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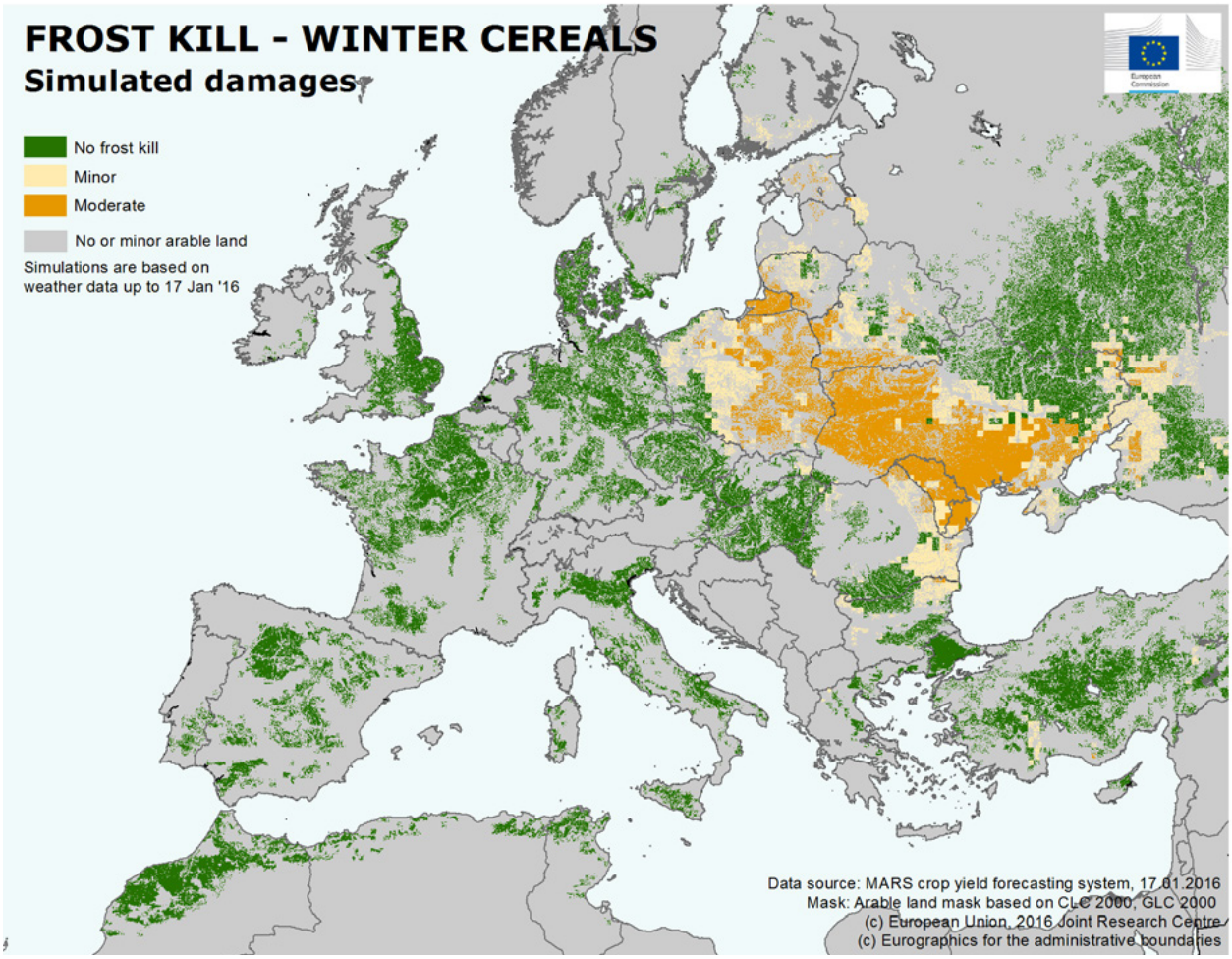
JRC MARS Bulletin

