terrein, slecht gedraineerde kleibodem	
Hydrografie:	Bronniveau: Ja, tussen 60 en 65 m boven zeeniveau Waterstagnatie / poelen: Nee Ondergraving door beek: Nee Oppervlakkige afvoer van hellingopwaarts gelegen akkers? Ja	
Landgebruik:	Bos	
Historiek:	Datum van activatie / reactivatie: 1960, januari 1966, winter 1988, februari - maart 1995, 1996, winter 1997, 1999, januari 2003 (zie opmerkingen)	
Menselijke ingrepen:	Voor de reactivatie van 1995: Ophogen van wegdek en terrein rond het vroegere huis van V. Desaeleer, verwaarlozen onderhoud grachten, oppervlakkige afvoer van ca. 10 ha groot toestroomgebied, graven van vijvers, wegnemen van materiaal aan de voet van de grondverschuiving in 2001 Na de reactivatie van 1995: In 2000 werden twee 2 m diepe afvoergrachten gegraven. Deze moeten de evacuatie van zowel het bronwater als van de oppervlakkige afvoer van de hellingopwaarts gelegen akkers doorheen de accumulatiezone van de grondverschuiving bevorderen	
Locale info DOV:	Recent werden door de Afdeling Geotechniek (Ministerie van de Vlaamse Gemeenschap) 6 sonderingen en 2 boringen uitgevoerd.	
Opmerkingen:	Bijkomende informatie omtrent de historic van deze grondverschuiving: Van Den Eeckhaut et al. (2003) en Van Den Eeckhaut et al. (in voorbereiding)	

Figuur 1 : Uitsnede uit de topografische kaart (Bron: OC GIS-Vlaanderen, 2001)



Figuur 2 : Uitsnede uit de geologische kaart (Bron: OC GIS-Vlaanderen, 2001)



Excerpt of soil map and photographs of the site.

Figuur 3 : Uitsnede uit de bodemkaart (Bron: OC GIS-Vlaanderen, 2001; eigen bewerking)

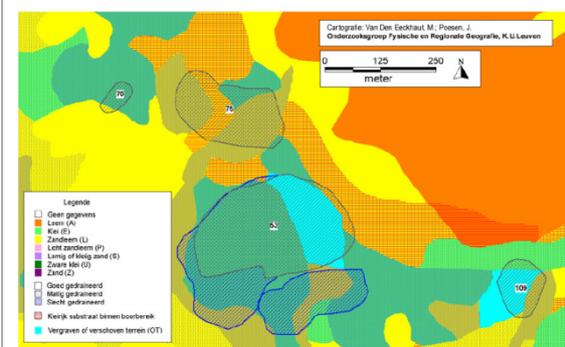


Foto 1 : Uitsnede luchtfoto (NGL, 14/04/1995) van GV. 53. Ook GV. 75, 76 en 109 zijn zichtbaar op de foto. Indien de GV. niet teruggevonden worden kan gebruik gemaakt worden van Figuur 1 om ze te lokaliseren.



Foto 2 : Zicht op de hoofsteilrand van GV. 53. Enkele jaren na de reactivatie van 1995 heeft deze steilrand nog een fris karakter: hij is zeer steil en onbegreid. Op de achtergrond liggen braakliggende akkers



Foto 3 : Materiële schade in de accumulatiezone van GV. 53



ZAGREB, CROATIA: Landslide Register of Urbanised Areas of Zagreb

Name of contact person 1	Zeljko Miklin
Telephone number	+385 016160771
E-mail	zeljko.miklin@hgi-cgs.hr
Institute	Croatian Geological Survey
Address	Sachsova 2, 10001 Zagreb
Official name of database	Landslide Register of Urbanised Areas of Zagreb
Owner of database	Croatian Geological Survey
Contact person	Zeljko Miklin
Producer of database	Croatian Geological Survey
Website	/

Approximate area covered (km ²)	6,680
Official document	Yes, regulatory No Yes, but not regulatory
Language	Croatian
First creation date	1995
Last update	2007
Recurrence for updating	<input checked="" type="checkbox"/> Not updated (first priority is to complete database of Croatia) <input type="checkbox"/> After major event <input type="checkbox"/> Every year <input type="checkbox"/> < 6 months <input type="checkbox"/> Other
Time period of landslide events covered	1985 - 2007
Other features than landslides in database	Yes No
Number of landslides	1540
Completeness of the database (estimate)	<input type="checkbox"/> <25% <input checked="" type="checkbox"/> 50-75% <input type="checkbox"/> 25-50% <input type="checkbox"/> >75%
Landslide inventory map	
Scale	1:25,000 to 1:5,000
Reference coordinate system	Gauss Kruger
Information on the positional accuracy	Yes No Don't know
Landslides representation	<input type="checkbox"/> Point <input type="checkbox"/> Line <input type="checkbox"/> Closed polygon <input checked="" type="checkbox"/> Combination of points, lines and polygons <input type="checkbox"/> Other
Production method	<input checked="" type="checkbox"/> Field survey <input checked="" type="checkbox"/> Historical documents <input checked="" type="checkbox"/> Aerial photographs <input type="checkbox"/> LiDAR derivatives <input type="checkbox"/> Satellite remote sensing <input type="checkbox"/> Airborne remote sensing * <input type="checkbox"/> Other
Representation of landslide location	<input checked="" type="checkbox"/> Coordinates <input type="checkbox"/> Municipality <input type="checkbox"/> Province/county <input type="checkbox"/> Other
Landslide classification	Yes No
Landslide types	
Landslide dimension	<input type="checkbox"/> Displaced volume <input checked="" type="checkbox"/> Affected area <input checked="" type="checkbox"/> Length <input checked="" type="checkbox"/> Width <input checked="" type="checkbox"/> Travel angle <input type="checkbox"/> Height (from top to toe) <input type="checkbox"/> Depth of surface of rupture <input type="checkbox"/> Other
Geo-environmental characteristics	<input checked="" type="checkbox"/> Lithology <input checked="" type="checkbox"/> Hydrogeology <input checked="" type="checkbox"/> Land use <input checked="" type="checkbox"/> Slope gradient <input checked="" type="checkbox"/> Slope aspect <input type="checkbox"/> Slope curvature <input checked="" type="checkbox"/> Other

LANDSLIDE INVENTORIES IN EUROPE

Completeness of triggering factor	<input type="checkbox"/> 0% <input type="checkbox"/> 0-25% <input checked="" type="checkbox"/> 25-50%	<input type="checkbox"/> 50-75% <input type="checkbox"/> >75%
Landslide data/history	Yes	No
Initiation date	Yes	No
Initiation and reactivation dates	Yes	No
Completeness	<input type="checkbox"/> 0% <input checked="" type="checkbox"/> 0-25% <input type="checkbox"/> 25-50%	<input type="checkbox"/> 50-75% <input type="checkbox"/> >75%
Landslide activity	Yes	No
Activity classes	Initial, active, modest, stabilised	
Consequences	Yes	No
Completeness	<input type="checkbox"/> 0% <input type="checkbox"/> 0-25% <input checked="" type="checkbox"/> 25-50%	<input type="checkbox"/> 50-75% <input type="checkbox"/> >75%
	7 levels: no, minimum, low, medium, high, very high and catastrophic damage	
Other information	<input type="checkbox"/> Photographs <input checked="" type="checkbox"/> Monitoring data or physical properties <input checked="" type="checkbox"/> Bibliographic references <input type="checkbox"/> Other	

Format	<input type="checkbox"/> Digital, spatial database <input type="checkbox"/> Digital, alphanumeric database <input checked="" type="checkbox"/> Digital, linked spatial and alphanumeric database <input type="checkbox"/> Digital, other <input checked="" type="checkbox"/> Paper
Spatial software	<input checked="" type="checkbox"/> ArcGIS <input type="checkbox"/> Other
Alphanumeric software	<input type="checkbox"/> Oracle <input checked="" type="checkbox"/> Microsoft Access <input type="checkbox"/> Other
Type of paper document	<input checked="" type="checkbox"/> Datasheets <input checked="" type="checkbox"/> Map
Accessibility	<input type="checkbox"/> General public <input type="checkbox"/> Administration <input checked="" type="checkbox"/> Scientific purposes <input checked="" type="checkbox"/> Other: commercial activities
Use	<input type="checkbox"/> For consultation only <input type="checkbox"/> Free of charge under any condition <input type="checkbox"/> After payment <input type="checkbox"/> Without special conditions <input checked="" type="checkbox"/> Under special conditions <input type="checkbox"/> I do not know

Database metadata complying with INSPIRE metadata regulations	Yes	No
	I do not know	
Database provided through/stored in a network following the INSPIRE network services	Yes	No
	I do not know	
Institute registered as an INSPIRE stakeholder	<input type="checkbox"/> LMO <input type="checkbox"/> SDIC <input type="checkbox"/> I do not know <input checked="" type="checkbox"/> No	
Institute willing to register as an INSPIRE stakeholder	<input type="checkbox"/> LMO <input type="checkbox"/> SDIC <input checked="" type="checkbox"/> I do not know <input type="checkbox"/> No	
Organization willing to participate in the real testing or reviewing of a draft of the INSPIRE Data Specifications related to the spatial data theme "Natural Risk Zones" when it is developed by the Thematic Working Group	Yes	No
	I do not know	

PÄRNU, ESTONIA: Landslides near Pärnu Town

Name of contact person 1	Marko Kohv
Telephone number	+372 56663752
E-mail	marko.kohv@gmail.com
Institute	University of Tartu, Department of Geology
Address	Ravila 14a, Tartu
Official name of database	Landslides near Pärnu town
Owner of database	University of Tartu, Department of Geology
Contact person	Marko Kohv
Producer of database	University of Tartu, Department of Geology
Website	/

Approximate area covered (km ²)	400
Official document	Yes, regulatory No Yes, but not regulatory
Language	Estonian
First creation date	2002
Last update	Oct 2009
Recurrence for updating	<input type="checkbox"/> Not updated <input checked="" type="checkbox"/> After major event <input type="checkbox"/> Every year <input type="checkbox"/> < 6 months <input type="checkbox"/> Other
Time period of landslide events covered	1905 - 2009
Other features than landslides in database	Yes No
Number of landslides	28
Completeness of the database (estimate)	<input type="checkbox"/> <25% <input type="checkbox"/> 50-75% <input type="checkbox"/> 25-50% <input checked="" type="checkbox"/> >75%
Landslide inventory map	
Scale	1:10,000
Reference coordinate system	L-EST 97
Information on the positional accuracy	Yes, precision of GPS No Don't know
Landslides representation	<input checked="" type="checkbox"/> Point <input type="checkbox"/> Line <input type="checkbox"/> Closed polygon <input type="checkbox"/> Combination of points, lines and polygons <input type="checkbox"/> Other
Production method	<input checked="" type="checkbox"/> Field survey <input checked="" type="checkbox"/> Historical documents <input checked="" type="checkbox"/> Aerial photographs <input type="checkbox"/> LiDAR derivatives <input type="checkbox"/> Satellite remote sensing <input type="checkbox"/> Airborne remote sensing * <input type="checkbox"/> Other
Representation of landslide location	<input checked="" type="checkbox"/> Coordinates <input type="checkbox"/> Municipality <input type="checkbox"/> Province/county <input type="checkbox"/> Other
Landslide classification	Yes No Agreement with Cruden and Varnes (1996)
Landslide types	Rotational slide, retrogressive slide (all along river bank)
Landslide dimension	<input type="checkbox"/> Displaced volume <input type="checkbox"/> Affected area <input checked="" type="checkbox"/> Length <input checked="" type="checkbox"/> Width <input type="checkbox"/> Travel angle <input type="checkbox"/> Height (from top to toe) <input type="checkbox"/> Depth of surface of rupture <input checked="" type="checkbox"/> Other: Height of the scarp
Geo-environmental characteristics	<input checked="" type="checkbox"/> Lithology <input type="checkbox"/> Hydrogeology <input type="checkbox"/> Land use <input type="checkbox"/> Slope gradient <input type="checkbox"/> Slope aspect <input type="checkbox"/> Slope curvature <input type="checkbox"/> Other

LANDSLIDE INVENTORIES IN EUROPE

Completeness of triggering factor	<input checked="" type="checkbox"/> 0% <input type="checkbox"/> 0-25% <input type="checkbox"/> 25-50%	<input type="checkbox"/> 50-75% <input type="checkbox"/> >75%
Landslide data/history	Yes	No
Initiation date	Yes	No
Initiation and reactivation dates	Yes	No
Completeness	<input type="checkbox"/> 0% <input checked="" type="checkbox"/> 0-25% <input type="checkbox"/> 25-50%	<input type="checkbox"/> 50-75% <input type="checkbox"/> >75%
Landslide activity	Yes	No
Activity classes		
Consequences	Yes	No
Completeness	<input checked="" type="checkbox"/> 0% <input type="checkbox"/> 0-25% <input type="checkbox"/> 25-50%	<input type="checkbox"/> 50-75% <input type="checkbox"/> >75%
Other information	<input type="checkbox"/> Photographs <input type="checkbox"/> Monitoring data or physical properties <input checked="" type="checkbox"/> Bibliographic references <input type="checkbox"/> Other	

Format	<input checked="" type="checkbox"/> Digital, spatial database <input type="checkbox"/> Digital, alphanumeric database <input type="checkbox"/> Digital, linked spatial and alphanumeric database <input type="checkbox"/> Digital, other <input type="checkbox"/> Paper	
Spatial software	<input type="checkbox"/> ArcGIS <input checked="" type="checkbox"/> Other: Mapinfo	
Alphanumeric software	<input type="checkbox"/> Oracle <input type="checkbox"/> Microsoft Access <input type="checkbox"/> Other	
Type of paper document	<input type="checkbox"/> Datasheets <input type="checkbox"/> Map	
Accessibility	<input checked="" type="checkbox"/> General public <input checked="" type="checkbox"/> Administration <input checked="" type="checkbox"/> Scientific purposes <input type="checkbox"/> Other	
Use	<input checked="" type="checkbox"/> For consultation only <input type="checkbox"/> Free of charge under any condition <input type="checkbox"/> After payment <input type="checkbox"/> Without special conditions <input type="checkbox"/> Under special conditions <input type="checkbox"/> I do not know	

Database metadata complying with INSPIRE metadata regulations	Yes	No
	I do not know	
Database provided through/stored in a network following the INSPIRE network services	Yes	No
	I do not know	
Institute registered as an INSPIRE stakeholder	<input type="checkbox"/> LMO <input type="checkbox"/> SDIC <input type="checkbox"/> I do not know <input checked="" type="checkbox"/> No	
Institute willing to register as an INSPIRE stakeholder	<input type="checkbox"/> LMO <input checked="" type="checkbox"/> SDIC <input type="checkbox"/> I do not know <input type="checkbox"/> No	
Organization willing to participate in the real testing or reviewing of a draft of the INSPIRE Data Specifications related to the spatial data theme "Natural Risk Zones" when it is developed by the Thematic Working Group	Yes	No
	I do not know	

SAXONY, GERMANY: Landslide Database of Saxony

Name of contact person 1	Christoph Starke
Telephone number	+49 3731294246
E-mail	Christoph.Starke@smul.sachsen.de
Institute	Saxon State office for environment, agriculture and geology
Address	Pillnitzer Platz 3, 01326 Dresden
Official name of database	Landslide Database of Saxony (Felssturzdatenbank)
Owner of database	Saxon State office for environment, agriculture and geology
Contact person	Peter Dommaschk
Producer of database	Saxon State office for environment, agriculture and geology
Website	http://www.umwelt.sachsen.de/umwelt/geologie/9605.htm ;

Approximate area covered (km ²)	18,500
Official document	Yes, regulatory No Yes, but not regulatory
Language	German
First creation date	2004
Last update	March 2010
Recurrence for updating	<input type="checkbox"/> Not updated <input checked="" type="checkbox"/> After major event <input type="checkbox"/> Every year <input type="checkbox"/> < 6 months <input type="checkbox"/> Other
Time period of landslide events covered	End of 19th century - 2010
Other features than landslides in database	Yes No
Number of landslides	310
Completeness of the database (estimate)	<input type="checkbox"/> <25% <input checked="" type="checkbox"/> 50-75% <input type="checkbox"/> 25-50% <input type="checkbox"/> >75%
Landslide inventory map	
Scale	1:25,000
Reference coordinate system	Gauss Kruger (from 2011/2012 UTM)
Information on the positional accuracy	Yes No Don't know
Landslides representation	<input checked="" type="checkbox"/> Point <input type="checkbox"/> Line <input type="checkbox"/> Closed polygon <input type="checkbox"/> Combination of points, lines and polygons <input type="checkbox"/> Other
Production method	<input checked="" type="checkbox"/> Field survey <input checked="" type="checkbox"/> Historical documents <input type="checkbox"/> Aerial photographs <input type="checkbox"/> LiDAR derivatives <input type="checkbox"/> Satellite remote sensing <input type="checkbox"/> Airborne remote sensing * <input type="checkbox"/> Other
Representation of landslide location	<input checked="" type="checkbox"/> Coordinates <input checked="" type="checkbox"/> Municipality <input checked="" type="checkbox"/> Province/county <input type="checkbox"/> Other
Landslide classification	Yes No Agreement with Cruden and Varnes (1996), Multilingual Landslide Glossary (1994) – UNESCO Work group
Landslide types	Rock fall, rock slide, debris flow, earth flow
Landslide dimension	<input checked="" type="checkbox"/> Displaced volume <input checked="" type="checkbox"/> Affected area <input checked="" type="checkbox"/> Length <input checked="" type="checkbox"/> Width <input checked="" type="checkbox"/> Travel angle <input checked="" type="checkbox"/> Height (from top to toe) <input checked="" type="checkbox"/> Depth of surface of rupture <input type="checkbox"/> Other
Geo-environmental characteristics	<input checked="" type="checkbox"/> Lithology <input checked="" type="checkbox"/> Hydrogeology <input type="checkbox"/> Land use <input checked="" type="checkbox"/> Slope gradient <input checked="" type="checkbox"/> Slope aspect <input checked="" type="checkbox"/> Slope curvature

