



Crop monitoring in Europe

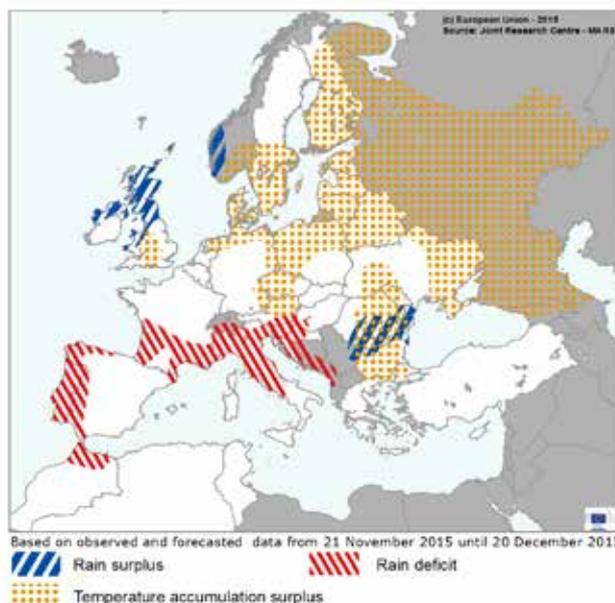
MARS Bulletin Vol. 23 No 12 (2015)

Mild weather favoured crop establishment but increased risk of frost damage

Temperatures since the end of November have been significantly higher than average in large areas of central (**Czech Republic, Germany**), eastern (**Bulgaria, Romania, Ukraine, Russia** and **Belarus**) and northern Europe (**Denmark, Poland, Finland, Sweden** and **the Baltic countries**). Winter crops were prevented from gaining frost tolerance due to the mild temperatures in these regions, and are now potentially exposed to frost kill if temperatures abruptly move to seasonal values — even though this is not forecast for the coming days.

In **Ireland** and the **United Kingdom**, overly wet conditions have persisted since November and will continue in the coming week according to the weather forecast. In **Romania**, the surplus of precipitation peaked at the end of November. Large parts of southern Europe (**southern France, Croatia, Italy, Slovenia** and the **western Iberian Peninsula**) have faced a persistent lack of precipitation since the beginning of November, which is forecast to continue over the coming days, except in **northern Spain** and **Portugal** where significant rain is forecast.

AREAS OF CONCERN - EXTREME WEATHER EVENTS



1. Agro-meteorological overview

1.1 Meteorological review (1 November–8 December)

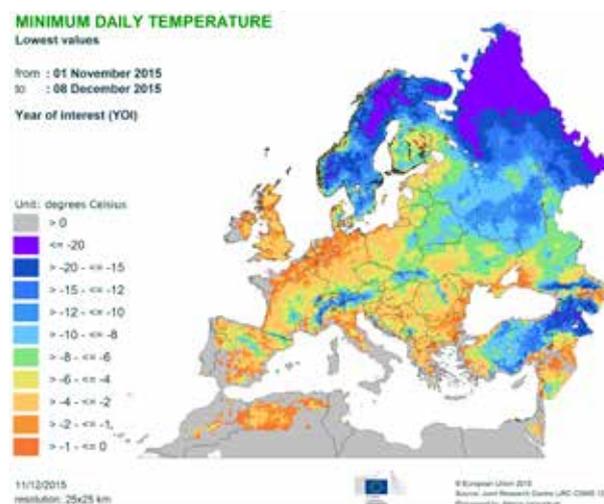
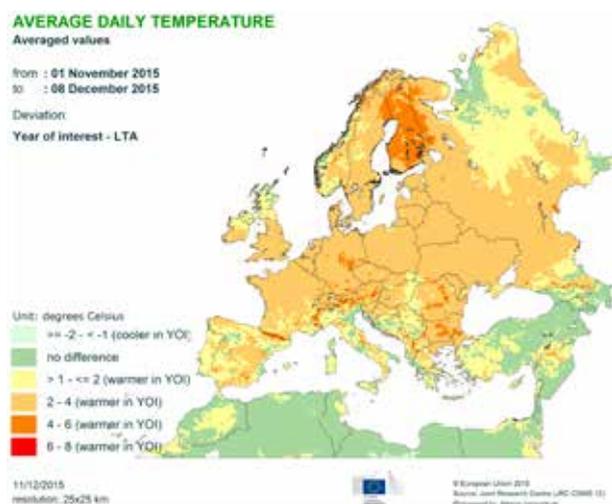
Exceptionally warm weather for this time of year has been observed in many parts of Europe during the period of analysis. Air temperatures were 2–4 °C above the long-term average, and regionally even higher. Abundant rainfall was recorded in regions surrounding the North Sea, and the central and southern parts of European Russia. Substantially drier-than-usual weather was observed in southern Europe, southern France, the Alpine region and Turkey.