Crop monitoring in Europe

January 2016

Weakly hardened winter cereals

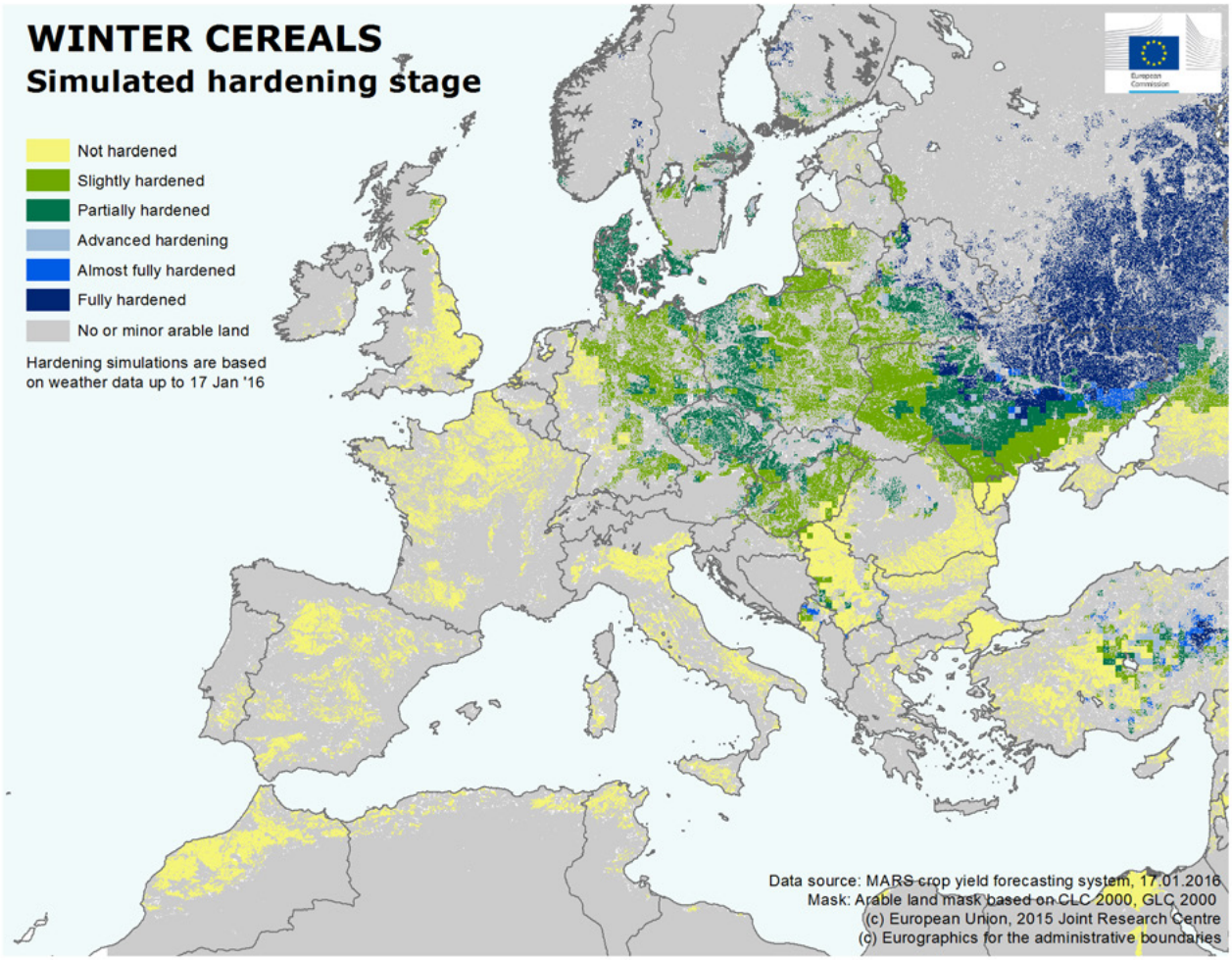
A first cold spell is likely to have caused damages in eastern Europe



The extremely mild weather of last December has delayed the hardening of winter crops. An intense cold air intrusion in the eastern half of Europe, combined with shallow snow cover, caused some frost injuries as simulated by our model.

Our latest frost-kill model simulations show no or only a slight degree of hardening in western and southern Europe. In the British Isles (except eastern Scotland), the Iberian peninsula and France, as well as in the Mediterranean region, the Balkan peninsula and surrounding areas of the Black Sea, winter crops have not gained low-temperature tolerance at all, due to the fact that this region has experienced mostly warmer-than-usual daily temperatures since early December. The weakly hardened crops run the risk of incurring frost-kill damage in the event of a sudden freezing air intrusion.

Joint Research Centre



Hardening is the bio-physiological process of winter cereals which transforms the cellular starch into glucose, thereby raising the freezing point of the cellular liquids and increasing the low-temperature tolerance of the plants.

In central and south-eastern Europe, the situation has improved slightly since mid-December due to the colder-than-usual weather conditions of late December-early January. The progress of the hardening process is more advanced, and a slight or moderate frost tolerance level is typical in the areas between the central regions of Germany and the western Ukraine, as well as in the Baltic countries, western Belarus, the Czech Republic, Slovakia, Hungary, northern Romania and Turkey. Eastern Ukraine and Russia were sufficiently cold to allow for the full or almost full hardening of winter crops.