LANDSLIDE INVENTORIES IN EUROPE

■ Other: Engineering geology and geotechnical aspects		
Completeness of triggering factor	<input type="checkbox"/> 0% <input type="checkbox"/> 0-25% <input type="checkbox"/> 25-50%	<input type="checkbox"/> 50-75% <input checked="" type="checkbox"/> >75%
Landslide data/history	Yes	No
Initiation date	Yes	No
Initiation and reactivation dates	Yes	No
Completeness	<input type="checkbox"/> 0% <input type="checkbox"/> 0-25% <input type="checkbox"/> 25-50%	<input type="checkbox"/> 50-75% <input checked="" type="checkbox"/> >75%
Landslide activity	Yes	No
Activity classes		
Consequences	Yes	No
Completeness	<input type="checkbox"/> 0% <input checked="" type="checkbox"/> 0-25% <input type="checkbox"/> 25-50%	<input type="checkbox"/> 50-75% <input type="checkbox"/> >75%
Other information	<input checked="" type="checkbox"/> Photographs <input checked="" type="checkbox"/> Monitoring data or physical properties <input checked="" type="checkbox"/> Bibliographic references <input type="checkbox"/> Other	

Format	<input type="checkbox"/> Digital, spatial database <input type="checkbox"/> Digital, alphanumeric database <input checked="" type="checkbox"/> Digital, linked spatial and alphanumeric database <input type="checkbox"/> Digital, other <input checked="" type="checkbox"/> Paper
Spatial software	<input checked="" type="checkbox"/> ArcGIS <input type="checkbox"/> Other
Alphanumeric software	<input type="checkbox"/> Oracle <input checked="" type="checkbox"/> Microsoft Access <input type="checkbox"/> Other
Type of paper document	<input checked="" type="checkbox"/> Datasheets <input checked="" type="checkbox"/> Map
Accessibility	<input type="checkbox"/> General public <input checked="" type="checkbox"/> Administration <input checked="" type="checkbox"/> Scientific purposes <input type="checkbox"/> Other
Use	<input checked="" type="checkbox"/> For consultation only <input type="checkbox"/> Free of charge under any condition <input type="checkbox"/> After payment <input type="checkbox"/> Without special conditions <input checked="" type="checkbox"/> Under special conditions <input type="checkbox"/> I do not know

Database metadata complying with INSPIRE metadata regulations	Yes	No I do not know
Database provided through/stored in a network following the INSPIRE network services	Yes	No I do not know
Institute registered as an INSPIRE stakeholder	<input checked="" type="checkbox"/> LMO <input type="checkbox"/> SDIC <input type="checkbox"/> I do not know <input type="checkbox"/> No	
Institute willing to register as an INSPIRE stakeholder	<input type="checkbox"/> LMO <input type="checkbox"/> SDIC <input type="checkbox"/> I do not know <input type="checkbox"/> No	
Organization willing to participate in the real testing or reviewing of a draft of the INSPIRE Data Specifications related to the spatial data theme "Natural Risk Zones" when it is developed by the Thematic Working Group	Yes	No I do not know

Example of datasheet of the landslide database of Saxony provided by Saxon State Office for Environment, Agriculture and Geology (LfLUG).

Ingenieurgeologische Aufnahme von Felsböschungen Ersteinschätzung von Felssturz- und Steinschlagereignissen Sächsisches Landesamt für Umwelt, Landwirtschaft und Geologie							
					lfd. Nr.: XXX	Blatt 1	
Allgemeine Angaben	Bearbeiter	XXXXX XXXXXXXXXXXX					
	Institution	XXXXXXXXXXXXXXXXXXXX					
	Veranlassung	Information durch XXXXXXXXXXXXX, Herr XXXXXX, am XX.XX.XXXX (Ingenieurgeologische Landesaufnahme – Erfassung von Massenbewegungen)					
	Zuständigkeit	XXXXXXXXXXXXXXXXXXXX					
	Rechtsträger	XXXXXXXXXXXXXXXXXXXX					
	TK 10 / TK 25 Nr.	XXXX-XX / XXXX	Rechtswert	XXXXXXX	Hochwert	XXXXXXX	
	Landkreis	XXXXXXXXXXXXXXXXXXXX	Gemeinde	XXXXXXXXXXXXXXXXXXXX			
	Gemarkung	XXXXXXXXXXXXXXXXXXXX	Flurstück	XX/X			
	Lagebeschreibung	Felsporn unterhalb des westlichsten Punktes vom XXXXXXXXXXXXXXXXXXXX					
	Schutzwürdige Objekte	Privatgrundstück (massives Schuppegebäude)					
	Schadensbild	beschädigter temporärer Bauzaun (kein Personenschaden, geringer materieller Sachschaden)					
	Witterung	am	leicht bewölkt, trocken, 2 °C	xx.xx.xxxx	Ereignisdatum	xx.xx.xxxx	
	Sonstiges	Das Baugerüst wurde an einer Stelle am späteren Abbruchkörper Ak1 befestigt und wenige Tage vor dem Ereignis abgebaut!					
Angaben zur Böschung	<input checked="" type="checkbox"/> Natürl. Böschung	<input type="checkbox"/> Ein- / Anschnitt	<input type="checkbox"/> Steinbruch / Halde	Streichrichtung: NW – SE			
	Ausbruchhöhe: 1,2 m	Ausbruchbreite: 0,8 m	Ausbruchtiefe: 0,35 m	Böschungswinkel: 60° / 90°			
	Verlagerte Masse	ca. 0,4 m ³		Verlagerungsgefährdete Masse	ca. 0,4 m ³		
	Böschungshöhe / -wand	ca. 8 – 10m	<input type="checkbox"/> eben	<input checked="" type="checkbox"/> uneben	Sonstiges:		
	Böschungsschulter	<input checked="" type="checkbox"/> konvex	<input type="checkbox"/> konkav		Sonstiges:		
	Böschungsfuß	<input checked="" type="checkbox"/> verschüttet	<input type="checkbox"/> nicht verschüttet		Sonstiges:		
	Art der Bewegung	<input type="checkbox"/> Fallen	<input type="checkbox"/> Kippen	<input checked="" type="checkbox"/> Gleiten	<input type="checkbox"/> Driften		
	Vegetation	im Ausbruchbereich sind Efeu-Wurzelreste erkennbar, oberhalb ist Efeubewuchs vorhanden					
	Wasseraustritte	<input type="checkbox"/> temporär	<input type="checkbox"/> permanent		Menge/Einheit (l/s):		
	Entwässerung / Drainage	nicht vorhanden					
	Sicherungsbauten	nicht vorhanden					
	Monitoring	<input type="checkbox"/> ja	<input checked="" type="checkbox"/> nein		Art des Monitoring		
	Ergebnis	Gefahrenbeurteilung					
Handlungsbedarf		<input type="checkbox"/> sofort	<input checked="" type="checkbox"/> mittelfristig		<input type="checkbox"/> kein		
Zusatzuntersuchungen		-					
Vorschläge für sofortige Sicherungsmaßnahmen		-					
Weiterer Handlungsbedarf		- Gebirgsschonende Beräumung des potentiellen Abbruchkörpers Ak2. In diesem Zusammenhang ist der Felsporn auf weiteres loses (verlagerungsgefährdetes) Material zu überprüfen, ggf. ist dieses zu beräumen. Die Maßnahme ist durch eine Fachfirma zu realisieren. - Bis zur Durchführung der Beräumungsarbeiten ist der Ablagerungsbereich abzusperren und der Privatgrundstücksbesitzer ist zeitnah nach der Ortsbegehung zu informieren.					
Datum:	xx.xx.xxxx		Unterschrift:				

Ingenieurgeologische Aufnahme von Felsböschungen																							
Ersteinschätzung von Felssturz- und Steinschlagereignissen																							
Sächsisches Landesamt für Umwelt, Landwirtschaft und Geologie																							
								Ifd. Nr.: XXX	Blatt 2														
Gebirgszustand																							
Gesteinsart		Metagrauwacke und Metagrauwackenpelit (feinstkörnige Metagrauwacke)																					
Stratigraphie		Neoproterozoikum (Tieferes Vendium; Varanger: <i>Weesensteiner Gruppe</i>); <i>Niederseidwitzer Folge</i> , kontaktmetamorph																					
geologische Struktur		nordöstlicher Rahmen des Maxen-Berggießhübeler Synklinoriums (Elbtalschiefergebirge)																					
Verwitterungsgrad		<input type="checkbox"/> unverwittert		<input checked="" type="checkbox"/> angewittert		<input type="checkbox"/> entfestigt		<input type="checkbox"/> zersetzt															
Trennflächengefüge																							
Schichtung (Ss)		Messwerte (EFR/EFW):																					
Abstand Schichtung [cm]		<input type="checkbox"/> < 1		<input type="checkbox"/> 1 - 5		<input type="checkbox"/> 5 - 10		<input type="checkbox"/> 10 - 30		<input type="checkbox"/> 30 - 60		<input type="checkbox"/> > 60											
Sonstiges																							
Schieferung (Sf)		Messwerte (EFR/EFW): 16° / 60°																					
Abstand Schieferung [cm]		<input type="checkbox"/> < 1		<input type="checkbox"/> 1 - 5		<input type="checkbox"/> 5 - 10		<input type="checkbox"/> 10 - 30		<input checked="" type="checkbox"/> 30 - 60		<input type="checkbox"/> > 60											
Sonstiges		bildet gleichzeitig die Ablösefläche für den Abbruchkörper Ak1 und Ak1a																					
tekton. Besonderheiten		Weesensteiner Störung ca. 240 m SW, Innerer Kontakthof (zweifach kontaktmetamorph überprägt)																					
Klüftung K 1 Messwerte (EFR/EFW):			Klüftung K 2 Messwerte (EFR/EFW):			Klüftung K 3 Messwerte (EFR/EFW):																	
266° / 8°			36° / 72°																				
weitere Klufsysteme Messwerte (EFR/EFW):																							
Kluftabstände K 1 – K 3 [cm]																							
<input type="checkbox"/> 1-5		<input type="checkbox"/> 5-10		<input type="checkbox"/> 10-30		<input type="checkbox"/> 30-60		<input checked="" type="checkbox"/> > 60		<input type="checkbox"/> 1-5		<input type="checkbox"/> 5-10		<input type="checkbox"/> 10-30		<input type="checkbox"/> 30-60		<input type="checkbox"/> > 60					
Sonstiges:			Sonstiges:			Sonstiges:																	
Kluftgröße – Trennflächenlänge K 1 – K 3 [m]																							
<input type="checkbox"/> < 1		<input checked="" type="checkbox"/> 1-10		<input type="checkbox"/> > 10		Bem.:		<input type="checkbox"/> < 1		<input checked="" type="checkbox"/> 1-10		<input type="checkbox"/> > 10		Bem.:		<input type="checkbox"/> < 1		<input type="checkbox"/> 1-10		<input type="checkbox"/> > 10		Bem.:	
Habitus der Kluftwandung K 1 – K 3																							
<input checked="" type="checkbox"/> stufig		<input type="checkbox"/> wellig		<input checked="" type="checkbox"/> eben		<input checked="" type="checkbox"/> stufig		<input type="checkbox"/> wellig		<input checked="" type="checkbox"/> eben		<input type="checkbox"/> stufig		<input type="checkbox"/> wellig		<input type="checkbox"/> eben							
<input type="checkbox"/> rau		<input checked="" type="checkbox"/> glatt		<input checked="" type="checkbox"/> rippelig		<input type="checkbox"/> rau		<input checked="" type="checkbox"/> glatt		<input checked="" type="checkbox"/> rippelig		<input type="checkbox"/> rau		<input type="checkbox"/> glatt		<input type="checkbox"/> rippelig							
Kluftöffnungsweite K 1 – K 3 [cm]																							
min.:		max.:		mittel:		min.:		max.:		mittel:		min.:		max.:		mittel:							
Kluftfüllung K 1 – K 3																							
Kluftversatz K 1 – K 3 [cm]																							
Kluftkörperform		<input type="checkbox"/> säulig		<input checked="" type="checkbox"/> blockig		<input type="checkbox"/> würfelig		<input type="checkbox"/> quaderig		<input checked="" type="checkbox"/> plattig													

Ingenieurgeologische Charakteristik

Ingenieurgeologische Aufnahme von Felsböschungen

Ersteinschätzung von Felssturz- und Steinschlagereignissen

Sächsisches Landesamt für Umwelt, Landwirtschaft und Geologie

lfd. Nr.: XXX

Blatt 3

Skizze / Profil / Bilder

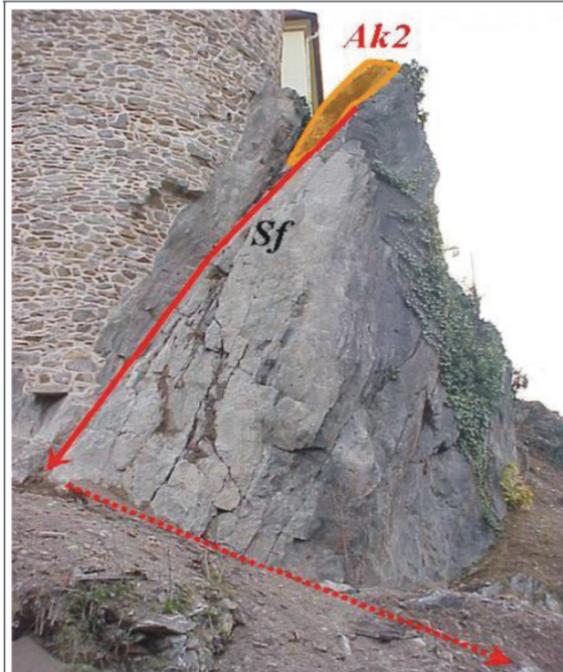


Bild 1

Abbruchbereich [Blickrichtung ± ESE, Seitenansicht] – maßgebend für den Abbruch ist die Trennsituation (rot gekennzeichnete Schiefeungsfläche **Sf**). Im oberen Teil verlagerungsgefährdeter Abbruchkörper **Ak2** ⇔ Abmessungen ca. 1,0 x 1,0 x 0,4 m (Länge x Breite x Höhe). Im unteren Bildbereich Aufschlagbereich (Böschungsfußbereich). Der Böschungswinkel des Aufschlagbereiches beträgt zwischen 35° und 42° (rot gepunktet), so dass das Abbruchmaterial (**Ak1** und **Ak1a**) dort nicht liegen geblieben ist und sich weiter hangabwärts abgelagert hat (s. a. Bild 2).

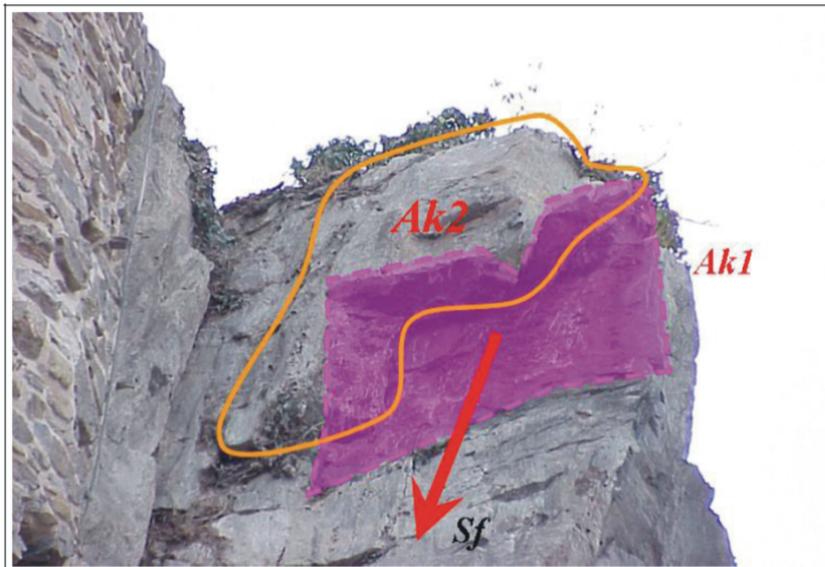


Bild 2

Im Bild 3 ist der potentielle Abbruchkörper **Ak2** aus dem Bild 1 in einer Detailaufnahme zu sehen. Der Abbruchkörper **Ak1** ist ebenfalls gekennzeichnet wie auch die Schiefeungsfläche **Sf** mit der Bewegungsrichtung.