Observed temperatures

The first half of November was characterised by unusually warm weather. Average daily air temperatures of 4–6 °C above the long-term average were observed in many areas of central and western Europe, and of up to 4 °C above average in eastern, northern and southern Europe. Warmer-than-seasonal weather continued during the second dekad of November in much of Europe. During this period, the greatest positive anomalies (between 4 and 6 °C above the long-term average) were recorded in the western and northern Black Sea regions and in Finland, whereas air temperatures in Spain, southern France and Italy remained closer to seasonal averages. Despite these substantial positive anomalies in average daily temperatures, minimum daily air temperatures below 0 °C were recorded in northern and eastern Europe and central Turkey, and temperatures

also frequently dropped below 0 °C in western Bulgaria, Hungary, western and central parts of Romania, Slovakia, Serbia and Macedonia.

In the beginning of December, warmer-than-average temperatures continued in many parts of Europe. Average daily temperatures exceeded the long-term average by 4–6 °C in central and eastern Europe, and in large parts of eastern and northern Europe temperatures exceeded the long-term average by more than 6 °C. By contrast, weather in Turkey was colder than seasonal. Minimum daily temperatures below 0 °C were restricted to higher mountain regions as well as eastern and northern Europe. Considering the period as a whole, weather conditions in much of western and central Europe and the Baltic countries were the warmest ever on our records, and those in south-eastern Europe were among the warmest on our records for this period.



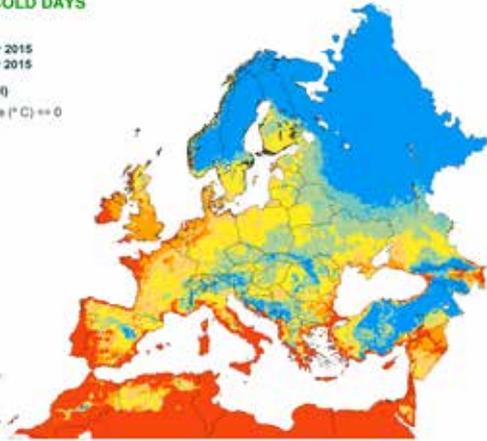
NUMBER OF COLD DAYS

from : 01 November 2015
 to : 08 December 2015
 Year of interest (YOI)
 Minimum temperature (°C) = 0

Unit: days
 <= 0
 > 0 - <= 2
 > 2 - <= 5
 > 5 - <= 10
 > 10 - <= 15
 > 15 - <= 20
 > 20

11/12/2015
 resolution: 25x25 km

 © European Union 2015
 Source: Joint Research Centre (JRC) OASIS (2)
 Prepared by: Meteo-consulting



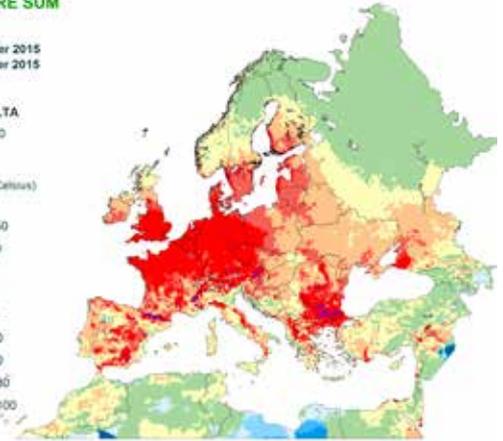
TEMPERATURE SUM

from : 01 November 2015
 to : 08 December 2015
 Deviation:
 Year of interest - LTA
 Base temperature: 0