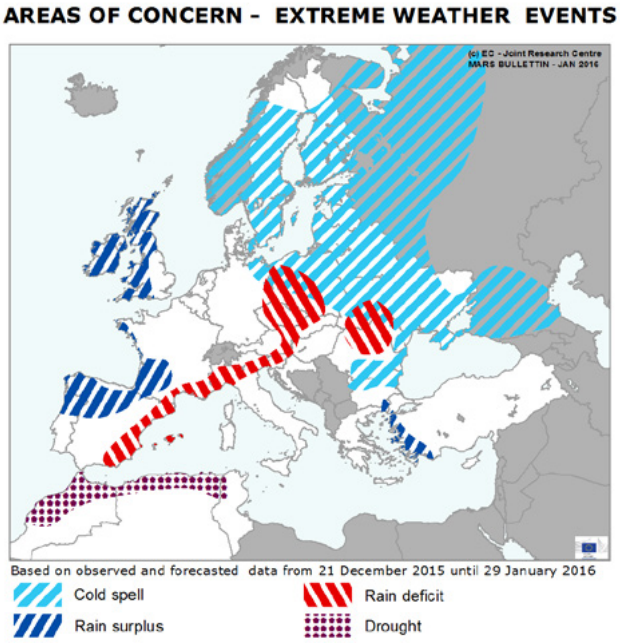
As stated above, the extremely mild weather of last December has delayed the hardening of winter crops. An intense cold air intrusion started on 29 December 2015 in the eastern half of Europe. The sharp temperature drop combined with shallow (1-5 cm) snow cover, primarily in Poland and western Ukraine, caused some frost injuries, as simulated by the model. This cold spell lasted until 6 January, and the most severe frosts reached – 15 and – 18 °C in this region. Slight or moderate frost-kill damage is predicted in eastern Poland, the Baltic states, western and southern Ukraine, Moldova, south-western Belarus, north-eastern Romania and some regions of southern Russia. The possibility of minor frost-kill damages also exists in some parts of Sweden, Finland, Bulgaria and Turkey. As far as the weather forecast is concerned, no additional frost-kill damage was indicated by our model for the period until the end of January.

1. Agro-meteorological overview (1 December-20 January)

In December, weather conditions were warmer than usual in most parts of Europe. Moreover, the warmest December conditions in our records were observed in major parts of western, central and south-eastern Europe. Colder-than-usual weather prevailed in northern, eastern and central Europe during the first two dekads of January. Drier-than-usual conditions prevailed in the eastern Iberian peninsula, southern France, Italy, Romania and many regions of southern and central Europe. Abundant rainfall was recorded in the British Isles, resulting in major flooding.

Observed temperatures

An exceptionally warm climatic anomaly was recorded in December in major parts of Europe, except in the western and southern Balkans. The highest December air temperatures in our records were recorded in central and western Europe, with average daily air temperatures up to 8 °C above the long-term average. Maximum air temperatures above 15 °C were recorded during the first half of December in major parts of western, southern and south-eastern Europe, even exceeding 20 °C in some Mediterranean areas. Negative temperature anomalies were observed only in Turkey and the northernmost part of Europe, with values as much as 4 °C below the long-term average. No cold days were recorded during December in agricultural areas of western Europe and southern Italy. Daily temperatures dropped at the end of the month, when the general circulation over Europe started to change, favouring an inflow of polar air from the north-east of Europe. Minimum daily temperatures dropped below – 10 °C in areas of high elevation, eastern and south-eastern Europe and Turkey. The first dekad of January remained warmer than usual in western Europe and southern Italy. Substantially colder-than-seasonal weather was recorded in eastern and northern Europe, with temperature anomalies of more than 6 °C below the long-term average. The second dekad of January remained colder than usual in northern Europe;