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BAVARIA, GERMANY: GEORISK

Name of contact person 1	A.v.Poschinger	
Telephone number	+49 8992141366	
E-mail	Andreas.Poschinger@lfu.bayern.de	
Institute	Bavarian Environment Agency	
Address	Lazarettstr. 67, 80636 München	
Official name of database	GEORISK	
Owner of database	Environment Agency (LfU)	
Contact person	A.v.Poschinger	
Producer of database	Environment Agency (LfU)	
Website	www.bis.bayern.de	
Approximate area covered (km ²)	70,500 (Bavarian Alps finish, whole Bavaria is under construction)	
Official document	Yes, regulatory	No
	Yes, but not regulatory	
Language	German	
First creation date	1987	
Last update	April 2010	
Recurrence for updating	<input type="checkbox"/> Not updated <input type="checkbox"/> After major event <input type="checkbox"/> Every year <input checked="" type="checkbox"/> < 6 months, about every 2-3 months <input type="checkbox"/> Other	
Time period of landslide events covered	Prehistoric - 2010	
Other features than landslides in database	Yes, sinkholes	No
Number of landslides	2800	
Completeness of the database (estimate)	<input checked="" type="checkbox"/> <25% (whole Bavaria) <input type="checkbox"/> 25-50%	<input type="checkbox"/> 50-75% <input checked="" type="checkbox"/> >75% (Bavarian Alps)
Landslide inventory map		
Scale	1:10,000	
Reference coordinate system	Gauss Kruger	
Information on the positional accuracy	Yes¹	No
	Don't know	
Landslides representation	<input type="checkbox"/> Point <input type="checkbox"/> Line <input type="checkbox"/> Closed polygon <input checked="" type="checkbox"/> Combination of points, lines and polygons <input type="checkbox"/> Other	
Production method	<input checked="" type="checkbox"/> Field survey <input checked="" type="checkbox"/> Historical documents <input checked="" type="checkbox"/> Aerial photographs <input checked="" type="checkbox"/> LiDAR derivatives <input type="checkbox"/> Satellite remote sensing <input type="checkbox"/> Airborne remote sensing * <input type="checkbox"/> Other	
Representation of landslide location	<input checked="" type="checkbox"/> Coordinates <input checked="" type="checkbox"/> Municipality <input checked="" type="checkbox"/> Province/county <input type="checkbox"/> Other	
Landslide classification	Yes	No
	Agreement with Cruden and Varnes (1996)	
Landslide types	Fall, slide, flow	
Landslide dimension	<input checked="" type="checkbox"/> Displaced volume <input checked="" type="checkbox"/> Affected area <input checked="" type="checkbox"/> Length <input checked="" type="checkbox"/> Width <input checked="" type="checkbox"/> Travel angle <input checked="" type="checkbox"/> Height (from top to toe) <input checked="" type="checkbox"/> Depth of surface of rupture <input type="checkbox"/> Other	
Geo-environmental characteristics	<input checked="" type="checkbox"/> Lithology <input type="checkbox"/> Hydrogeology <input type="checkbox"/> Land use <input type="checkbox"/> Slope gradient <input checked="" type="checkbox"/> Slope aspect <input type="checkbox"/> Slope curvature <input type="checkbox"/> Other	

LANDSLIDE INVENTORIES IN EUROPE

Completeness of triggering factor	<input type="checkbox"/> 0% <input type="checkbox"/> 0-25% <input checked="" type="checkbox"/> 25-50%	<input type="checkbox"/> 50-75% <input type="checkbox"/> >75%
Landslide data/history	Yes	No
Initiation date	Yes	No
Initiation and reactivation dates	Yes	No
Completeness	<input type="checkbox"/> 0% <input checked="" type="checkbox"/> 0-25% <input type="checkbox"/> 25-50%	<input type="checkbox"/> 50-75% <input type="checkbox"/> >75%
Landslide activity	Yes	No
Activity classes	Active, potential, quiet, uncertain	
Consequences	Yes	No
Completeness	<input type="checkbox"/> 0% <input checked="" type="checkbox"/> 0-25% <input type="checkbox"/> 25-50%	<input type="checkbox"/> 50-75% <input type="checkbox"/> >75%
Other information	<input checked="" type="checkbox"/> Photographs <input checked="" type="checkbox"/> Monitoring data or physical properties <input checked="" type="checkbox"/> Bibliographic references <input type="checkbox"/> Other	

Format	<input type="checkbox"/> Digital, spatial database <input type="checkbox"/> Digital, alphanumeric database <input checked="" type="checkbox"/> Digital, linked spatial and alphanumeric database <input type="checkbox"/> Digital, other <input type="checkbox"/> Paper
Spatial software	<input checked="" type="checkbox"/> ArcGIS <input type="checkbox"/> Other
Alphanumeric software	<input checked="" type="checkbox"/> Oracle <input type="checkbox"/> Microsoft Access <input type="checkbox"/> Other
Type of paper document	<input type="checkbox"/> Datasheets <input type="checkbox"/> Map
Accessibility	<input checked="" type="checkbox"/> General public <input checked="" type="checkbox"/> Administration <input checked="" type="checkbox"/> Scientific purposes <input type="checkbox"/> Other
Use	<input checked="" type="checkbox"/> For consultation only <input type="checkbox"/> Free of charge under any condition <input type="checkbox"/> After payment <input type="checkbox"/> Without special conditions <input type="checkbox"/> Under special conditions <input type="checkbox"/> I do not know

Database metadata complying with INSPIRE metadata regulations	Yes	No
	I do not know	
Database provided through/stored in a network following the INSPIRE network services	Yes	No
	I do not know	
Institute registered as an INSPIRE stakeholder	<input type="checkbox"/> LMO <input type="checkbox"/> SDIC <input type="checkbox"/> I do not know <input checked="" type="checkbox"/> No	
Institute willing to register as an INSPIRE stakeholder	<input type="checkbox"/> LMO <input type="checkbox"/> SDIC <input checked="" type="checkbox"/> I do not know <input type="checkbox"/> No	
Organization willing to participate in the real testing or reviewing of a draft of the INSPIRE Data Specifications related to the spatial data theme "Natural Risk Zones" when it is developed by the Thematic Working Group	Yes	No
	I do not know	

¹ precise measurement <= 1 m; rough measurement 1-25 m; coordinates from map < 1:10,000: 1-20 m; coordinates from topographical map 1:25,000: 10-100 m; and coordinates from topographic map 1:50,000: 20-250 m.

RHEINLAND-PFALZ, GERMANY: Landslide Inventory (name not specified)

Name of contact person 1	Michael Rogall
Telephone number	+49 61319254344
E-mail	michael.rogall@lgb-rlp.de
Institute	Regional Office for Geology, Raw Materials and Mining
Address	Emy-Roeder-Str. 5, 55129 Mainz
Official name of database	Not yet specified
Owner of database	Regional Office for Geology, Raw Materials and Mining
Contact person	Michael Rogall
Producer of database	Regional Office for Geology, Raw Materials and Mining
Website	/

Approximate area covered (km ²)	20,000
Official document	Yes, regulatory No Yes, but not regulatory
Language	German
First creation date	in progress
Last update	in progress
Recurrence for updating	<input type="checkbox"/> Not updated <input type="checkbox"/> After major event <input checked="" type="checkbox"/> Every year <input type="checkbox"/> < 6 months <input type="checkbox"/> Other
Time period of landslide events covered	1880 - 2010
Other features than landslides in database	Yes No
Number of landslides	1800
Completeness of the database (estimate)	<input type="checkbox"/> <25% <input type="checkbox"/> 50-75% <input type="checkbox"/> 25-50% <input checked="" type="checkbox"/> >75%
Landslide inventory map Scale	
Reference coordinate system	Gauss Kruger
Information on the positional accuracy	Yes No Don't know
Landslides representation	<input type="checkbox"/> Point <input type="checkbox"/> Line <input type="checkbox"/> Closed polygon <input checked="" type="checkbox"/> Combination of points, lines and polygons <input type="checkbox"/> Other
Production method	<input checked="" type="checkbox"/> Field survey <input checked="" type="checkbox"/> Historical documents <input type="checkbox"/> Aerial photographs <input type="checkbox"/> LiDAR derivatives <input type="checkbox"/> Satellite remote sensing <input type="checkbox"/> Airborne remote sensing * <input type="checkbox"/> Other
Representation of landslide location	<input checked="" type="checkbox"/> Coordinates <input checked="" type="checkbox"/> Municipality <input checked="" type="checkbox"/> Province/county <input type="checkbox"/> Other
Landslide classification Landslide types	Yes No Rock fall, landslide
Landslide dimension	<input checked="" type="checkbox"/> Displaced volume <input checked="" type="checkbox"/> Affected area <input checked="" type="checkbox"/> Length <input checked="" type="checkbox"/> Width <input type="checkbox"/> Travel angle <input type="checkbox"/> Height (from top to toe) <input type="checkbox"/> Depth of surface of rupture <input type="checkbox"/> Other
Geo-environmental characteristics	<input checked="" type="checkbox"/> Lithology <input type="checkbox"/> Hydrogeology <input checked="" type="checkbox"/> Land use <input checked="" type="checkbox"/> Slope gradient <input type="checkbox"/> Slope aspect <input type="checkbox"/> Slope curvature <input type="checkbox"/> Other
Completeness of triggering factor	<input type="checkbox"/> 0%

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	<input type="checkbox"/> 0-25% <input checked="" type="checkbox"/> 25-50%	<input type="checkbox"/> 50-75% <input type="checkbox"/> >75%
Landslide data/history	Yes	No
Initiation date	Yes	No
Initiation and reactivation dates	Yes	No
Completeness	<input type="checkbox"/> 0% <input type="checkbox"/> 0-25% <input type="checkbox"/> 25-50%	<input type="checkbox"/> 50-75% <input checked="" type="checkbox"/> >75%
Landslide activity	Yes	No
Activity classes		
Consequences	Yes	No
Completeness	<input type="checkbox"/> 0% <input type="checkbox"/> 0-25% <input type="checkbox"/> 25-50%	<input checked="" type="checkbox"/> 50-75% <input type="checkbox"/> >75%
	Detailed description of remediation costs	
Other information	<input checked="" type="checkbox"/> Photographs <input checked="" type="checkbox"/> Monitoring data or physical properties <input type="checkbox"/> Bibliographic references <input type="checkbox"/> Other	

Format	<input type="checkbox"/> Digital, spatial database <input type="checkbox"/> Digital, alphanumeric database <input type="checkbox"/> Digital, linked spatial and alphanumeric database <input checked="" type="checkbox"/> Digital, other Excel <input type="checkbox"/> Paper
Spatial software	<input type="checkbox"/> ArcGIS <input type="checkbox"/> Other
Alphanumeric software	<input type="checkbox"/> Oracle <input type="checkbox"/> Microsoft Access <input type="checkbox"/> Other
Type of paper document	<input type="checkbox"/> Datasheets <input type="checkbox"/> Map
Accessibility	<input type="checkbox"/> General public <input checked="" type="checkbox"/> Administration <input checked="" type="checkbox"/> Scientific purposes <input type="checkbox"/> Other
Use	<input type="checkbox"/> For consultation only <input type="checkbox"/> Free of charge under any condition <input type="checkbox"/> After payment <input type="checkbox"/> Without special conditions <input type="checkbox"/> Under special conditions <input checked="" type="checkbox"/> I do not know

Database metadata complying with INSPIRE metadata regulations	Yes No I do not know
Database provided through/stored in a network following the INSPIRE network services	Yes No I do not know
Institute registered as an INSPIRE stakeholder	<input type="checkbox"/> LMO <input type="checkbox"/> SDIC <input type="checkbox"/> I do not know <input checked="" type="checkbox"/> No
Institute willing to register as an INSPIRE stakeholder	<input type="checkbox"/> LMO <input type="checkbox"/> SDIC <input checked="" type="checkbox"/> I do not know <input type="checkbox"/> No
Organization willing to participate in the real testing or reviewing of a draft of the INSPIRE Data Specifications related to the spatial data theme "Natural Risk Zones" when it is developed by the Thematic Working Group	Yes No I do not know

ALPS, ITALY, SWITZERLAND, AUSTRIA: Alpine Inventory of Deep-Seated Gravitational Slope Deformations

Name of contact person 1	Federico Agliardi	
Telephone number	+39 02 64482006	
E-mail	federico.agliardi@unimib.it	
Institute	University of Milano-Bicocca, Italy	
Address	Piazza della Scienza, 4 – 20126 Milano	
Official name of database	Alpine Inventory of Deep-Seated Gravitational Slope Deformations	
Owner of database	Geology and Geotechnology Department, University of Milano-Bicocca, Italy	
Contact person	Prof. Giovanni B. Crosta	
Producer of database	Geology and Geotechnology Department, University of Milano-Bicocca, Italy	
Website	/	
Approximate area covered (km ²)	103,000	
Official document	Yes, regulatory	No
	Yes, but not regulatory	
Language	English	
First creation date	2007-2008	
Last update	2009	
Recurrence for updating	<input type="checkbox"/> Not updated <input type="checkbox"/> After major event <input type="checkbox"/> Every year <input type="checkbox"/> < 6 months <input checked="" type="checkbox"/> Other: in function of research activities	
Time period of landslide events covered	Late Pleistocene – 2009	
Other features than landslides in database	Yes, Active tectonic features, sediment fans, large slope deposits	No
Number of landslides	2216 (868 DSGSD)	
Completeness of the database (estimate)	<input type="checkbox"/> <25% <input type="checkbox"/> 25-50%	<input type="checkbox"/> 50-75% <input checked="" type="checkbox"/> >75%
Landslide inventory map		
Scale		
Reference coordinate system	UTM-WGS84	
Information on the positional accuracy	Yes	No
	Don't know	
Landslides representation	<input type="checkbox"/> Point <input type="checkbox"/> Line <input type="checkbox"/> Closed polygon <input checked="" type="checkbox"/> Combination of points, lines and polygons <input type="checkbox"/> Other	
Production method	<input checked="" type="checkbox"/> Field survey <input checked="" type="checkbox"/> Historical documents <input checked="" type="checkbox"/> Aerial photographs <input type="checkbox"/> LiDAR derivatives <input checked="" type="checkbox"/> Satellite remote sensing <input type="checkbox"/> Airborne remote sensing * <input checked="" type="checkbox"/> Other: Google Earth™	
Representation of landslide location	<input type="checkbox"/> Coordinates <input type="checkbox"/> Municipality <input checked="" type="checkbox"/> Province/county <input checked="" type="checkbox"/> Other: Landslide id linked to map	
Landslide classification	Yes	No
Landslide types	Agreement with Cruden and Varnes (1996) Deep-seated gravitational soil deformations (DSGSD), large rock slides, rock avalanches	
Landslide dimension	<input type="checkbox"/> Displaced volume <input checked="" type="checkbox"/> Affected area <input checked="" type="checkbox"/> Length <input checked="" type="checkbox"/> Width <input checked="" type="checkbox"/> Travel angle <input checked="" type="checkbox"/> Height (from top to toe) <input type="checkbox"/> Depth of surface of rupture <input type="checkbox"/> Other	
Geo-environmental characteristics	<input checked="" type="checkbox"/> Lithology <input type="checkbox"/> Hydrogeology <input type="checkbox"/> Land use	

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	<input checked="" type="checkbox"/> Slope gradient <input checked="" type="checkbox"/> Slope aspect <input type="checkbox"/> Slope curvature <input checked="" type="checkbox"/> Other: local relief, rock uplift, glacial features, seismicity
Completeness of triggering factor	<input checked="" type="checkbox"/> 0% <input type="checkbox"/> 0-25% <input type="checkbox"/> 50-75% <input type="checkbox"/> 25-50% <input type="checkbox"/> >75%
Landslide data/history	Yes No
Initiation date	Yes No
Initiation and reactivation dates	Yes No
Completeness	<input type="checkbox"/> 0% <input checked="" type="checkbox"/> 0-25% <input type="checkbox"/> 50-75% <input type="checkbox"/> 25-50% <input type="checkbox"/> >75%
Landslide activity	Yes No
Activity classes	
Consequences	Yes No
Completeness	<input checked="" type="checkbox"/> 0% <input type="checkbox"/> 0-25% <input type="checkbox"/> 50-75% <input type="checkbox"/> 25-50% <input type="checkbox"/> >75%
Other information	<input type="checkbox"/> Photographs <input type="checkbox"/> Monitoring data or physical properties <input type="checkbox"/> Bibliographic references <input type="checkbox"/> Other

Format	<input checked="" type="checkbox"/> Digital, spatial database <input type="checkbox"/> Digital, alphanumeric database <input type="checkbox"/> Digital, linked spatial and alphanumeric database <input type="checkbox"/> Digital, other <input checked="" type="checkbox"/> Paper
Spatial software	<input checked="" type="checkbox"/> ArcGIS <input type="checkbox"/> Other
Alphanumeric software	<input type="checkbox"/> Oracle <input type="checkbox"/> Microsoft Access <input type="checkbox"/> Other
Type of paper document	<input checked="" type="checkbox"/> Datasheets <input type="checkbox"/> Map
Accessibility	<input type="checkbox"/> General public <input type="checkbox"/> Administration <input checked="" type="checkbox"/> Scientific purposes (only producer) <input type="checkbox"/> Other
Use	<input type="checkbox"/> For consultation only <input type="checkbox"/> Free of charge under any condition <input type="checkbox"/> After payment <input type="checkbox"/> Without special conditions <input type="checkbox"/> Under special conditions <input type="checkbox"/> I do not know