Unit: degree days (Celsius)
 >= 150
 >= 100 - < 150
 >= 80 - < 100
 >= 50 - < 80
 >= 20 - < 50
 >= -20 - < 20
 >= -50 - < -20
 >= -80 - < -50
 >= -100 - < -80
 >= -150 - < -100
 < -150

11/12/2015
 resolution: 25x25 km

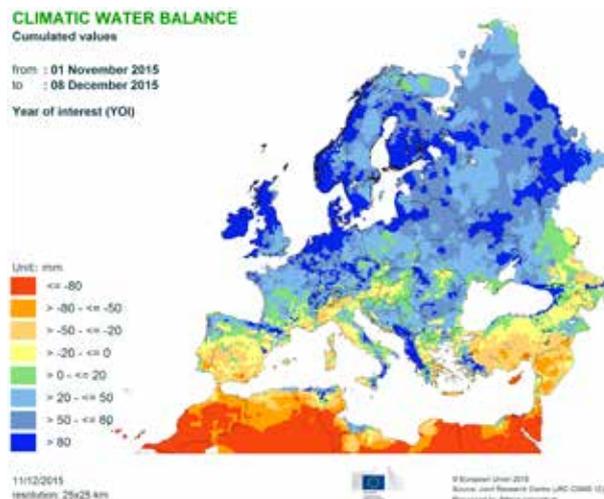
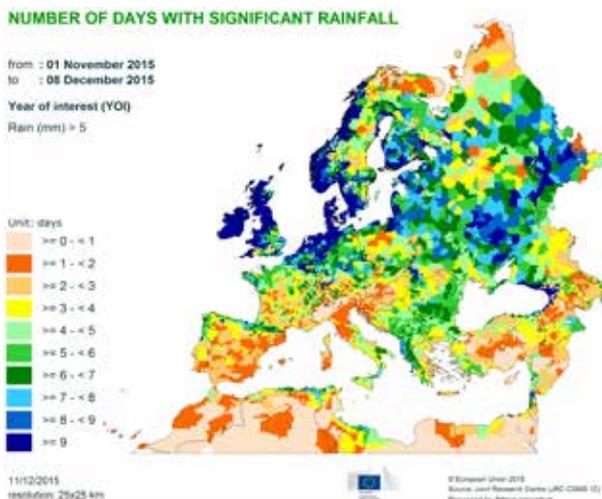
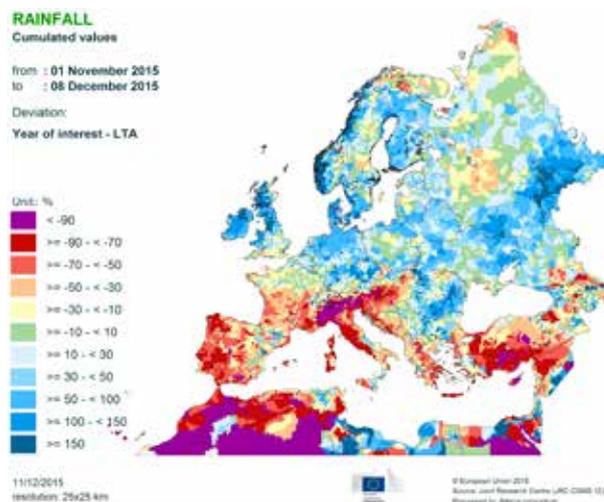
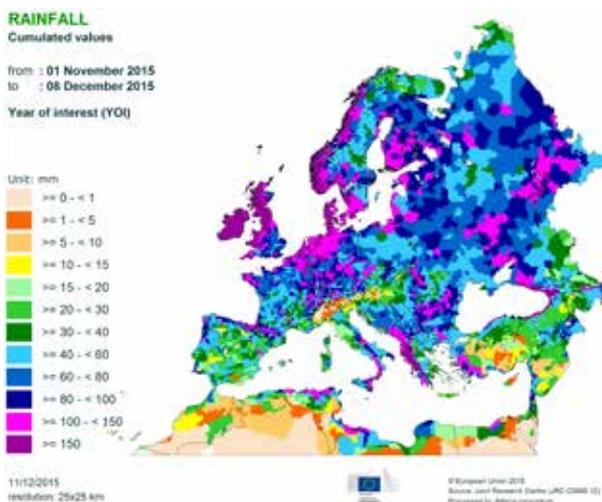
 © European Union 2015
 Source: Joint Research Centre (JRC) OASIS (2)
 Prepared by: Meteo-consulting