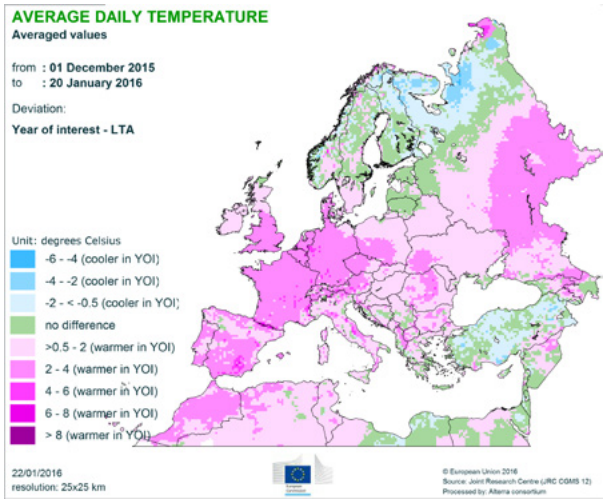
however, warm anomalies prevailed in south-eastern Europe, Turkey, Ukraine and southern European Russia. Minimum daily temperatures during the cold spell dropped below – 20 °C in major parts of eastern Europe, central and northern Scandinavia and eastern Turkey.

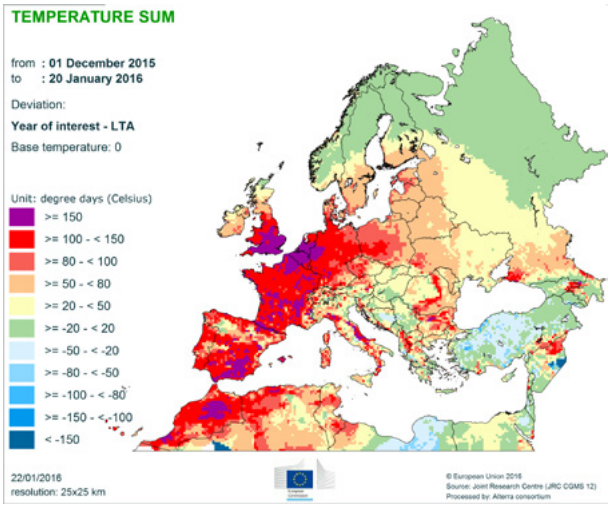
Observed rainfall

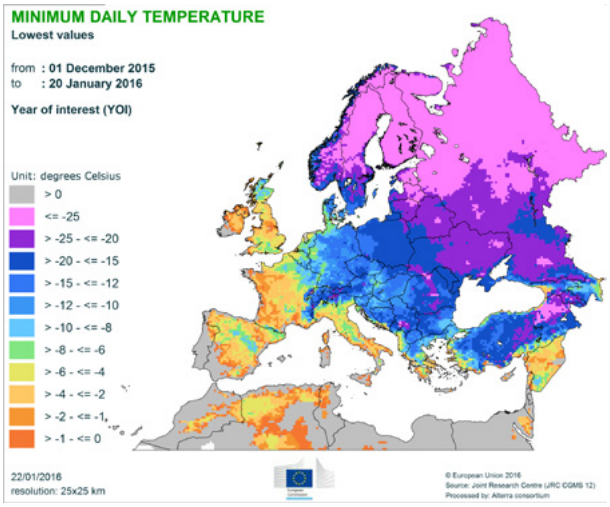
During December, substantially drier-than-usual conditions were observed in southern and south-eastern Europe and Turkey. Dry conditions were observed in the eastern half of the Iberian peninsula, Italy, south-eastern Europe and western Turkey. Drier-than-seasonal weather was also experienced in major parts of central Europe, with rainfall cumulates mainly below 30 mm. Western Europe saw a series of cyclones forming in a westerly flow over the Atlantic, which resulted in abundant rainfall in Ireland, central and northern United Kingdom and the Atlantic coast of Scandinavia. Exceptional rainfall events caused flooding in central and northern England and Ireland. Precipitation cumulates above 50 mm were recorded in many areas of western and south-eastern Europe and Turkey during the first dekad of January. Locally, more than 100 mm were recorded in the north-western part of the Iberian peninsula, the British Isles, France and the western Balkans. The second dekad of January saw little rainfall in north-eastern Spain, northern Italy, northern Romania, northern Poland and southern Scandinavia. Precipitation cumulates above 50 mm were recorded in north-western Spain, south-western France, the southern and western Balkans, western Turkey and eastern Ukraine. Snow covered many regions of central, eastern, northern and south-eastern Europe during the first two dekads of January.