Database metadata complying with INSPIRE metadata regulations	Yes No I do not know
Database provided through/stored in a network following the INSPIRE network services	Yes No I do not know
Institute registered as an INSPIRE stakeholder	<input type="checkbox"/> LMO <input type="checkbox"/> SDIC <input type="checkbox"/> I do not know <input checked="" type="checkbox"/> No
Institute willing to register as an INSPIRE stakeholder	<input type="checkbox"/> LMO <input type="checkbox"/> SDIC <input checked="" type="checkbox"/> I do not know <input type="checkbox"/> No
Organization willing to participate in the real testing or reviewing of a draft of the INSPIRE Data Specifications related to the spatial data theme "Natural Risk Zones" when it is developed by the Thematic Working Group	Yes No I do not know

ARNO RIVER BASIN, ITALY: Landslide Inventory of the Arno River Basin

Name of contact person 1	Veronica Tofani	
Telephone number	+39 055 2756221	
E-mail	veronica.tofani@unifi.it	
Institute	Department of Earth Sciences, University of Firenze	
Address	Via La Pira, 4, 50121 Firenze	
Official name of database	Landslide inventory of the Arno river basin	
Owner of database	Department of Earth Sciences, University of Firenze and Arno River Basin Authority	
Contact person	/	
Producer of database	Department of Earth Sciences, University of Firenze	
Website	http://www.adbarno.it/	
Approximate area covered (km ²)	9,100	
Official document	Yes, regulatory	No
	Yes, but not regulatory	
Language	Italian	
First creation date	2002	
Last update	2005	
Recurrence for updating	<input type="checkbox"/> Not updated <input checked="" type="checkbox"/> After major event <input type="checkbox"/> Every year <input type="checkbox"/> < 6 months <input type="checkbox"/> Other	
Time period of landslide events covered	1980 - 2005	
Other features than landslides in database	Yes	No
Number of landslides	27,500	
Completeness of the database (estimate)	<input type="checkbox"/> <25% <input type="checkbox"/> 50-75% <input type="checkbox"/> 25-50% <input checked="" type="checkbox"/> >75%	
Landslide inventory map		
Scale	1:10,000	
Reference coordinate system	UTM/WGS84	
Information on the positional accuracy	Yes	No
	Don't know	
Landslides representation	<input type="checkbox"/> Point <input type="checkbox"/> Line <input checked="" type="checkbox"/> Closed polygon <input type="checkbox"/> Combination of points, lines and polygons <input type="checkbox"/> Other	
Production method	<input checked="" type="checkbox"/> Field survey <input checked="" type="checkbox"/> Historical documents <input checked="" type="checkbox"/> Aerial photographs <input type="checkbox"/> LiDAR derivatives <input checked="" type="checkbox"/> Satellite remote sensing <input type="checkbox"/> Airborne remote sensing * <input type="checkbox"/> Other	
Representation of landslide location	<input checked="" type="checkbox"/> Coordinates <input checked="" type="checkbox"/> Municipality <input type="checkbox"/> Province/county <input type="checkbox"/> Other	
Landslide classification	Yes	No
	Agreement with Cruden and Varnes (1996)	
Landslide types	Falls, slides, flows, rapid flows, shallow landslides	
Landslide dimension	<input type="checkbox"/> Displaced volume <input checked="" type="checkbox"/> Affected area <input checked="" type="checkbox"/> Length <input checked="" type="checkbox"/> Width <input type="checkbox"/> Travel angle <input checked="" type="checkbox"/> Height (from top to toe) <input type="checkbox"/> Depth of surface of rupture <input type="checkbox"/> Other	
Geo-environmental characteristics	<input checked="" type="checkbox"/> Lithology <input type="checkbox"/> Hydrogeology <input checked="" type="checkbox"/> Land use <input checked="" type="checkbox"/> Slope gradient <input checked="" type="checkbox"/> Slope aspect <input checked="" type="checkbox"/> Slope curvature	

LANDSLIDE INVENTORIES IN EUROPE

	<input type="checkbox"/> Other	
Completeness of triggering factor	<input checked="" type="checkbox"/> 0% <input type="checkbox"/> 0-25% <input type="checkbox"/> 25-50%	<input type="checkbox"/> 50-75% <input type="checkbox"/> >75%
Landslide data/history	Yes	No
Initiation date	Yes	No
Initiation and reactivation dates	Yes	No
Completeness	<input checked="" type="checkbox"/> 0% <input type="checkbox"/> 0-25% <input type="checkbox"/> 25-50%	<input type="checkbox"/> 50-75% <input type="checkbox"/> >75%
Landslide activity	Yes	No
Activity classes	Active, dormant, inactive, stabilised	
Consequences	Yes	No
Completeness	<input checked="" type="checkbox"/> 0% <input type="checkbox"/> 0-25% <input type="checkbox"/> 25-50%	<input type="checkbox"/> 50-75% <input type="checkbox"/> >75%
Other information	<input type="checkbox"/> Photographs <input type="checkbox"/> Monitoring data or physical properties <input type="checkbox"/> Bibliographic references <input type="checkbox"/> Other	

Format	<input checked="" type="checkbox"/> Digital, spatial database <input type="checkbox"/> Digital, alphanumeric database <input type="checkbox"/> Digital, linked spatial and alphanumeric database <input type="checkbox"/> Digital, other <input type="checkbox"/> Paper	
Spatial software	<input checked="" type="checkbox"/> ArcGIS <input type="checkbox"/> Other	
Alphanumeric software	<input type="checkbox"/> Oracle <input type="checkbox"/> Microsoft Access <input type="checkbox"/> Other	
Type of paper document	<input type="checkbox"/> Datasheets <input type="checkbox"/> Map	
Accessibility	<input checked="" type="checkbox"/> General public <input checked="" type="checkbox"/> Administration <input checked="" type="checkbox"/> Scientific purposes <input type="checkbox"/> Other	
Use	<input checked="" type="checkbox"/> For consultation only <input type="checkbox"/> Free of charge under any condition <input type="checkbox"/> After payment <input type="checkbox"/> Without special conditions <input type="checkbox"/> Under special conditions <input type="checkbox"/> I do not know	

Database metadata complying with INSPIRE metadata regulations	Yes	No
	I do not know	
Database provided through/stored in a network following the INSPIRE network services	Yes	No
	I do not know	
Institute registered as an INSPIRE stakeholder	<input type="checkbox"/> LMO <input type="checkbox"/> SDIC <input type="checkbox"/> I do not know <input checked="" type="checkbox"/> No	
Institute willing to register as an INSPIRE stakeholder	<input type="checkbox"/> LMO <input type="checkbox"/> SDIC <input checked="" type="checkbox"/> I do not know <input type="checkbox"/> No	
Organization willing to participate in the real testing or reviewing of a draft of the INSPIRE Data Specifications related to the spatial data theme "Natural Risk Zones" when it is developed by the Thematic Working Group	Yes	No
	I do not know	

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	<input type="checkbox"/> Slope curvature <input type="checkbox"/> Other	
Completeness of triggering factor	<input checked="" type="checkbox"/> 0% <input type="checkbox"/> 0-25% <input type="checkbox"/> 25-50%	<input type="checkbox"/> 50-75% <input type="checkbox"/> >75%
Landslide data/history	Yes	No
Initiation date	Yes	No
Initiation and reactivation dates	Yes	No
Completeness	<input type="checkbox"/> 0% <input checked="" type="checkbox"/> 0-25% <input type="checkbox"/> 25-50%	<input type="checkbox"/> 50-75% <input type="checkbox"/> >75%
Landslide activity	Yes	No
Activity classes	Active, dormant, inactive	
Consequences	Yes	No
Completeness	<input type="checkbox"/> 0% <input checked="" type="checkbox"/> 0-25% <input type="checkbox"/> 25-50%	<input type="checkbox"/> 50-75% <input type="checkbox"/> >75%
Other information	<input type="checkbox"/> Photographs <input type="checkbox"/> Monitoring data or physical properties <input type="checkbox"/> Bibliographic references <input type="checkbox"/> Other	

Format	<input checked="" type="checkbox"/> Digital, spatial database <input type="checkbox"/> Digital, alphanumeric database <input type="checkbox"/> Digital, linked spatial and alphanumeric database <input type="checkbox"/> Digital, other <input type="checkbox"/> Paper	
Spatial software	<input type="checkbox"/> ArcGIS <input checked="" type="checkbox"/> Other: Mapinfo	
Alphanumeric software	<input type="checkbox"/> Oracle <input type="checkbox"/> Microsoft Access <input type="checkbox"/> Other	
Type of paper document	<input type="checkbox"/> Datasheets <input type="checkbox"/> Map	
Accessibility	<input type="checkbox"/> General public <input checked="" type="checkbox"/> Administration (public bodies) <input checked="" type="checkbox"/> Scientific purposes <input type="checkbox"/> Other	
Use	<input type="checkbox"/> For consultation only <input type="checkbox"/> Free of charge under any condition <input type="checkbox"/> After payment <input type="checkbox"/> Without special conditions <input checked="" type="checkbox"/> Under special conditions <input type="checkbox"/> I do not know	

Database metadata complying with INSPIRE metadata regulations	Yes	No
	I do not know	
Database provided through/stored in a network following the INSPIRE network services	Yes	No
	I do not know	
Institute registered as an INSPIRE stakeholder	<input type="checkbox"/> LMO <input type="checkbox"/> SDIC <input type="checkbox"/> I do not know <input checked="" type="checkbox"/> No	
Institute willing to register as an INSPIRE stakeholder	<input type="checkbox"/> LMO <input type="checkbox"/> SDIC <input checked="" type="checkbox"/> I do not know <input type="checkbox"/> No	
Organization willing to participate in the real testing or reviewing of a draft of the INSPIRE Data Specifications related to the spatial data theme "Natural Risk Zones" when it is developed by the Thematic Working Group	Yes	No
	I do not know	

NAPLES, ITALY: P.A.I. of Province of Naples

Name of contact person 1	Frederico Baistrocchi	
Telephone number		
E-mail	baistrocchi.federico@autoritabacinosarno.it	
Institute	Sarno River Basin Authority	
Address	http://www.autoritabacinosarno.it/default.asp;	
Official name of database	P.A.I of Province of Naples (Piano straicio di Assetto Idrogeologico)	
Owner of database	Sarno River Basin Authority	
Contact person	Frederico Baistrocchi	
Producer of database	CUGRI (University of Naplesi)	
Website	http://www.autoritabacinosarno.it/default.asp;	
Approximate area covered (km ²)	330	
Official document	Yes, regulatory	No
	Yes, but not regulatory	
Language	Italian	
First creation date	1999	
Last update	2009	
Recurrence for updating	<input type="checkbox"/> Not updated <input checked="" type="checkbox"/> After major event <input type="checkbox"/> Every year <input type="checkbox"/> < 6 months <input checked="" type="checkbox"/> Other: depends also on updating of P.A.I.	
Time period of landslide events covered	up to 2007	
Other features than landslides in database	Yes, sinksholes	No
Number of landslides	465	
Completeness of the database (estimate)	<input type="checkbox"/> <25% <input type="checkbox"/> 25-50%	<input type="checkbox"/> 50-75% <input checked="" type="checkbox"/> >75%
Landslide inventory map		
Scale	1:5,000	
Reference coordinate system	GAUSS BOAGA, Italy, Zone 2 - east	
Information on the positional accuracy	Yes	No
	Don't know	
Landslides representation	<input type="checkbox"/> Point <input type="checkbox"/> Line <input type="checkbox"/> Closed polygon <input checked="" type="checkbox"/> Combination of points, lines and polygons <input type="checkbox"/> Other	
Production method	<input checked="" type="checkbox"/> Field survey <input checked="" type="checkbox"/> Historical documents <input checked="" type="checkbox"/> Aerial photographs <input type="checkbox"/> LiDAR derivatives <input type="checkbox"/> Satellite remote sensing <input type="checkbox"/> Airborne remote sensing * <input type="checkbox"/> Other	
Representation of landslide location	<input type="checkbox"/> Coordinates <input checked="" type="checkbox"/> Municipality <input checked="" type="checkbox"/> Province/county <input type="checkbox"/> Other	
Landslide classification	Yes	No
	Agreement with Cruden and Varnes (1996)	
Landslide types	All types in Cruden and Varnes (1996)	
Landslide dimension	<input type="checkbox"/> Displaced volume <input checked="" type="checkbox"/> Affected area <input type="checkbox"/> Length <input type="checkbox"/> Width <input type="checkbox"/> Travel angle <input type="checkbox"/> Height (from top to toe) <input type="checkbox"/> Depth of surface of rupture <input type="checkbox"/> Other	
Geo-environmental characteristics	<input type="checkbox"/> Lithology <input type="checkbox"/> Hydrogeology <input type="checkbox"/> Land use <input type="checkbox"/> Slope gradient <input type="checkbox"/> Slope aspect <input type="checkbox"/> Slope curvature <input type="checkbox"/> Other	

LANDSLIDE INVENTORIES IN EUROPE

Completeness of triggering factor	<input checked="" type="checkbox"/> 0% <input type="checkbox"/> 0-25% <input type="checkbox"/> 25-50%	<input type="checkbox"/> 50-75% <input type="checkbox"/> >75%
Landslide data/history	Yes	No
Initiation date	Yes	No
Initiation and reactivation dates	Yes	No
Completeness	<input type="checkbox"/> 0% <input checked="" type="checkbox"/> 0-25% <input type="checkbox"/> 25-50%	<input type="checkbox"/> 50-75% <input type="checkbox"/> >75%
Landslide activity	Yes	No
Activity classes		
Consequences	Yes	No
Completeness	<input type="checkbox"/> 0% <input checked="" type="checkbox"/> 0-25% <input type="checkbox"/> 25-50%	<input type="checkbox"/> 50-75% <input type="checkbox"/> >75%
Other information	Only descriptive <input type="checkbox"/> Photographs <input type="checkbox"/> Monitoring data or physical properties <input type="checkbox"/> Bibliographic references <input type="checkbox"/> Other	

Format	<input checked="" type="checkbox"/> Digital, spatial database <input type="checkbox"/> Digital, alphanumeric database <input type="checkbox"/> Digital, linked spatial and alphanumeric database <input type="checkbox"/> Digital, other <input type="checkbox"/> Paper
Spatial software	<input type="checkbox"/> ArcGIS <input checked="" type="checkbox"/> Other: Mapinfo
Alphanumeric software	<input type="checkbox"/> Oracle <input type="checkbox"/> Microsoft Access <input type="checkbox"/> Other
Type of paper document	<input type="checkbox"/> Datasheets <input type="checkbox"/> Map
Accessibility	<input type="checkbox"/> General public <input checked="" type="checkbox"/> Administration (public bodies) <input checked="" type="checkbox"/> Scientific purposes <input type="checkbox"/> Other
Use	<input type="checkbox"/> For consultation only <input type="checkbox"/> Free of charge under any condition <input type="checkbox"/> After payment <input type="checkbox"/> Without special conditions <input checked="" type="checkbox"/> Under special conditions <input type="checkbox"/> I do not know

Database metadata complying with INSPIRE metadata regulations	Yes	No
	I do not know	
Database provided through/stored in a network following the INSPIRE network services	Yes	No
	I do not know	
Institute registered as an INSPIRE stakeholder	<input type="checkbox"/> LMO <input type="checkbox"/> SDIC <input type="checkbox"/> I do not know	<input checked="" type="checkbox"/> No
Institute willing to register as an INSPIRE stakeholder	<input type="checkbox"/> LMO <input type="checkbox"/> SDIC	<input checked="" type="checkbox"/> I do not know <input type="checkbox"/> No
Organization willing to participate in the real testing or reviewing of a draft of the INSPIRE Data Specifications related to the spatial data theme "Natural Risk Zones" when it is developed by the Thematic Working Group	Yes	No
	I do not know	