Observed precipitation

During the first half of November, dry weather prevailed over the Alpine region, Italy, south-eastern Europe and the western half of Turkey. Below-average rainfall was also recorded in southern Germany, France, Hungary, Austria and Slovakia. During the same period, regions surrounding the North Sea experienced abundant rainfall, and wetter-than-usual conditions also occurred in the Baltic countries, Belarus, northern Poland and the southern part of European Russia. During the second half of November, drier-than-seasonal conditions were recorded in the Iberian Peninsula (except the Pyrenees), northern Italy,

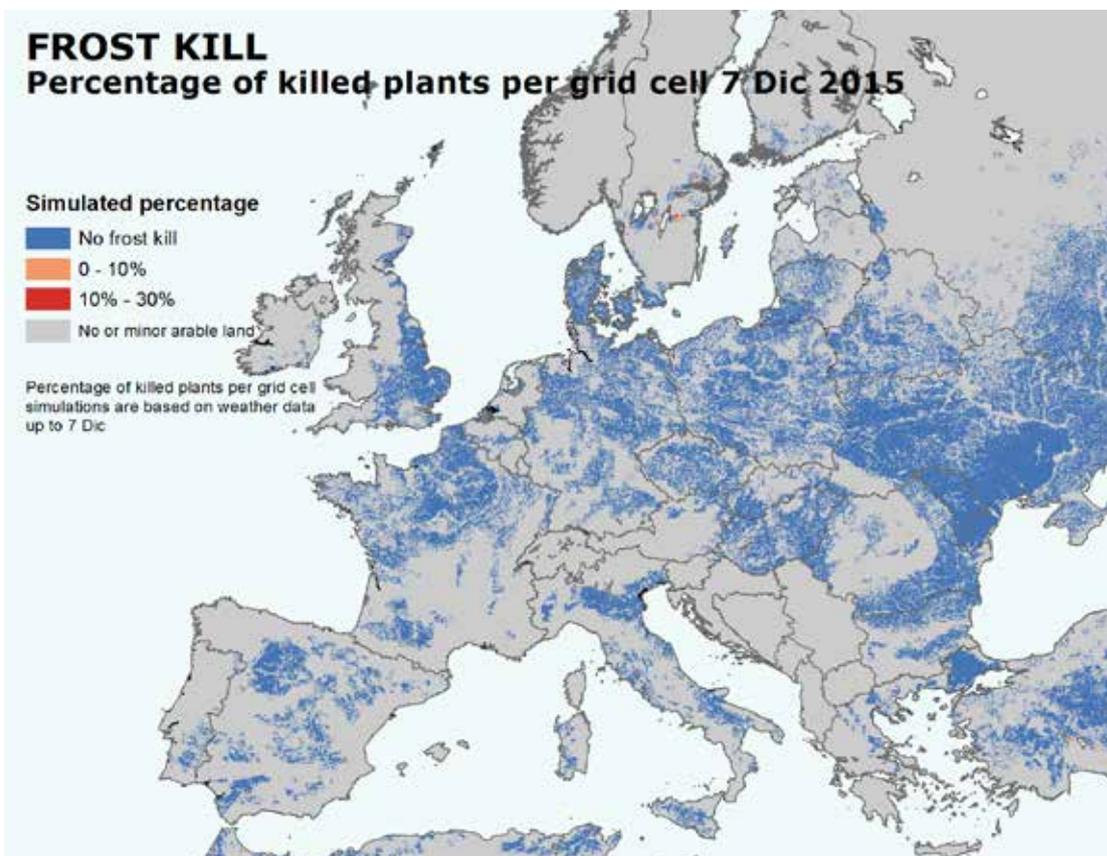
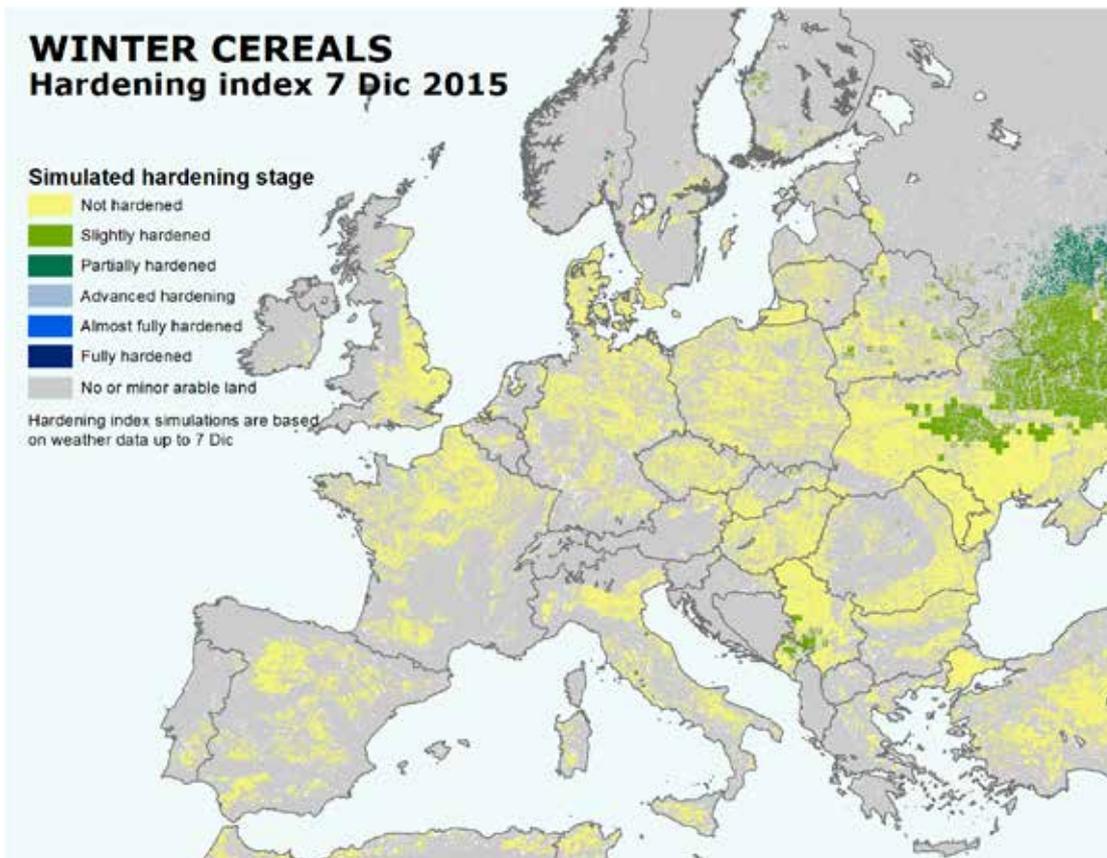
western Hungary, eastern Austria, Turkey and the eastern Black Sea region. Total rainfall above 60 mm occurred in the Balkans and the Carpathians, and locally also in western Belgium, Denmark, Germany, the Netherlands and the British Isles. The beginning of December was dry in many parts of southern, south-eastern and central Europe and Turkey. Wet conditions were recorded in the British Isles and northern Europe. Heavy rainfall caused flooding in north-western England and Ireland. The agricultural areas affected are mainly pasture areas which should be able to withstand such conditions.



Winter hardening and frost kill

Hardening is the bio-physiological process whereby winter cereals gain low-temperature tolerance to withstand freezing conditions that occur during the winter dormancy period. From mid-October onwards, hardening started in northern and eastern Europe and in central-western Europe north of the Alps, but was followed by a period of de-hardening in many regions due to the much warmer-than-usual weather conditions that prevailed since early November. As a consequence, the hardening of winter cereals is considerably delayed. Our model simulations indicate that frost tolerance is very weak in most of the EU, except for small parts of the Czech Republic, Austria, Romania, Slovakia, Finland, Sweden, Norway and on the western side of the Balkan Peninsula, where the winter crops are partially hardened. In addition, below-average precipitation in these regions did not allow to build up a snow cover of the crops. The current situation is worrying as the occurrence of a cold air intrusion in areas with little or no snow cover could cause significant frost-kill damage in the winter crops that have not gained frost tolerance. Likewise, the winter wheat in the most important crop-pro-