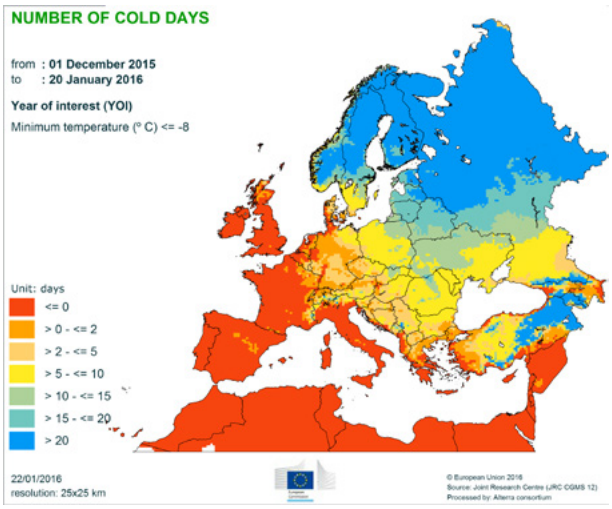
2. Atlas maps

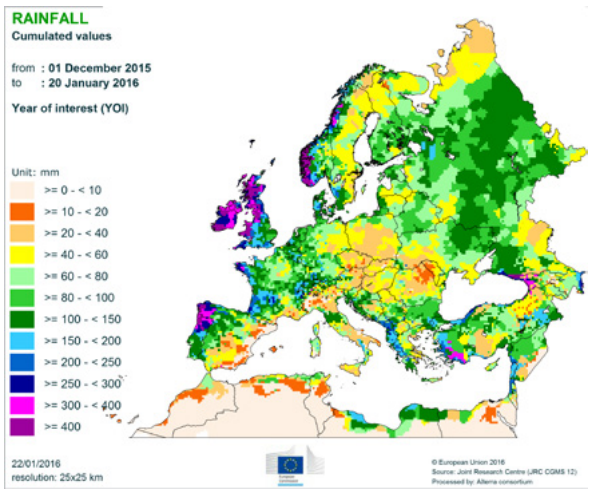
Weather maps — 1 December-20 January

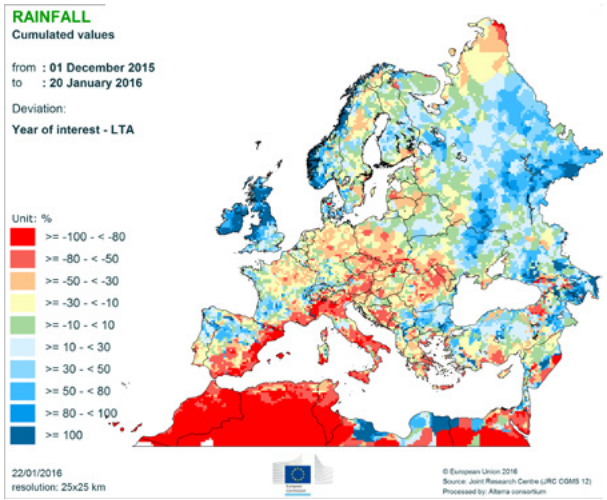


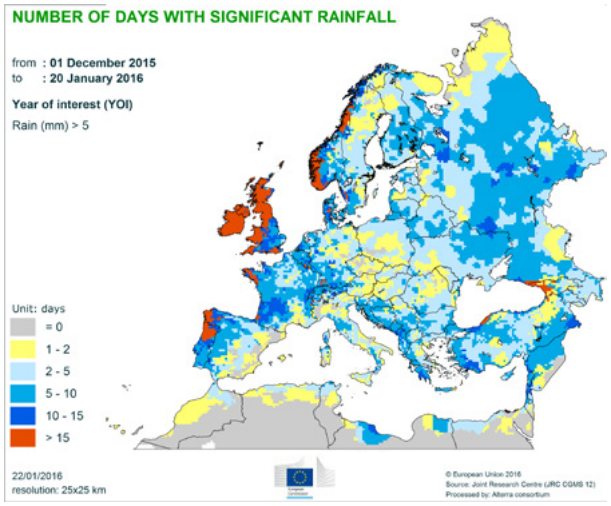


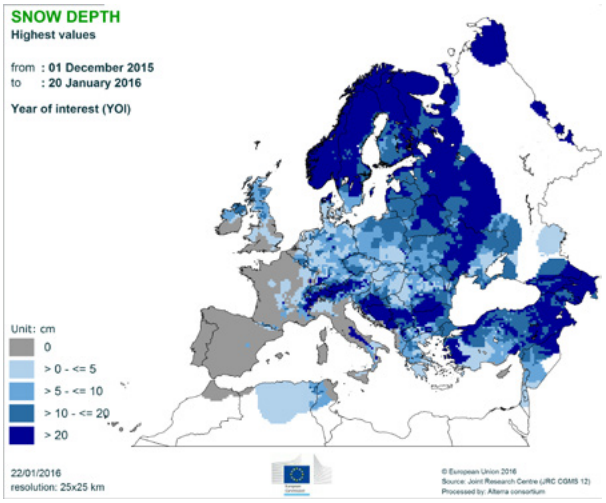