BASIN of LIRI-GARIGLIANO and VOLTURNO RIVERS, ITALY: Landslide Inventory

Name of contact person 1	Vera Corbelli	
Telephone number	+39 0823300205	
E-mail	Vera.Corbelli@autoritadibacino.it	
Institute	National Basin Authority of Liri-Garigliano and Volturno rivers	
Address	Viale Lincoln (ex Zona Saint Gobin) - 81100 Caserta	
Official name of database	Landslide inventory	
Owner of database	National Basin authority of Liri-Garigliano and Volturno rivers	
Contact person	General Secretary	
Producer of database	National Basin authority of Liri-Garigliano and Volturno rivers	
Website	http://www2.autoritadibacino.it/	
Approximate area covered (km ²)	11,500	
Official document	Yes, regulatory	No
	Yes, but not regulatory	
Language	Italian	
First creation date	1990	
Last update	2006	
Recurrence for updating	<input type="checkbox"/> Not updated <input type="checkbox"/> After major event <input type="checkbox"/> Every year <input checked="" type="checkbox"/> < 6 months (continuously) <input type="checkbox"/> Other	
Time period of landslide events covered	Historical – 2010 (more detailed from 1990)	
Other features than landslides in database	Yes	No
Number of landslides	32,247	
Completeness of the database (estimate)	<input type="checkbox"/> <25% <input type="checkbox"/> 25-50%	<input type="checkbox"/> 50-75% <input checked="" type="checkbox"/> >75%
Landslide inventory map	1:25,000	
Scale	UTM ED50	
Reference coordinate system	Yes	No
Information on the positional accuracy	Don't know	
Landslides representation	<input type="checkbox"/> Point <input type="checkbox"/> Line <input checked="" type="checkbox"/> Closed polygon <input type="checkbox"/> Combination of points, lines and polygons <input type="checkbox"/> Other	
Production method	<input checked="" type="checkbox"/> Field survey <input checked="" type="checkbox"/> Historical documents <input checked="" type="checkbox"/> Aerial photographs <input type="checkbox"/> LiDAR derivatives <input type="checkbox"/> Satellite remote sensing <input type="checkbox"/> Airborne remote sensing * <input checked="" type="checkbox"/> Other: communications from local authorities	
Representation of landslide location	<input checked="" type="checkbox"/> Coordinates <input checked="" type="checkbox"/> Municipality <input checked="" type="checkbox"/> Province/county <input type="checkbox"/> Other	
Landslide classification	Yes	No
Landslide types	Agreement with Cruden and Varnes (1996) Rock fall, topple, (rotational and translational) slide, (earth and debris) flow, creep, lateral spread, deep-seated gravitational movement	
Landslide dimension	<input type="checkbox"/> Displaced volume <input checked="" type="checkbox"/> Affected area <input type="checkbox"/> Length <input type="checkbox"/> Width <input type="checkbox"/> Travel angle <input checked="" type="checkbox"/> Height (from top to toe) <input type="checkbox"/> Depth of surface of rupture <input type="checkbox"/> Other	
Geo-environmental characteristics	<input type="checkbox"/> Lithology <input type="checkbox"/> Hydrogeology <input type="checkbox"/> Land use <input type="checkbox"/> Slope gradient <input type="checkbox"/> Slope aspect <input type="checkbox"/> Slope curvature	

LANDSLIDE INVENTORIES IN EUROPE

■ All these are reported in specific documents		
Completeness of triggering factor	■ 0% <input type="checkbox"/> 0-25% <input type="checkbox"/> 25-50%	<input type="checkbox"/> 50-75% <input type="checkbox"/> >75%
Landslide data/history	Yes	No
Initiation date	Yes	No
Initiation and reactivation dates	Yes	No
Completeness	<input type="checkbox"/> 0% <input type="checkbox"/> 0-25% ■ 25-50%	<input type="checkbox"/> 50-75% <input type="checkbox"/> >75%
Landslide activity	Yes	No
Activity classes	Active (including active, reactivated and suspended), dormant, inactive (including relict and inactive)	
Consequences	Yes	No
Completeness	<input type="checkbox"/> 0% <input type="checkbox"/> 0-25% <input type="checkbox"/> 25-50%	■ 50-75% <input type="checkbox"/> >75%
Other information	■ Photographs <input type="checkbox"/> Monitoring data or physical properties ■ Bibliographic references <input type="checkbox"/> Other	

Format	<input type="checkbox"/> Digital, spatial database <input type="checkbox"/> Digital, alphanumeric database ■ Digital, linked spatial and alphanumeric database <input type="checkbox"/> Digital, other <input type="checkbox"/> Paper
Spatial software	■ ArcGIS <input type="checkbox"/> Other
Alphanumeric software	<input type="checkbox"/> Oracle ■ Microsoft Access <input type="checkbox"/> Other
Type of paper document	<input type="checkbox"/> Datasheets <input type="checkbox"/> Map
Accessibility	■ General public ■ Administration ■ Scientific purposes <input type="checkbox"/> Other
Use	■ For consultation only <input type="checkbox"/> Free of charge under any condition <input type="checkbox"/> After payment <input type="checkbox"/> Without special conditions ■ Under special conditions <input type="checkbox"/> I do not know

Database metadata complying with INSPIRE metadata regulations	Yes	No I do not know
Database provided through/stored in a network following the INSPIRE network services	Yes	No I do not know
Institute registered as an INSPIRE stakeholder	<input type="checkbox"/> LMO <input type="checkbox"/> SDIC <input type="checkbox"/> I do not know	■ No
Institute willing to register as an INSPIRE stakeholder	<input type="checkbox"/> LMO ■ SDIC <input type="checkbox"/> I do not know <input type="checkbox"/> No	
Organization willing to participate in the real testing or reviewing of a draft of the INSPIRE Data Specifications related to the spatial data theme "Natural Risk Zones" when it is developed by the Thematic Working Group	Yes	No I do not know

BASILICATA, ITALY: P.A.I. of ADB of Basilicata

Name of contact person 1	Michele Vita	
Telephone number	+39 0971669977	
E-mail	mivita@regione.basilicata.it	
Institute	National Basin Authority of Basilicata	
Address	Corso Umberto I, 85100 Potenza	
Official name of database	P.A.I. of ADB of Basilicata (Piano straicio di Assetto Idrogeologico)	
Owner of database	National Basin Authority of Basilicata	
Contact person	Michele Vita	
Producer of database	National Basin Authority of Basilicata	
Website	http://www.adb.basilicata.it/adb/risorseidriche.asp ; www.pcn.minambiente.it	
Approximate area covered (km ²)	8,830	
Official document	Yes, regulatory	No
	Yes, but not regulatory	
Language	Italian	
First creation date	2001	
Last update	2010	
Recurrence for updating	<input type="checkbox"/> Not updated <input type="checkbox"/> After major event <input checked="" type="checkbox"/> Every year <input type="checkbox"/> < 6 months <input type="checkbox"/> Other	
Time period of landslide events covered	> 100 years (similar to AVI)	
Other features than landslides in database	Yes	No
Number of landslides	17,233	
Completeness of the database (estimate)	<input type="checkbox"/> <25% <input checked="" type="checkbox"/> 25-50%	<input type="checkbox"/> 50-75% <input type="checkbox"/> >75%
Landslide inventory map		
Scale	1:10,00 to 1:25,000	
Reference coordinate system	UTM-ED50 fuso 33	
Information on the positional accuracy	Yes	No
	Don't know	
Landslides representation	<input type="checkbox"/> Point <input type="checkbox"/> Line <input checked="" type="checkbox"/> Closed polygon <input type="checkbox"/> Combination of points, lines and polygons <input type="checkbox"/> Other	
Production method	<input checked="" type="checkbox"/> Field survey <input checked="" type="checkbox"/> Historical documents <input checked="" type="checkbox"/> Aerial photographs <input type="checkbox"/> LiDAR derivatives <input type="checkbox"/> Satellite remote sensing <input type="checkbox"/> Airborne remote sensing * <input type="checkbox"/> Other	
Representation of landslide location	<input checked="" type="checkbox"/> Coordinates <input type="checkbox"/> Municipality <input type="checkbox"/> Province/county <input type="checkbox"/> Other	
Landslide classification	Yes	No
	Agreement with Cruden and Varnes (1996)	
Landslide types	Same as in IFFI project	
Landslide dimension	<input type="checkbox"/> Displaced volume <input checked="" type="checkbox"/> Affected area <input type="checkbox"/> Length <input type="checkbox"/> Width <input type="checkbox"/> Travel angle <input type="checkbox"/> Height (from top to toe) <input type="checkbox"/> Depth of surface of rupture <input type="checkbox"/> Other	
Geo-environmental characteristics	<input type="checkbox"/> Lithology <input type="checkbox"/> Hydrogeology <input type="checkbox"/> Land use <input type="checkbox"/> Slope gradient <input type="checkbox"/> Slope aspect <input type="checkbox"/> Slope curvature <input type="checkbox"/> Other	

LANDSLIDE INVENTORIES IN EUROPE

Completeness of triggering factor	<input checked="" type="checkbox"/> 0% <input type="checkbox"/> 0-25% <input type="checkbox"/> 25-50%	<input type="checkbox"/> 50-75% <input type="checkbox"/> >75%
Landslide data/history	Yes	No
Initiation date	Yes	No
Initiation and reactivation dates	Yes	No
Completeness	<input checked="" type="checkbox"/> 0% <input type="checkbox"/> 0-25% <input type="checkbox"/> 25-50%	<input type="checkbox"/> 50-75% <input type="checkbox"/> >75%
Landslide activity	Yes	No
Activity classes		
Consequences	Yes	No
Completeness	<input checked="" type="checkbox"/> 0% <input type="checkbox"/> 0-25% <input type="checkbox"/> 25-50%	<input type="checkbox"/> 50-75% <input type="checkbox"/> >75%
Other information	<input type="checkbox"/> Photographs <input type="checkbox"/> Monitoring data or physical properties <input type="checkbox"/> Bibliographic references <input type="checkbox"/> Other	

Format	<input checked="" type="checkbox"/> Digital, spatial database <input type="checkbox"/> Digital, alphanumeric database <input type="checkbox"/> Digital, linked spatial and alphanumeric database <input type="checkbox"/> Digital, other <input type="checkbox"/> Paper	
Spatial software	<input type="checkbox"/> ArcGIS <input checked="" type="checkbox"/> Other: ArcView 3.x	
Alphanumeric software	<input type="checkbox"/> Oracle <input type="checkbox"/> Microsoft Access <input type="checkbox"/> Other	
Type of paper document	<input type="checkbox"/> Datasheets <input type="checkbox"/> Map	
Accessibility	<input checked="" type="checkbox"/> General public (simplified version including also risk zonation) <input checked="" type="checkbox"/> Administration <input checked="" type="checkbox"/> Scientific purposes <input type="checkbox"/> Other	
Use	<input type="checkbox"/> For consultation only <input checked="" type="checkbox"/> Free of charge under any condition <input type="checkbox"/> After payment <input type="checkbox"/> Without special conditions <input checked="" type="checkbox"/> Under special conditions <input type="checkbox"/> I do not know	

Database metadata complying with INSPIRE metadata regulations	Yes	No
	I do not know	
Database provided through/stored in a network following the INSPIRE network services	Yes	No
	I do not know	
Institute registered as an INSPIRE stakeholder	<input type="checkbox"/> LMO <input type="checkbox"/> SDIC <input type="checkbox"/> I do not know <input checked="" type="checkbox"/> No	
Institute willing to register as an INSPIRE stakeholder	<input type="checkbox"/> LMO <input checked="" type="checkbox"/> SDIC <input type="checkbox"/> I do not know <input type="checkbox"/> No	
Organization willing to participate in the real testing or reviewing of a draft of the INSPIRE Data Specifications related to the spatial data theme "Natural Risk Zones" when it is developed by the Thematic Working Group	Yes	No
	I do not know	

PUGLIA, ITALY: P.A.I. of Puglia

Name of contact person 1	Antonio Rosario Di Santo	
Telephone number	+39 0804670352	
E-mail	segreteria@adb.puglia.it	
Institute	Puglian Basin Authority	
Address	C/o InnovaPuglia s.p.a. -S.P. per Casamassima, km 3, 70010 - Valenzano (BA)	
Official name of database	P.A.I. of Puglia (Piano straicio di Assetto Idrogeologico)	
Owner of database	Puglian Basin Authority	
Contact person	Prof. Antonio Rosario Di Santo	
Producer of database	Puglian Basin Authority	
Website	www.adb.puglia.it	
Approximate area covered (km ²)	19,780	
Official document	<input checked="" type="checkbox"/> Yes, regulatory	<input type="checkbox"/> No
	<input type="checkbox"/> Yes, but not regulatory	
Language	Italian	
First creation date	2004	
Last update	April 2010	
Recurrence for updating	<input type="checkbox"/> Not updated <input type="checkbox"/> After major event <input type="checkbox"/> Every year <input checked="" type="checkbox"/> < 6 months (every two or three months) <input type="checkbox"/> Other	
Time period of landslide events covered		
Other features than landslides in database	<input checked="" type="checkbox"/> Yes, floods and sinkholes	<input type="checkbox"/> No
Number of landslides	1476	
Completeness of the database (estimate)	<input type="checkbox"/> <25% <input type="checkbox"/> 25-50%	<input type="checkbox"/> 50-75% <input checked="" type="checkbox"/> >75%
Landslide inventory map		
Scale	1:25,000	
Reference coordinate system	UTM-WGS84	
Information on the positional accuracy	<input type="checkbox"/> Yes	<input type="checkbox"/> No
	<input type="checkbox"/> Don't know	
Landslides representation	<input type="checkbox"/> Point <input type="checkbox"/> Line <input checked="" type="checkbox"/> Closed polygon <input type="checkbox"/> Combination of points, lines and polygons <input type="checkbox"/> Other	
Production method	<input checked="" type="checkbox"/> Field survey <input checked="" type="checkbox"/> Historical documents <input checked="" type="checkbox"/> Aerial photographs <input type="checkbox"/> LiDAR derivatives <input checked="" type="checkbox"/> Satellite remote sensing <input checked="" type="checkbox"/> Airborne remote sensing * <input type="checkbox"/> Other	
Representation of landslide location	<input type="checkbox"/> Coordinates <input type="checkbox"/> Municipality <input type="checkbox"/> Province/county <input type="checkbox"/> Other	
Landslide classification	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Landslide types		
Landslide dimension	<input type="checkbox"/> Displaced volume <input type="checkbox"/> Affected area <input type="checkbox"/> Length <input type="checkbox"/> Width <input type="checkbox"/> Travel angle <input type="checkbox"/> Height (from top to toe) <input type="checkbox"/> Depth of surface of rupture <input type="checkbox"/> Other	
Geo-environmental characteristics	<input checked="" type="checkbox"/> Lithology <input type="checkbox"/> Hydrogeology <input type="checkbox"/> Land use <input checked="" type="checkbox"/> Slope gradient <input type="checkbox"/> Slope aspect <input type="checkbox"/> Slope curvature <input type="checkbox"/> Other	
Completeness of triggering factor	<input checked="" type="checkbox"/> 0%	

LANDSLIDE INVENTORIES IN EUROPE

	<input type="checkbox"/> 0-25%	<input type="checkbox"/> 50-75%
	<input type="checkbox"/> 25-50%	<input type="checkbox"/> >75%
Landslide data/history	Yes	No
Initiation date	Yes	No
Initiation and reactivation dates	Yes	No
Completeness	<input checked="" type="checkbox"/> 0%	
	<input type="checkbox"/> 0-25%	<input type="checkbox"/> 50-75%
	<input type="checkbox"/> 25-50%	<input type="checkbox"/> >75%
Landslide activity	Yes	No
Activity classes		
Consequences	Yes	No
Completeness	<input checked="" type="checkbox"/> 0%	
	<input type="checkbox"/> 0-25%	<input type="checkbox"/> 50-75%
	<input type="checkbox"/> 25-50%	<input type="checkbox"/> >75%
Other information	<input type="checkbox"/> Photographs <input checked="" type="checkbox"/> Monitoring data or physical properties <input type="checkbox"/> Bibliographic references <input type="checkbox"/> Other	

Format	<input checked="" type="checkbox"/> Digital, spatial database <input type="checkbox"/> Digital, alphanumeric database <input type="checkbox"/> Digital, linked spatial and alphanumeric database <input type="checkbox"/> Digital, other <input type="checkbox"/> Paper
Spatial software	<input checked="" type="checkbox"/> ArcGIS <input type="checkbox"/> Other
Alphanumeric software	<input type="checkbox"/> Oracle <input type="checkbox"/> Microsoft Access <input type="checkbox"/> Other
Type of paper document	<input type="checkbox"/> Datasheets <input type="checkbox"/> Map
Accessibility	<input checked="" type="checkbox"/> General public <input checked="" type="checkbox"/> Administration <input checked="" type="checkbox"/> Scientific purposes <input type="checkbox"/> Other
Use	<input type="checkbox"/> For consultation only <input checked="" type="checkbox"/> Free of charge under any condition <input type="checkbox"/> After payment <input checked="" type="checkbox"/> Without special conditions <input type="checkbox"/> Under special conditions <input type="checkbox"/> I do not know

Database metadata complying with INSPIRE metadata regulations	Yes	No
	I do not know	
Database provided through/stored in a network following the INSPIRE network services	Yes	No
	I do not know	
Institute registered as an INSPIRE stakeholder	<input type="checkbox"/> LMO <input type="checkbox"/> SDIC <input type="checkbox"/> I do not know <input checked="" type="checkbox"/> No	
Institute willing to register as an INSPIRE stakeholder	<input checked="" type="checkbox"/> LMO <input type="checkbox"/> SDIC <input type="checkbox"/> I do not know <input type="checkbox"/> No	
Organization willing to participate in the real testing or reviewing of a draft of the INSPIRE Data Specifications related to the spatial data theme "Natural Risk Zones" when it is developed by the Thematic Working Group	Yes	No
	I do not know	