ducing southern regions of Russia has still not significantly hardened. Crops in Russia could also be more vulnerable than usual due to delayed emergence and weak establishment following the very dry autumn, even though this situation has improved recently. In eastern Turkey and in the region of the Caucasus, hardening is somewhat more advanced depending on local conditions. Some areas in Belarus, central and north-eastern Ukraine and in western Russia were simulated to attain some frost tolerance. The hardening is even more advanced further eastward, such as in the north-eastern and eastern parts of the Central Okrug and in the south-western part of the Near Volga Okrug, and crops are expected to be fully or almost fully hardened in the eastern regions of the Near Volga Okrug. Due to the absence of low temperatures, so far frost kill has been very limited. Slight frost kill has been simulated in some parts of Sweden, eastern Turkey and the southern part of the Near Volga Okrug in Russia. Given the current weather forecast, no additional frost kill is expected over the coming days.



MARS Bulletins 2015

Date	Publication	Reference
26 Jan	Agromet analysis	Vol. 23 No 1
23 Feb	Agromet analysis	Vol. 23 No 2
23 Mar	Agromet analysis and yield forecast	Vol. 23 No 3
27 Apr	Agromet analysis, remote sensing and yield forecast	Vol. 23 No 4
26 May	Agromet analysis, remote sensing, yield forecast and pasture analysis	Vol. 23 No 5
22 Jun	Agromet analysis, remote sensing, yield forecast, pasture update and rice analysis	Vol. 23 No 6
27 Jul	Agromet analysis, remote sensing and yield forecast	Vol. 23 No 7
24 Aug	Agromet analysis, remote sensing and yield forecast	Vol. 23 No 8
21 Sep	Agromet analysis, remote sensing, yield forecast and pasture update	Vol. 23 No 9
26 Oct	Agromet analysis, remote sensing, yield forecast and rice analysis	Vol. 23 No 10
23 Nov	Agromet analysis, yield forecast and sowing conditions	Vol. 23 No 11
14 Dec	Agromet analysis	Vol. 23 No 12

As the Commission's in-house science service, the Joint Research Centre's (JRC) mission is to provide EU policies with independent, evidence-based scientific and technical support throughout the whole policy cycle. Working in close cooperation with policy directorates-general, the JRC addresses key societal challenges while stimulating innovation through developing new standards, methods and tools, and sharing and transferring its know-how to the Member States and international community.

The mission of the JRC-IES is to provide scientific-technical support to the European Union's policies for the protection and sustainable development of the European and global environment.

The current [MARS* Bulletin](#) is a European Commission publication from AGRI4CAST (JRC/IES MARS Unit).

All [MARS Bulletins](#) are available at:

<http://mars.jrc.ec.europa.eu/mars/Bulletins-Publications>

Analysis and reports

B. Baruth, I. Biavetti, A. Bussay, A. Ceglar, G. De Sanctis, S. Garcia Condado, J. Hooker, S. Karetsos, R. Lecerf, R. Lopez, L. Nisini, J. Rodriguez, L. Seguini, A. Toreti, M. Van den Berg, M. Van der Velde.

Reporting support

G. Mulhern

Editing

B. Baruth, M. Van den Berg, S. Niemeyer

Data production

MARS Unit AGRI4CAST/JRC, ALTEERRA (NL), Meteogroup (NL), VITO (BE) and CMCC (IT)

Contact

JRC-IES-MARS/AGRI4CAST
info-agri4cast@jrc.ec.europa.eu

*MARS stands for Monitoring Agricultural Resources

Legal notice:

Neither the European Commission nor any person acting on behalf of the Commission is responsible for the use which might be made of this publication.

Disclaimer

The geographic borders are purely a graphical representation and are only intended to be indicative. The boundaries do not necessarily reflect the official EC position.

Technical note:

The long-term average (LTA) used within this bulletin as a reference is based on an archive of data covering 1975-2014.