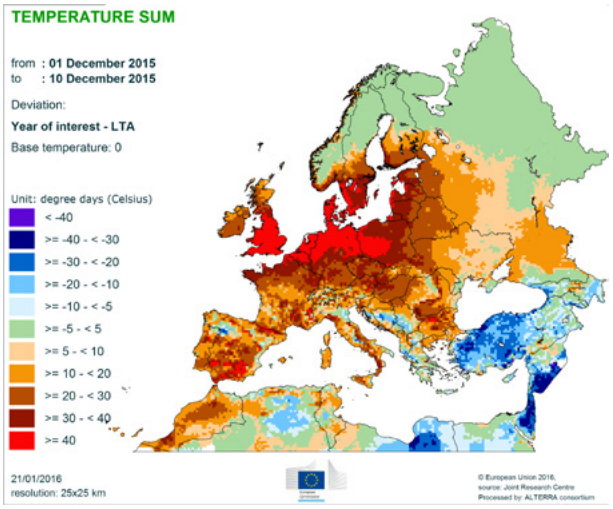


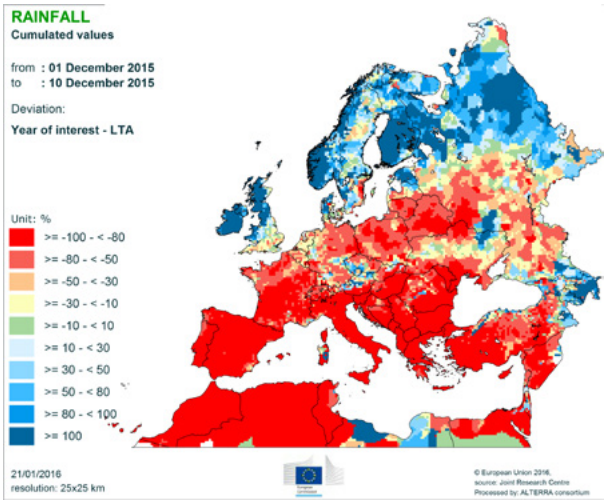


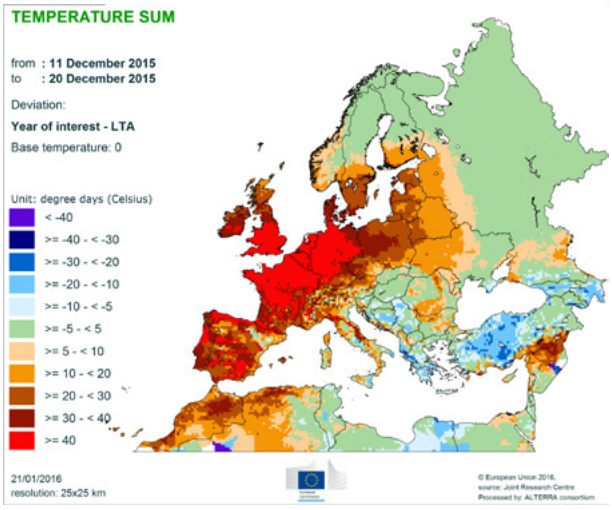


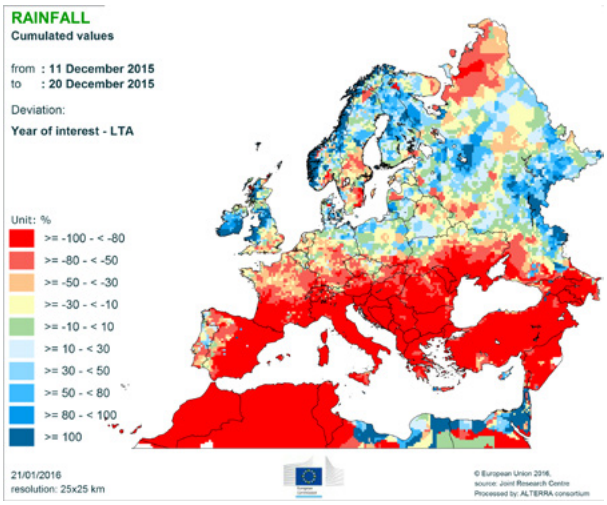


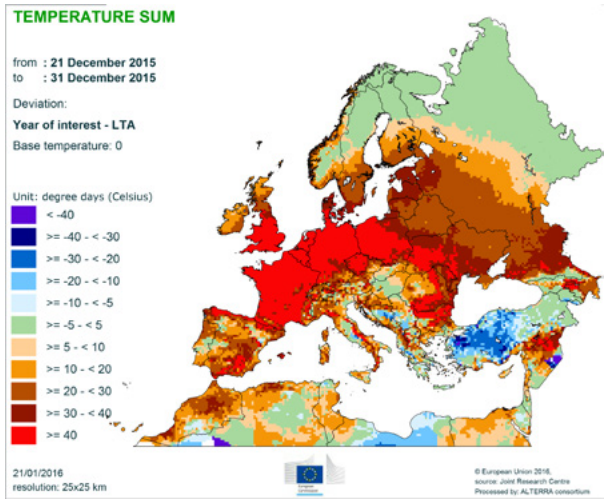
Dekadal weather maps — rainfall and temperature sum