PUGLIA, ITALY: Hydrogeomorphological Map of Puglia

Name of contact person 1	Antonio Rosario Di Santo	
Telephone number	+39 0804670352	
E-mail	segreteria@adb.puglia.it	
Institute	Puglian Basin Authority	
Address	C/o InnovaPuglia s.p.a. -S.P. per Casamassima, km 3, 70010 - Valenzano (BA)	
Official name of database	Hydrogeomorphological Map of Puglia (Carta idrogeomorfologica della Regione Puglia)	
Owner of database	Puglian Basin Authority	
Contact person	Antonio Rosario Di Santo	
Producer of database	Puglian Basin Authority	
Website	www.adb.puglia.it; www.sit.puglia.it	
Approximate area covered (km ²)	19,780	
Official document	Yes, regulatory	No
	Yes, but not regulatory	
Language	Italian	
First creation date	2009	
Last update		
Recurrence for updating	<input type="checkbox"/> Not updated <input type="checkbox"/> After major event <input type="checkbox"/> Every year <input checked="" type="checkbox"/> < 6 months (at least every three months) <input type="checkbox"/> Other	
Time period of landslide events covered		
Other features than landslides in database	Yes, floods, sinkholes and other human or natural geomorphological features	No
Number of landslides	1614	
Completeness of the database (estimate)	<input type="checkbox"/> <25% <input type="checkbox"/> 25-50%	<input type="checkbox"/> 50-75% <input checked="" type="checkbox"/> >75%
Landslide inventory map		
Scale	1:25,000	
Reference coordinate system	UTM-WGS84	
Information on the positional accuracy	Yes	No
Landslides representation	Don't know <input type="checkbox"/> Point <input checked="" type="checkbox"/> Line <input checked="" type="checkbox"/> Closed polygon <input type="checkbox"/> Combination of points, lines and polygons <input type="checkbox"/> Other	
Production method	<input checked="" type="checkbox"/> Field survey <input checked="" type="checkbox"/> Historical documents <input checked="" type="checkbox"/> Aerial photographs <input type="checkbox"/> LiDAR derivatives <input checked="" type="checkbox"/> Satellite remote sensing <input type="checkbox"/> Airborne remote sensing * <input type="checkbox"/> Other	
Representation of landslide location	<input type="checkbox"/> Coordinates <input type="checkbox"/> Municipality <input type="checkbox"/> Province/county <input type="checkbox"/> Other	
Landslide classification	Yes	No
Landslide types	Crown and landslide body, widespread slide areas, (badlands)	
Landslide dimension	<input type="checkbox"/> Displaced volume <input type="checkbox"/> Affected area <input type="checkbox"/> Length <input type="checkbox"/> Width <input type="checkbox"/> Travel angle <input type="checkbox"/> Height (from top to toe) <input type="checkbox"/> Depth of surface of rupture <input type="checkbox"/> Other	
Geo-environmental characteristics	<input checked="" type="checkbox"/> Lithology <input type="checkbox"/> Hydrogeology <input type="checkbox"/> Land use <input checked="" type="checkbox"/> Slope gradient <input type="checkbox"/> Slope aspect	

LANDSLIDE INVENTORIES IN EUROPE

	<input type="checkbox"/> Slope curvature <input type="checkbox"/> Other	
Completeness of triggering factor	<input checked="" type="checkbox"/> 0% <input type="checkbox"/> 0-25% <input type="checkbox"/> 25-50%	<input type="checkbox"/> 50-75% <input type="checkbox"/> >75%
Landslide data/history	Yes	No
Initiation date	Yes	No
Initiation and reactivation dates	Yes	No
Completeness	<input checked="" type="checkbox"/> 0% <input type="checkbox"/> 0-25% <input type="checkbox"/> 25-50%	<input type="checkbox"/> 50-75% <input type="checkbox"/> >75%
Landslide activity	Yes	No
Activity classes		
Consequences	Yes	No
Completeness	<input checked="" type="checkbox"/> 0% <input type="checkbox"/> 0-25% <input type="checkbox"/> 25-50%	<input type="checkbox"/> 50-75% <input type="checkbox"/> >75%
Other information	<input type="checkbox"/> Photographs <input checked="" type="checkbox"/> Monitoring data or physical properties <input type="checkbox"/> Bibliographic references <input type="checkbox"/> Other	

Format	<input checked="" type="checkbox"/> Digital, spatial database <input type="checkbox"/> Digital, alphanumeric database <input type="checkbox"/> Digital, linked spatial and alphanumeric database <input type="checkbox"/> Digital, other <input type="checkbox"/> Paper	
Spatial software	<input checked="" type="checkbox"/> ArcGIS <input type="checkbox"/> Other	
Alphanumeric software	<input type="checkbox"/> Oracle <input type="checkbox"/> Microsoft Access <input type="checkbox"/> Other	
Type of paper document	<input type="checkbox"/> Datasheets <input type="checkbox"/> Map	
Accessibility	<input checked="" type="checkbox"/> General public <input checked="" type="checkbox"/> Administration <input checked="" type="checkbox"/> Scientific purposes <input type="checkbox"/> Other	
Use	<input type="checkbox"/> For consultation only <input checked="" type="checkbox"/> Free of charge under any condition <input type="checkbox"/> After payment <input checked="" type="checkbox"/> Without special conditions <input type="checkbox"/> Under special conditions <input type="checkbox"/> I do not know	

Database metadata complying with INSPIRE metadata regulations	Yes	No
	I do not know	
Database provided through/stored in a network following the INSPIRE network services	Yes	No
	I do not know	
Institute registered as an INSPIRE stakeholder	<input type="checkbox"/> LMO <input type="checkbox"/> SDIC <input type="checkbox"/> I do not know <input checked="" type="checkbox"/> No	
Institute willing to register as an INSPIRE stakeholder	<input checked="" type="checkbox"/> LMO <input type="checkbox"/> SDIC <input type="checkbox"/> I do not know <input type="checkbox"/> No	
Organization willing to participate in the real testing or reviewing of a draft of the INSPIRE Data Specifications related to the spatial data theme "Natural Risk Zones" when it is developed by the Thematic Working Group	Yes	No
	I do not know	

PUGLIA, ITALY: Landslide Database of Puglia

Name of contact person 1	Antonio Rosario Di Santo	
Telephone number	+39 0804670352	
E-mail	segreteria@adb.puglia.it	
Institute	Puglian Basin Authority	
Address	C/o InnovaPuglia s.p.a. -S.P. per Casamassima, km 3, 70010 - Valenzano (BA)	
Official name of database	Landslide Database of Puglia (Sistema informativo delle aree soggetto a fenomeni di instabilità nella Regione Puglia e individuazione sperimentale di alcune aree campione a rischio di instabilità)	
Owner of database	Puglian Basin Authority	
Contact person	Prof. Antonio Rosario Di Santo	
Producer of database	Apulian Basin Authority	
Website	www.adb.puglia.it	
Approximate area covered (km ²)	19,327	
Official document	Yes, regulatory	No
	Yes, but not regulatory	
Language	Italian	
First creation date	2009	
Last update		
Recurrence for updating	<input type="checkbox"/> Not updated <input checked="" type="checkbox"/> After major event <input type="checkbox"/> Every year <input type="checkbox"/> < 6 months <input type="checkbox"/> Other	
Time period of landslide events covered		
Other features than landslides in database	Yes	No
Number of landslides	1590	
Completeness of the database (estimate)	<input type="checkbox"/> <25% <input type="checkbox"/> 50-75% <input type="checkbox"/> 25-50% <input checked="" type="checkbox"/> >75%	
Landslide inventory map		
Scale	1:5,000	
Reference coordinate system	UTM-WGS84	
Information on the positional accuracy	Yes	No
	Don't know	
Landslides representation	<input type="checkbox"/> Point <input type="checkbox"/> Line <input checked="" type="checkbox"/> Closed polygon <input type="checkbox"/> Combination of points, lines and polygons <input type="checkbox"/> Other	
Production method	<input checked="" type="checkbox"/> Field survey <input type="checkbox"/> Historical documents <input checked="" type="checkbox"/> Aerial photographs <input type="checkbox"/> LiDAR derivatives <input checked="" type="checkbox"/> Satellite remote sensing <input type="checkbox"/> Airborne remote sensing * <input type="checkbox"/> Other	
Representation of landslide location	<input checked="" type="checkbox"/> Coordinates <input type="checkbox"/> Municipality <input type="checkbox"/> Province/county <input type="checkbox"/> Other	
Landslide classification	Yes	No
	Agreement with Cruden and Varnes (1996)	
Landslide types	Fall, topple, slide, flow, widespread slide areas, complex landslides	
Landslide dimension	<input type="checkbox"/> Displaced volume <input type="checkbox"/> Affected area <input type="checkbox"/> Length <input type="checkbox"/> Width <input type="checkbox"/> Travel angle <input type="checkbox"/> Height (from top to toe) <input type="checkbox"/> Depth of surface of rupture <input type="checkbox"/> Other	
Geo-environmental characteristics	<input checked="" type="checkbox"/> Lithology <input checked="" type="checkbox"/> Hydrogeology <input checked="" type="checkbox"/> Land use <input checked="" type="checkbox"/> Slope gradient <input checked="" type="checkbox"/> Slope aspect	

LANDSLIDE INVENTORIES IN EUROPE

	<input checked="" type="checkbox"/> Slope curvature <input type="checkbox"/> Other	
Completeness of triggering factor	<input checked="" type="checkbox"/> 0% <input type="checkbox"/> 0-25% <input type="checkbox"/> 25-50%	<input type="checkbox"/> 50-75% <input type="checkbox"/> >75%
Landslide data/history	Yes	No
Initiation date	Yes	No
Initiation and reactivation dates	Yes	No
Completeness	<input checked="" type="checkbox"/> 0% <input type="checkbox"/> 0-25% <input type="checkbox"/> 25-50%	<input type="checkbox"/> 50-75% <input type="checkbox"/> >75%
Landslide activity	Yes	No
Activity classes	Active, inactive	
Consequences	Yes	No
Completeness	<input type="checkbox"/> 0% <input checked="" type="checkbox"/> 0-25% <input type="checkbox"/> 25-50%	<input type="checkbox"/> 50-75% <input type="checkbox"/> >75%
Other information	<input checked="" type="checkbox"/> Photographs <input checked="" type="checkbox"/> Monitoring data or physical properties <input checked="" type="checkbox"/> Bibliographic references <input type="checkbox"/> Other	

Format	<input checked="" type="checkbox"/> Digital, spatial database <input checked="" type="checkbox"/> Digital, alphanumeric database (not complete) <input type="checkbox"/> Digital, linked spatial and alphanumeric database <input type="checkbox"/> Digital, other <input checked="" type="checkbox"/> Paper	
Spatial software	<input checked="" type="checkbox"/> ArcGIS <input type="checkbox"/> Other	
Alphanumeric software	<input type="checkbox"/> Oracle <input checked="" type="checkbox"/> Microsoft Access (not complete) <input type="checkbox"/> Other	
Type of paper document	<input checked="" type="checkbox"/> Datasheets <input checked="" type="checkbox"/> Map	
Accessibility	<input type="checkbox"/> General public <input checked="" type="checkbox"/> Administration <input type="checkbox"/> Scientific purposes <input type="checkbox"/> Other	
Use	<input type="checkbox"/> For consultation only <input type="checkbox"/> Free of charge under any condition <input type="checkbox"/> After payment <input type="checkbox"/> Without special conditions <input checked="" type="checkbox"/> Under special conditions <input type="checkbox"/> I do not know	

Database metadata complying with INSPIRE metadata regulations	Yes	No
	I do not know	
Database provided through/stored in a network following the INSPIRE network services	Yes	No
	I do not know	
Institute registered as an INSPIRE stakeholder	<input type="checkbox"/> LMO <input type="checkbox"/> SDIC <input type="checkbox"/> I do not know <input checked="" type="checkbox"/> No	
Institute willing to register as an INSPIRE stakeholder	<input checked="" type="checkbox"/> LMO <input type="checkbox"/> SDIC <input type="checkbox"/> I do not know <input type="checkbox"/> No	
Organization willing to participate in the real testing or reviewing of a draft of the INSPIRE Data Specifications related to the spatial data theme "Natural Risk Zones" when it is developed by the Thematic Working Group	Yes	No
	I do not know	

NORTH OF LISBON, PORTUGAL: North of Lisbon Landslides

Name of contact person 1	Jose Luis Zêzere
Telephone number	+351 217965469
E-mail	zezere@campus.ul.pt
Institute	Centre of Geographical Studies, University of Lisbon FLUL
Address	Alameda da Universidade, 1600-214 Lisboa
Official name of database	North of Lisbon Landslides
Owner of database	Centre of Geographical Studies, University of Lisbon
Contact person	Jose Luis Zêzere
Producer of database	Centre of Geographical Studies, University of Lisbon
Website	/

Approximate area covered (km ²)	400
Official document	Yes, regulatory No Yes, but not regulatory
Language	Portuguese
First creation date	1990
Last update	2010
Recurrence for updating	<input type="checkbox"/> Not updated <input checked="" type="checkbox"/> After major event <input type="checkbox"/> Every year <input type="checkbox"/> < 6 months <input type="checkbox"/> Other
Time period of landslide events covered	1950 - 2010
Other features than landslides in database	Yes No
Number of landslides	2500
Completeness of the database (estimate)	<input type="checkbox"/> <25% <input checked="" type="checkbox"/> 50-75% <input type="checkbox"/> 25-50% <input type="checkbox"/> >75%
Landslide inventory map	
Scale	1:10,000
Reference coordinate system	Hayford Gauss Datum 73
Information on the positional accuracy	Yes No Don't know
Landslides representation	<input type="checkbox"/> Point <input type="checkbox"/> Line <input type="checkbox"/> Closed polygon <input checked="" type="checkbox"/> Combination of points, lines and polygons <input type="checkbox"/> Other
Production method	<input checked="" type="checkbox"/> Field survey <input type="checkbox"/> Historical documents <input checked="" type="checkbox"/> Aerial photographs <input type="checkbox"/> LiDAR derivatives <input type="checkbox"/> Satellite remote sensing <input type="checkbox"/> Airborne remote sensing * <input type="checkbox"/> Other
Representation of landslide location	<input checked="" type="checkbox"/> Coordinates <input checked="" type="checkbox"/> Municipality <input type="checkbox"/> Province/county <input checked="" type="checkbox"/> Other: Hydrographic basin
Landslide classification	Yes No Agreement with Cruden and Varnes (1996)
Landslide types	Rock fall, deep (rotational and translational) slide, debris slide, debris flow
Landslide dimension	<input checked="" type="checkbox"/> Displaced volume <input checked="" type="checkbox"/> Affected area <input checked="" type="checkbox"/> Length <input checked="" type="checkbox"/> Width <input checked="" type="checkbox"/> Travel angle <input checked="" type="checkbox"/> Height (from top to toe) <input checked="" type="checkbox"/> Depth of surface of rupture <input type="checkbox"/> Other
Geo-environmental characteristics	<input checked="" type="checkbox"/> Lithology <input type="checkbox"/> Hydrogeology <input checked="" type="checkbox"/> Land use <input checked="" type="checkbox"/> Slope gradient <input checked="" type="checkbox"/> Slope aspect <input checked="" type="checkbox"/> Slope curvature <input checked="" type="checkbox"/> Other: Wetness index

LANDSLIDE INVENTORIES IN EUROPE

Completeness of triggering factor	<input type="checkbox"/> 0% <input type="checkbox"/> 0-25% <input type="checkbox"/> 25-50%	<input checked="" type="checkbox"/> 50-75% <input type="checkbox"/> >75%
Landslide data/history	Yes	No
Initiation date	Yes	No
Initiation and reactivation dates	Yes	No
Completeness	<input type="checkbox"/> 0% <input type="checkbox"/> 0-25% <input checked="" type="checkbox"/> 25-50%	<input type="checkbox"/> 50-75% <input type="checkbox"/> >75%
Landslide activity	Yes	No
Activity classes	Active, reactivated, suspended, stabilized	
Consequences	Yes	No
Completeness	<input type="checkbox"/> 0% <input checked="" type="checkbox"/> 0-25% <input type="checkbox"/> 25-50%	<input type="checkbox"/> 50-75% <input type="checkbox"/> >75%
Other information	<input checked="" type="checkbox"/> Photographs <input type="checkbox"/> Monitoring data or physical properties <input type="checkbox"/> Bibliographic references <input type="checkbox"/> Other	

Format	<input type="checkbox"/> Digital, spatial database <input type="checkbox"/> Digital, alphanumeric database <input checked="" type="checkbox"/> Digital, linked spatial and alphanumeric database <input type="checkbox"/> Digital, other <input type="checkbox"/> Paper
Spatial software	<input checked="" type="checkbox"/> ArcGIS <input type="checkbox"/> Other
Alphanumeric software	<input type="checkbox"/> Oracle <input type="checkbox"/> Microsoft Access <input checked="" type="checkbox"/> Other: Excel
Type of paper document	<input type="checkbox"/> Datasheets <input type="checkbox"/> Map
Accessibility	<input type="checkbox"/> General public <input type="checkbox"/> Administration <input checked="" type="checkbox"/> Scientific purposes (only producer) <input type="checkbox"/> Other
Use	<input type="checkbox"/> For consultation only <input type="checkbox"/> Free of charge under any condition <input type="checkbox"/> After payment <input type="checkbox"/> Without special conditions <input type="checkbox"/> Under special conditions <input type="checkbox"/> I do not know

Database metadata complying with INSPIRE metadata regulations	Yes	No
	I do not know	
Database provided through/stored in a network following the INSPIRE network services	Yes	No
	I do not know	
Institute registered as an INSPIRE stakeholder	<input type="checkbox"/> LMO <input type="checkbox"/> SDIC <input type="checkbox"/> I do not know <input checked="" type="checkbox"/> No	
Institute willing to register as an INSPIRE stakeholder	<input type="checkbox"/> LMO <input type="checkbox"/> SDIC <input checked="" type="checkbox"/> I do not know <input type="checkbox"/> No	
Organization willing to participate in the real testing or reviewing of a draft of the INSPIRE Data Specifications related to the spatial data theme "Natural Risk Zones" when it is developed by the Thematic Working Group	Yes	No
	I do not know	

PRAHOVA-ARGES-DAMBOVITA-VALCEA-BAZAU COUNTIES, ROMANIA: Landslide Inventory

Name of contact person 1	Raluca Maftei	
Telephone number	+40 21 3060484	
E-mail	mafteir@yahoo.com	
Institute	Geological Institute of Romania (GIR)	
Address	1 Caransebes, sect.1, 012271, PO 32, Bucharest	
Official name of database	Landslide inventory	
Owner of database	Geological Institute of Romania (GIR)	
Contact person	Raluca Maftei	
Producer of database	Geological Institute of Romania (GIR)	
Website	/	
Approximate area covered (km ²)	123,500	
Official document	Yes, regulatory	No
	Yes, but not regulatory	
Language	Romanian	
First creation date	1992 - 1993	
Last update	2010	
Recurrence for updating	<input type="checkbox"/> Not updated <input checked="" type="checkbox"/> After major event <input type="checkbox"/> Every year <input type="checkbox"/> < 6 months <input type="checkbox"/> Other	
Time period of landslide events covered	1916 - 2010	
Other features than landslides in database	Yes	No
Number of landslides	>2000	
Completeness of the database (estimate)	<input type="checkbox"/> <25% <input type="checkbox"/> 25-50%	<input checked="" type="checkbox"/> 50-75% <input type="checkbox"/> >75%
Landslide inventory map		
Scale	1:50,000	
Reference coordinate system	Stereo 70	
Information on the positional accuracy	Yes	No
	Don't know	
Landslides representation	<input type="checkbox"/> Point <input type="checkbox"/> Line <input checked="" type="checkbox"/> Closed polygon <input type="checkbox"/> Combination of points, lines and polygons <input type="checkbox"/> Other	
Production method	<input checked="" type="checkbox"/> Field survey <input checked="" type="checkbox"/> Historical documents <input type="checkbox"/> Aerial photographs <input type="checkbox"/> LiDAR derivatives <input type="checkbox"/> Satellite remote sensing <input type="checkbox"/> Airborne remote sensing * <input type="checkbox"/> Other	
Representation of landslide location	<input checked="" type="checkbox"/> Coordinates <input type="checkbox"/> Municipality <input type="checkbox"/> Province/county <input checked="" type="checkbox"/> Other: Position from a topographic reference point	
Landslide classification	Yes	No
Landslide types		
Landslide dimension	<input type="checkbox"/> Displaced volume <input type="checkbox"/> Affected area <input checked="" type="checkbox"/> Length <input checked="" type="checkbox"/> Width <input type="checkbox"/> Travel angle <input type="checkbox"/> Height (from top to toe) <input checked="" type="checkbox"/> Depth of surface of rupture <input type="checkbox"/> Other	
Geo-environmental characteristics	<input checked="" type="checkbox"/> Lithology <input checked="" type="checkbox"/> Hydrogeology <input checked="" type="checkbox"/> Land use <input checked="" type="checkbox"/> Slope gradient <input checked="" type="checkbox"/> Slope aspect <input type="checkbox"/> Slope curvature	

LANDSLIDE INVENTORIES IN EUROPE

	<input type="checkbox"/> Other	
Completeness of triggering factor	<input type="checkbox"/> 0% <input type="checkbox"/> 0-25% <input type="checkbox"/> 25-50%	<input type="checkbox"/> 50-75% <input checked="" type="checkbox"/> >75%
Landslide data/history	Yes	No
Initiation date	Yes	No
Initiation and reactivation dates	Yes	No
Completeness	<input type="checkbox"/> 0% <input checked="" type="checkbox"/> 0-25% <input type="checkbox"/> 25-50%	<input type="checkbox"/> 50-75% <input type="checkbox"/> >75%
Landslide activity	Yes	No
Activity classes	Active, reactivated, suspended, dormant, relict, inactive	
Consequences	Yes	No
Completeness	<input checked="" type="checkbox"/> 0% <input type="checkbox"/> 0-25% <input type="checkbox"/> 25-50%	<input type="checkbox"/> 50-75% <input type="checkbox"/> >75%
Other information	<input checked="" type="checkbox"/> Photographs <input checked="" type="checkbox"/> Monitoring data or physical properties <input checked="" type="checkbox"/> Bibliographic references <input type="checkbox"/> Other	

Format	<input type="checkbox"/> Digital, spatial database <input type="checkbox"/> Digital, alphanumeric database <input type="checkbox"/> Digital, linked spatial and alphanumeric database <input type="checkbox"/> Digital, other <input checked="" type="checkbox"/> Paper
Spatial software	<input type="checkbox"/> ArcGIS <input type="checkbox"/> Other
Alphanumeric software	<input type="checkbox"/> Oracle <input type="checkbox"/> Microsoft Access <input type="checkbox"/> Other
Type of paper document	<input checked="" type="checkbox"/> Datasheets <input checked="" type="checkbox"/> Map
Accessibility	<input type="checkbox"/> General public <input type="checkbox"/> Administration <input checked="" type="checkbox"/> Scientific purposes <input type="checkbox"/> Other
Use	<input type="checkbox"/> For consultation only <input type="checkbox"/> Free of charge under any condition <input type="checkbox"/> After payment <input type="checkbox"/> Without special conditions <input checked="" type="checkbox"/> Under special conditions <input type="checkbox"/> I do not know

Database metadata complying with INSPIRE metadata regulations	Yes	No
	I do not know	
Database provided through/stored in a network following the INSPIRE network services	Yes	No
	I do not know	
Institute registered as an INSPIRE stakeholder	<input type="checkbox"/> LMO <input type="checkbox"/> SDIC <input type="checkbox"/> I do not know <input checked="" type="checkbox"/> No	
Institute willing to register as an INSPIRE stakeholder	<input type="checkbox"/> LMO <input type="checkbox"/> SDIC <input checked="" type="checkbox"/> I do not know <input type="checkbox"/> No	
Organization willing to participate in the real testing or reviewing of a draft of the INSPIRE Data Specifications related to the spatial data theme "Natural Risk Zones" when it is developed by the Thematic Working Group	Yes	No
	I do not know	

BELGRADO-KRAGUJEVAC, SERBIA: Cadastre of Landslides and Unstable Slopes on the Territory of Serbia

Name of contact person 1	Djordje Trbojevic	
Telephone number	+381 11 4880595	
E-mail	djtrbojevic@gis.co.rs; office@gis.co.rs	
Institute	Geological Institute of Serbia	
Address	Belgrade, Rovinjska 12	
Official name of database	Cadastre of landslides and unstable slopes on the territory of Serbia	
Owner of database	Republic of Serbia, Ministry of Environment and spatial planning	
Contact person	Velizar Nikolic	
Producer of database	Geological Institute of Serbia	
Website	/	
Approximate area covered (km ²)	800	
Official document	Yes, regulatory	No
	Yes, but not regulatory	
Language	Serbian	
First creation date	2007	
Last update	2009	
Recurrence for updating	<input type="checkbox"/> Not updated <input type="checkbox"/> After major event <input checked="" type="checkbox"/> Every year <input type="checkbox"/> < 6 months <input type="checkbox"/> Other	
Time period of landslide events covered	1960s - 2009	
Other features than landslides in database	Yes, floods, sinkholes, avalanches	No
Number of landslides	1000	
Completeness of the database (estimate)	<input checked="" type="checkbox"/> <25% <input type="checkbox"/> 25-50%	<input type="checkbox"/> 50-75% <input type="checkbox"/> >75%
Landslide inventory map		
Scale	1:25,000 to 100,000	
Reference coordinate system	Gauss Kruger, Bessel 1841, Hermannskogel	
Information on the positional accuracy	Yes	No
Landslides representation	Don't know <input type="checkbox"/> Point <input type="checkbox"/> Line <input type="checkbox"/> Closed polygon <input checked="" type="checkbox"/> Combination of points, lines and polygons <input type="checkbox"/> Other	
Production method	<input checked="" type="checkbox"/> Field survey <input checked="" type="checkbox"/> Historical documents <input checked="" type="checkbox"/> Aerial photographs <input type="checkbox"/> LiDAR derivatives <input type="checkbox"/> Satellite remote sensing <input type="checkbox"/> Airborne remote sensing * <input type="checkbox"/> Other	
Representation of landslide location	<input checked="" type="checkbox"/> Coordinates <input checked="" type="checkbox"/> Municipality <input checked="" type="checkbox"/> Province/county <input type="checkbox"/> Other	
Landslide classification	Yes	No
Landslide types		
Landslide dimension	<input checked="" type="checkbox"/> Displaced volume <input checked="" type="checkbox"/> Affected area <input checked="" type="checkbox"/> Length <input checked="" type="checkbox"/> Width <input checked="" type="checkbox"/> Travel angle <input checked="" type="checkbox"/> Height (from top to toe) <input checked="" type="checkbox"/> Depth of surface of rupture <input type="checkbox"/> Other	
Geo-environmental characteristics	<input checked="" type="checkbox"/> Lithology <input checked="" type="checkbox"/> Hydrogeology <input checked="" type="checkbox"/> Land use <input checked="" type="checkbox"/> Slope gradient <input checked="" type="checkbox"/> Slope aspect <input checked="" type="checkbox"/> Slope curvature	

LANDSLIDE INVENTORIES IN EUROPE

	<input type="checkbox"/> Other	
Completeness of triggering factor	<input type="checkbox"/> 0% <input type="checkbox"/> 0-25% <input type="checkbox"/> 25-50%	<input type="checkbox"/> 50-75% <input checked="" type="checkbox"/> >75%
Landslide data/history	Yes	No
Initiation date	Yes	No
Initiation and reactivation dates	Yes	No
Completeness	<input type="checkbox"/> 0% <input type="checkbox"/> 0-25% <input checked="" type="checkbox"/> 25-50%	<input type="checkbox"/> 50-75% <input type="checkbox"/> >75%
Landslide activity	Yes	No
Activity classes	Active, reactivated, suspended	
Consequences	Yes	No
Completeness	<input type="checkbox"/> 0% <input checked="" type="checkbox"/> 0-25% <input type="checkbox"/> 25-50% Only descriptive	<input type="checkbox"/> 50-75% <input type="checkbox"/> >75%
Other information	<input checked="" type="checkbox"/> Photographs <input checked="" type="checkbox"/> Monitoring data or physical properties <input checked="" type="checkbox"/> Bibliographic references <input type="checkbox"/> Other	

Format	<input checked="" type="checkbox"/> Digital, spatial database <input checked="" type="checkbox"/> Digital, alphanumeric database <input type="checkbox"/> Digital, linked spatial and alphanumeric database <input type="checkbox"/> Digital, other <input checked="" type="checkbox"/> Paper
Spatial software	<input checked="" type="checkbox"/> ArcGIS <input type="checkbox"/> Other
Alphanumeric software	<input type="checkbox"/> Oracle <input type="checkbox"/> Microsoft Access <input checked="" type="checkbox"/> Other: SQL server
Type of paper document	<input checked="" type="checkbox"/> Datasheets <input checked="" type="checkbox"/> Map
Accessibility	<input checked="" type="checkbox"/> General public <input checked="" type="checkbox"/> Administration <input type="checkbox"/> Scientific purposes <input type="checkbox"/> Other
Use	<input checked="" type="checkbox"/> For consultation only <input type="checkbox"/> Free of charge under any condition <input type="checkbox"/> After payment <input type="checkbox"/> Without special conditions <input checked="" type="checkbox"/> Under special conditions <input type="checkbox"/> I do not know

Database metadata complying with INSPIRE metadata regulations	Yes	No
	I do not know	
Database provided through/stored in a network following the INSPIRE network services	Yes	No
	I do not know	
Institute registered as an INSPIRE stakeholder	<input type="checkbox"/> LMO <input type="checkbox"/> SDIC <input type="checkbox"/> I do not know <input checked="" type="checkbox"/> No	
Institute willing to register as an INSPIRE stakeholder	<input checked="" type="checkbox"/> LMO <input type="checkbox"/> SDIC <input type="checkbox"/> I do not know <input type="checkbox"/> No	
Organization willing to participate in the real testing or reviewing of a draft of the INSPIRE Data Specifications related to the spatial data theme "Natural Risk Zones" when it is developed by the Thematic Working Group	Yes	No
	I do not know	

BELGRADO, SERBIA: BEOSlide

Name of contact person 1	Branislav Trivić	
Telephone number	+381 11 3219262	
E-mail	btrivic@rgf.bg.ac.rs	
Institute	University of Belgrade, Faculty of Mining and Geology	
Address	Belgrade, Djušina 7	
Official name of database	BEOSlide	
Owner of database	Belgrade Land Development Public Agency, Faculty of Mining and Geology	
Contact person	Branislav Trivić	
Producer of database	Faculty of Mining and Geology (FMG)	
Website	/	
Approximate area covered (km ²)	440	
Official document	Yes, regulatory	No
	Yes, but not regulatory	
Language	Serbian	
First creation date	2007	
Last update	2009	
Recurrence for updating	<input checked="" type="checkbox"/> Not updated <input type="checkbox"/> After major event <input type="checkbox"/> Every year <input type="checkbox"/> < 6 months <input type="checkbox"/> Other	
Time period of landslide events covered	1980s - 2009	
Other features than landslides in database	Yes	No
Number of landslides	1160	
Completeness of the database (estimate)	<input type="checkbox"/> <25% <input type="checkbox"/> 25-50%	<input checked="" type="checkbox"/> 50-75% <input type="checkbox"/> >75%
Landslide inventory map		
Scale	1:5,000	
Reference coordinate system	Gauss Kruger, Bessel 1841, Hermannskogel	
Information on the positional accuracy	Yes	No
Landslides representation	<input checked="" type="checkbox"/> Point <input type="checkbox"/> Line <input checked="" type="checkbox"/> Closed polygon <input type="checkbox"/> Combination of points, lines and polygons <input type="checkbox"/> Other	
Production method	<input checked="" type="checkbox"/> Field survey <input checked="" type="checkbox"/> Historical documents <input checked="" type="checkbox"/> Aerial photographs <input type="checkbox"/> LiDAR derivatives <input type="checkbox"/> Satellite remote sensing <input type="checkbox"/> Airborne remote sensing * <input type="checkbox"/> Other	
Representation of landslide location	<input checked="" type="checkbox"/> Coordinates <input checked="" type="checkbox"/> Municipality <input type="checkbox"/> Province/county <input type="checkbox"/> Other	
Landslide classification	Yes	No
Landslide types		
Landslide dimension	<input type="checkbox"/> Displaced volume <input checked="" type="checkbox"/> Affected area <input checked="" type="checkbox"/> Length <input checked="" type="checkbox"/> Width <input type="checkbox"/> Travel angle <input type="checkbox"/> Height (from top to toe) <input checked="" type="checkbox"/> Depth of surface of rupture <input type="checkbox"/> Other	
Geo-environmental characteristics	<input checked="" type="checkbox"/> Lithology <input checked="" type="checkbox"/> Hydrogeology <input type="checkbox"/> Land use <input checked="" type="checkbox"/> Slope gradient <input type="checkbox"/> Slope aspect <input checked="" type="checkbox"/> Slope curvature <input type="checkbox"/> Other	
Completeness of triggering factor	<input type="checkbox"/> 0%	

LANDSLIDE INVENTORIES IN EUROPE

	<input type="checkbox"/> 0-25% <input checked="" type="checkbox"/> 25-50%	<input type="checkbox"/> 50-75% <input type="checkbox"/> >75%
Landslide data/history	Yes	No
Initiation date	Yes	No
Initiation and reactivation dates	Yes	No
Completeness	<input type="checkbox"/> 0% <input checked="" type="checkbox"/> 0-25% <input type="checkbox"/> 25-50%	<input type="checkbox"/> 50-75% <input type="checkbox"/> >75%
Landslide activity	Yes	No
Activity classes	Acute active, active, suspended, dormant, relict	
Consequences	Yes	No
Completeness	<input type="checkbox"/> 0% <input type="checkbox"/> 0-25% <input type="checkbox"/> 25-50%	<input checked="" type="checkbox"/> 50-75% <input type="checkbox"/> >75%
Very detailed description for each damaged object with estimated monetary value of damage		
Other information	<input checked="" type="checkbox"/> Photographs <input checked="" type="checkbox"/> Monitoring data or physical properties <input checked="" type="checkbox"/> Bibliographic references <input checked="" type="checkbox"/> Other: Very detailed borehole data, cross sections, other geotechnical data	