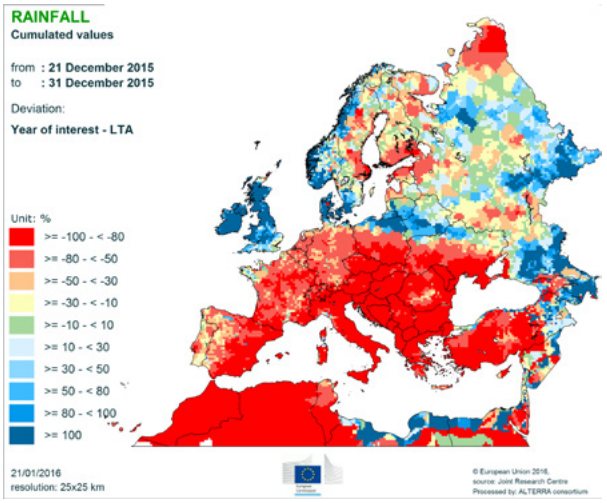


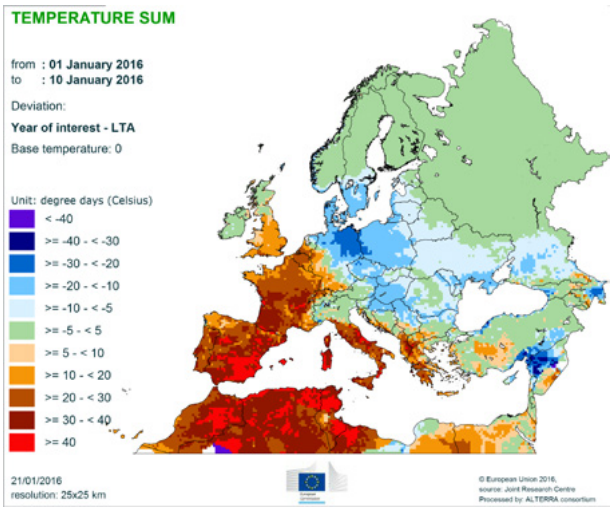


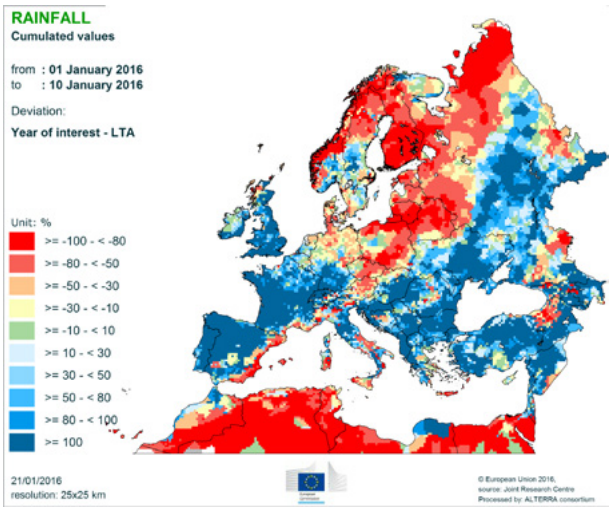


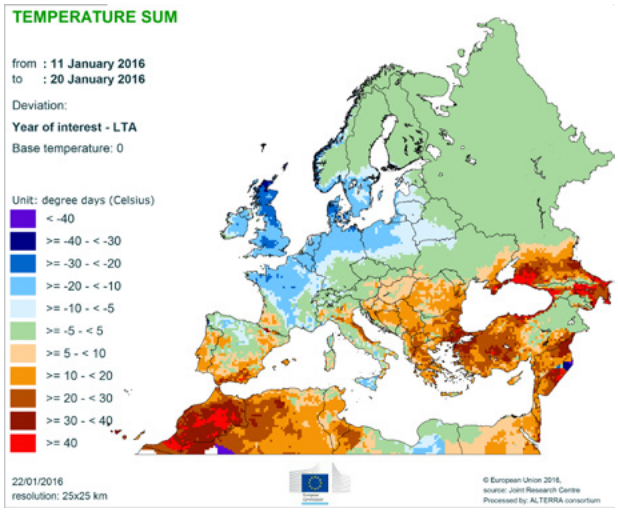


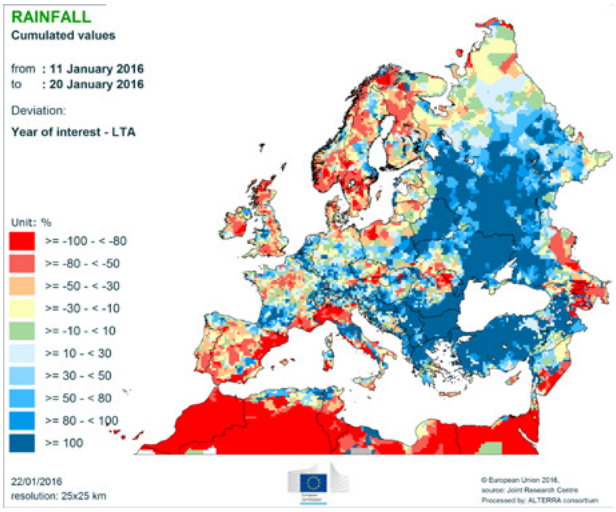

TEMPERATURE SUM
from : 21 December 2015
to : 31 December 2015
Deviation:
Year of interest - LTA
Base temperature: 0
Unit: degree days (Celsius)
< -40
>= -40 - < -30
>= -30 - < -20
>= -20 - < -10
>= -10 - < -5
>= -5 - < 5
>= 5 - < 10
>= 10 - < 20
>= 20 - < 30
>= 30 - < 40
>= 40
21/01/2016
resolution: 25x25 km


RAINFALL
Cumulated values
from : 21 December 2015
to : 31 December 2015
Deviation:
Year of interest - LTA
Unit: %
>= -100 - < -80
>= -80 - < -50
>= -50 - < -30
>= -30 - < -10
>= -10 - < 10
>= 10 - < 30
>= 30 - < 50
>= 50 - < 80
>= 80 - < 100
>= 100
21/01/2016
resolution: 25x25 km


TEMPERATURE SUM
from : 01 January 2016
to : 10 January 2016
Deviation:
Year of interest - LTA
Base temperature: 0
Unit: degree days (Celsius)
< -40
>= -40 - < -30
>= -30 - < -20
>= -20 - < -10
>= -10 - < -5
>= -5 - < 5
>= 5 - < 10
>= 10 - < 20
>= 20 - < 30
>= 30 - < 40
>= 40
21/01/2016
resolution: 25x25 km


RAINFALL
Cumulated values
from : 01 January 2016
to : 10 January 2016
Deviation:
Year of interest - LTA
Unit: %
>= -100 - < -80
>= -80 - < -50
>= -50 - < -30
>= -30 - < -10
>= -10 - < 10
>= 10 - < 30
>= 30 - < 50
>= 50 - < 80
>= 80 - < 100
>= 100
21/01/2016
resolution: 25x25 km


TEMPERATURE SUM
from : 11 January 2016
to : 20 January 2016
Deviation:
Year of interest - LTA
Base temperature: 0
Unit: degree days (Celsius)
< -40
>= -40 - < -30
>= -30 - < -20
>= -20 - < -10
>= -10 - < -5
>= -5 - < 5
>= 5 - < 10
>= 10 - < 20
>= 20 - < 30
>= 30 - < 40
>= 40
22/01/2016
resolution: 25x25 km


RAINFALL
Cumulated values
from : 11 January 2016
to : 20 January 2016
Deviation:
Year of interest - LTA
Unit: %
>= -100 - < -80
>= -80 - < -50
>= -50 - < -30
>= -30 - < -10
>= -10 - < 10
>= 10 - < 30
>= 30 - < 50
>= 50 - < 80
>= 80 - < 100
>= 100
22/01/2016
resolution: 25x25 km

JRC MARS Bulletins 2016

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

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*MARS stands for Monitoring Agricultural Resources

Technical note:
The long-term average (LTA) used within this bulletin as a reference is based on an archive of data covering 1975-2015.

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