Format	<input checked="" type="checkbox"/> Digital, spatial database <input checked="" type="checkbox"/> Digital, alphanumeric database <input type="checkbox"/> Digital, linked spatial and alphanumeric database <input type="checkbox"/> Digital, other <input checked="" type="checkbox"/> Paper
Spatial software	<input checked="" type="checkbox"/> ArcGIS <input type="checkbox"/> Other
Alphanumeric software	<input type="checkbox"/> Oracle <input type="checkbox"/> Microsoft Access <input checked="" type="checkbox"/> Other: SQL server
Type of paper document	<input checked="" type="checkbox"/> Datasheets <input checked="" type="checkbox"/> Map
Accessibility	<input type="checkbox"/> General public <input checked="" type="checkbox"/> Administration <input type="checkbox"/> Scientific purposes <input type="checkbox"/> Other
Use	<input type="checkbox"/> For consultation only <input type="checkbox"/> Free of charge under any condition <input type="checkbox"/> After payment <input type="checkbox"/> Without special conditions <input type="checkbox"/> Under special conditions <input checked="" type="checkbox"/> I do not know

Database metadata complying with INSPIRE metadata regulations	Yes	No
	<input checked="" type="checkbox"/> I do not know	
Database provided through/stored in a network following the INSPIRE network services	Yes	No
	<input checked="" type="checkbox"/> I do not know	
Institute registered as an INSPIRE stakeholder	<input type="checkbox"/> LMO <input type="checkbox"/> SDIC <input type="checkbox"/> I do not know <input checked="" type="checkbox"/> No	
Institute willing to register as an INSPIRE stakeholder	<input type="checkbox"/> LMO <input checked="" type="checkbox"/> SDIC <input type="checkbox"/> I do not know <input type="checkbox"/> No	
Organization willing to participate in the real testing or reviewing of a draft of the INSPIRE Data Specifications related to the spatial data theme "Natural Risk Zones" when it is developed by the Thematic Working Group	Yes	No
	I do not know	

CATALONIA, SPAIN and ANDORRA: LLISCAT

Name of contact person 1	Jordi Corominas
Telephone number	+34 .934016861
E-mail	jordi.corominas@upc.edu
Institute	Department of Geotechnical Engineering and Geosciences. Technical University of Catalonia. Barcelona. Spain
Address	Jordi Girona 1-3, Campus Nord UPC. D-2 Building, 08034 Barcelona
Official name of database	LLISCAT
Owner of database	Technical University of Catalonia, UPC
Contact person	Technical University of Catalonia, UPC
Producer of database	Technical University of Catalonia, UPC
Website	http://www.lliscat.upc.es/
Approximate area covered (km ²)	32,514 (32,114 in Catalonia and 400 in Andorra)
Official document	Yes, regulatory No Yes, but not regulatory
Language	Catalan (English and Spanish will follow)
First creation date	2006
Last update	2009
Recurrence for updating	<input type="checkbox"/> Not updated <input type="checkbox"/> After major event <input checked="" type="checkbox"/> Every year <input type="checkbox"/> < 6 months <input checked="" type="checkbox"/> Other, depends on staff availability
Time period of landslide events covered	1900 - 2009
Other features than landslides in database	Yes No
Number of landslides	400
Completeness of the database (estimate)	<input checked="" type="checkbox"/> <25% <input type="checkbox"/> 50-75% <input type="checkbox"/> 25-50% <input type="checkbox"/> >75%
Landslide inventory map Scale	
Reference coordinate system	WGS 84 (from Google Earth™) but not for all landslides
Information on the positional accuracy	Yes No Don't know
Landslides representation	<input checked="" type="checkbox"/> Point <input type="checkbox"/> Line <input type="checkbox"/> Closed polygon <input type="checkbox"/> Combination of points, lines and polygons <input type="checkbox"/> Other
Production method	<input checked="" type="checkbox"/> Field survey <input checked="" type="checkbox"/> Historical documents <input checked="" type="checkbox"/> Aerial photographs <input type="checkbox"/> LiDAR derivatives <input type="checkbox"/> Satellite remote sensing <input type="checkbox"/> Airborne remote sensing * <input type="checkbox"/> Other
Representation of landslide location	<input checked="" type="checkbox"/> Coordinates <input checked="" type="checkbox"/> Municipality <input type="checkbox"/> Province/county <input type="checkbox"/> Other
Landslide classification	Yes No
Landslide types	Agreement with Cruden and Varnes (1996) Rock fall, topple, slide, flow (earth flow, debris flow, avalanche), lateral spread, complex movements
Landslide dimension	<input checked="" type="checkbox"/> Displaced volume <input type="checkbox"/> Affected area <input checked="" type="checkbox"/> Length <input checked="" type="checkbox"/> Width <input type="checkbox"/> Travel angle <input type="checkbox"/> Height (from top to toe) <input type="checkbox"/> Depth of surface of rupture <input type="checkbox"/> Other
Geo-environmental characteristics	<input checked="" type="checkbox"/> Lithology <input type="checkbox"/> Hydrogeology <input type="checkbox"/> Land use <input type="checkbox"/> Slope gradient <input type="checkbox"/> Slope aspect

LANDSLIDE INVENTORIES IN EUROPE

	<input type="checkbox"/> Slope curvature <input type="checkbox"/> Other	
Completeness of triggering factor	<input type="checkbox"/> 0% <input type="checkbox"/> 0-25% <input checked="" type="checkbox"/> 25-50%	<input type="checkbox"/> 50-75% <input type="checkbox"/> >75%
Landslide data/history	Yes	No
Initiation date	Yes	No
Initiation and reactivation dates	Yes	No
Completeness	<input type="checkbox"/> 0% <input checked="" type="checkbox"/> 0-25% <input type="checkbox"/> 25-50%	<input type="checkbox"/> 50-75% <input type="checkbox"/> >75%
Landslide activity	Yes	No
Activity classes	Active, reactivated, dormant	
Consequences	Yes	No
Completeness	<input type="checkbox"/> 0% <input checked="" type="checkbox"/> 0-25% <input type="checkbox"/> 25-50%	<input type="checkbox"/> 50-75% <input type="checkbox"/> >75%
Other information	<input checked="" type="checkbox"/> Photographs <input checked="" type="checkbox"/> Monitoring data or physical properties <input checked="" type="checkbox"/> Bibliographic references <input type="checkbox"/> Other	

Format	<input type="checkbox"/> Digital, spatial database <input checked="" type="checkbox"/> Digital, alphanumeric database <input type="checkbox"/> Digital, linked spatial and alphanumeric database <input type="checkbox"/> Digital, other <input type="checkbox"/> Paper	
Spatial software	<input checked="" type="checkbox"/> ArcGIS <input type="checkbox"/> Other	
Alphanumeric software	<input type="checkbox"/> Oracle <input type="checkbox"/> Microsoft Access <input checked="" type="checkbox"/> Other: web application	
Type of paper document	<input type="checkbox"/> Datasheets <input type="checkbox"/> Map	
Accessibility	<input checked="" type="checkbox"/> General public <input checked="" type="checkbox"/> Administration <input checked="" type="checkbox"/> Scientific purposes <input type="checkbox"/> Other	
Use	<input type="checkbox"/> For consultation only <input checked="" type="checkbox"/> Free of charge under any condition (level 1 and 2) <input type="checkbox"/> After payment <input type="checkbox"/> Without special conditions <input checked="" type="checkbox"/> Under special conditions (level 3) <input type="checkbox"/> I do not know	

Database metadata complying with INSPIRE metadata regulations	Yes	No
	I do not know	
Database provided through/stored in a network following the INSPIRE network services	Yes	No
	I do not know	
Institute registered as an INSPIRE stakeholder	<input type="checkbox"/> LMO <input type="checkbox"/> SDIC <input type="checkbox"/> I do not know <input checked="" type="checkbox"/> No	
Institute willing to register as an INSPIRE stakeholder	<input type="checkbox"/> LMO <input type="checkbox"/> SDIC <input checked="" type="checkbox"/> I do not know <input type="checkbox"/> No	
Organization willing to participate in the real testing or reviewing of a draft of the INSPIRE Data Specifications related to the spatial data theme "Natural Risk Zones" when it is developed by the Thematic Working Group	Yes	No
	I do not know	

GRANADA, SPAIN: Landslides Database of the Southern Slopes of Sierra Nevada, Granada

Name of contact person 1	Jorge David Jiménez Perálvarez	
Telephone number	+34 958243367	
E-mail	jorgejp@ugr.es	
Institute	University of Granada	
Address	Upper School of Civil Engineering, C/ Severo Ochoa S/N. 18071 Granada	
Official name of database	Landslides database of the Southern Slopes of Sierra Nevada, Granada	
Owner of database	RNM121 Research Group	
Contact person	Jorge David Jiménez Perálvarez	
Producer of database	RNM121 Research Group.	
Website	/	
Approximate area covered (km ²)	500	
Official document	Yes, regulatory	No
	Yes, but not regulatory	
Language	Spanish	
First creation date	2005	
Last update	2009	
Recurrence for updating	<input type="checkbox"/> Not updated <input checked="" type="checkbox"/> After major event <input type="checkbox"/> Every year <input type="checkbox"/> < 6 months <input type="checkbox"/> Other	
Time period of landslide events covered	±1975 – 2009	
Other features than landslides in database	Yes	No
Number of landslides	About 500	
Completeness of the database (estimate)	<input type="checkbox"/> <25% <input type="checkbox"/> 25-50%	<input type="checkbox"/> 50-75% <input checked="" type="checkbox"/> >75%
Landslide inventory map		
Scale	1:10,000	
Reference coordinate system	European Datum 1950 UTM Zone 30N	
Information on the positional accuracy	Yes, horizontal accuracy is about 5 m (in metadata)	No
Landslides representation	Don't know <input type="checkbox"/> Point <input type="checkbox"/> Line <input checked="" type="checkbox"/> Closed polygon <input type="checkbox"/> Combination of points, lines and polygons <input type="checkbox"/> Other	
Production method	<input checked="" type="checkbox"/> Field survey <input type="checkbox"/> Historical documents <input checked="" type="checkbox"/> Aerial photographs <input type="checkbox"/> LiDAR derivatives <input type="checkbox"/> Satellite remote sensing <input type="checkbox"/> Airborne remote sensing * <input type="checkbox"/> Other	
Representation of landslide location	<input type="checkbox"/> Coordinates <input type="checkbox"/> Municipality <input checked="" type="checkbox"/> Province/county <input type="checkbox"/> Other	
Landslide classification	Yes	No
Landslide types	Agreement with Cruden and Varnes (1996) Rock fall, slide, flow, complex landslide	
Landslide dimension	<input type="checkbox"/> Displaced volume <input checked="" type="checkbox"/> Affected area <input type="checkbox"/> Length <input type="checkbox"/> Width <input type="checkbox"/> Travel angle <input type="checkbox"/> Height (from top to toe) <input type="checkbox"/> Depth of surface of rupture <input type="checkbox"/> Other	
Geo-environmental characteristics	<input checked="" type="checkbox"/> Lithology <input checked="" type="checkbox"/> Hydrogeology <input checked="" type="checkbox"/> Land use <input checked="" type="checkbox"/> Slope gradient	

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	<input checked="" type="checkbox"/> Slope aspect <input checked="" type="checkbox"/> Slope curvature <input checked="" type="checkbox"/> Other: Altitude (from DEM)	
Completeness of triggering factor	<input type="checkbox"/> 0% <input type="checkbox"/> 0-25% <input checked="" type="checkbox"/> 25-50%	<input type="checkbox"/> 50-75% <input type="checkbox"/> >75%
Landslide data/history	Yes	No
Initiation date	Yes	No
Initiation and reactivation dates	Yes	No
Completeness	<input type="checkbox"/> 0% <input checked="" type="checkbox"/> 0-25% <input type="checkbox"/> 25-50%	<input type="checkbox"/> 50-75% <input type="checkbox"/> >75%
Landslide activity	Yes	No
Activity classes	Active, relict, suspended, dormant	
Consequences	Yes	No
Completeness	<input type="checkbox"/> 0% <input checked="" type="checkbox"/> 0-25% <input type="checkbox"/> 25-50%	<input type="checkbox"/> 50-75% <input type="checkbox"/> >75%
Other information	<input checked="" type="checkbox"/> Photographs <input checked="" type="checkbox"/> Monitoring data or physical properties <input checked="" type="checkbox"/> Bibliographic references <input type="checkbox"/> Other	

Format	<input type="checkbox"/> Digital, spatial database <input type="checkbox"/> Digital, alphanumeric database <input checked="" type="checkbox"/> Digital, linked spatial and alphanumeric database <input type="checkbox"/> Digital, other <input checked="" type="checkbox"/> Paper	
Spatial software	<input checked="" type="checkbox"/> ArcGIS <input type="checkbox"/> Other	
Alphanumeric software	<input type="checkbox"/> Oracle <input checked="" type="checkbox"/> Microsoft Access <input type="checkbox"/> Other	
Type of paper document	<input type="checkbox"/> Datasheets <input checked="" type="checkbox"/> Map	
Accessibility	<input type="checkbox"/> General public <input type="checkbox"/> Administration <input checked="" type="checkbox"/> Scientific purposes, only institute that produced the database <input type="checkbox"/> Other	
Use	<input type="checkbox"/> For consultation only <input type="checkbox"/> Free of charge under any condition <input type="checkbox"/> After payment <input type="checkbox"/> Without special conditions <input type="checkbox"/> Under special conditions <input type="checkbox"/> I do not know	

Database metadata complying with INSPIRE metadata regulations	Yes	No
	I do not know	
Database provided through/stored in a network following the INSPIRE network services	Yes	No
	I do not know	
Institute registered as an INSPIRE stakeholder	<input type="checkbox"/> LMO <input type="checkbox"/> SDIC <input type="checkbox"/> I do not know <input checked="" type="checkbox"/> No	
Institute willing to register as an INSPIRE stakeholder	<input type="checkbox"/> LMO <input type="checkbox"/> SDIC <input checked="" type="checkbox"/> I do not know <input type="checkbox"/> No	
Organization willing to participate in the real testing or reviewing of a draft of the INSPIRE Data Specifications related to the spatial data theme "Natural Risk Zones" when it is developed by the Thematic Working Group	Yes	No
	I do not know	

European Commission
EUR25666 EN – Joint Research Centre – Institute for Environment and Sustainability

Title: Landslide inventories in Europe and policy recommendations for their interoperability and harmonisation

Authors: Miet Van Den Eeckhaut, Javier Hervás

Luxembourg: Publications Office of the European Union

2012 – 202 pp. – 21.0 x 29.7 cm

EUR – Scientific and Technical Research series – ISSN 1831-9424

ISBN 978-92-79-27994-2

doi 10.2788/75587

Abstract

Landslides are a major natural hazard in most mountainous and hilly regions as well as in steep river banks and coastlines. In the EU Thematic Strategy for Soil Protection landslides are mainly recognized as a soil threat for which areas where they are likely to occur in the future have to be delineated, and measures to reduce their impact have to be designed. Thus the Strategy implies that landslide susceptibility, hazard and risk assessments are needed for appropriate risk management in Europe. To enable such assessments landslide databases, usually including landslide inventory maps and linked alphanumeric information, are a key infrastructure. They should contain information on the location of landslide phenomena, types, history, state of activity, magnitude or size, lithology involved, failure mechanisms, causal factors and the damage caused. Yet, it was not known which national (or regional) landslide databases contain all this information, and thus allow risk assessment. Therefore, this report makes a detailed review of national landslide databases in EU member states, EU official candidate and potential candidate countries and EFTA countries together with a number of regional databases, and proposes improvements for delineating areas at risk in agreement with the EU Soil Thematic Strategy and its associated Proposal for a Soil Framework Directive, and for achieving interoperability and harmonisation in agreement with INSPIRE Directive, which aims at establishing an Infrastructure for Spatial Information in the European Community. The report is based on the analysis of replies to a detailed questionnaire sent out to the competent persons and organisations in 37 European countries in spring 2010 and a review of literature, websites and main European legislation on the subject, carried out in the framework of the EU-FP7 SafeLand project. In total, information has been collected and analysed for 24 national databases in 22 countries and 22 regional databases in 10 countries. At the moment, over 633,000 landslides are recorded in national databases, representing on average less than 50% of the estimated landslides occurred in these countries. The sample of regional databases included over 103,000 landslides, with an estimated completeness substantially higher than that of national databases, as more attention can be paid for data collection over smaller regions. Both for national and regional coverage, information on landslide magnitude, geometrical characteristics, triggering factors, age and impact (damage and casualties) reported in national and regional databases greatly differs, as it strongly depends on the objectives of the database, the data collection methods used, the resources employed and the remaining landslide expression. In particular, information on landslide initiation and/or reactivation dates is generally included for less than 25% of records, thus making hazard and hence risk assessment difficult. In most databases, scarce information on landslide impact further hinders risk assessment at regional and national scales. About half of national and regional agencies provide free web-GIS visualisation services. Yet, the potential of existing landslide databases is often not fully exploited as, in many cases, access by the general public and external researchers is restricted. Additionally, the information is generally only available in the national or local language, thus hampering consultation for most foreigners. Based on these results, suggestions for a minimum set of attributes, i.e. those required for landslide risk assessments, to be collected and made available by European countries in support of EU policies are also presented.

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