



European Commission

JRC MARS Bulletin Vol. 27 No 1

Period covered: 1 December 2018-15 January 2019

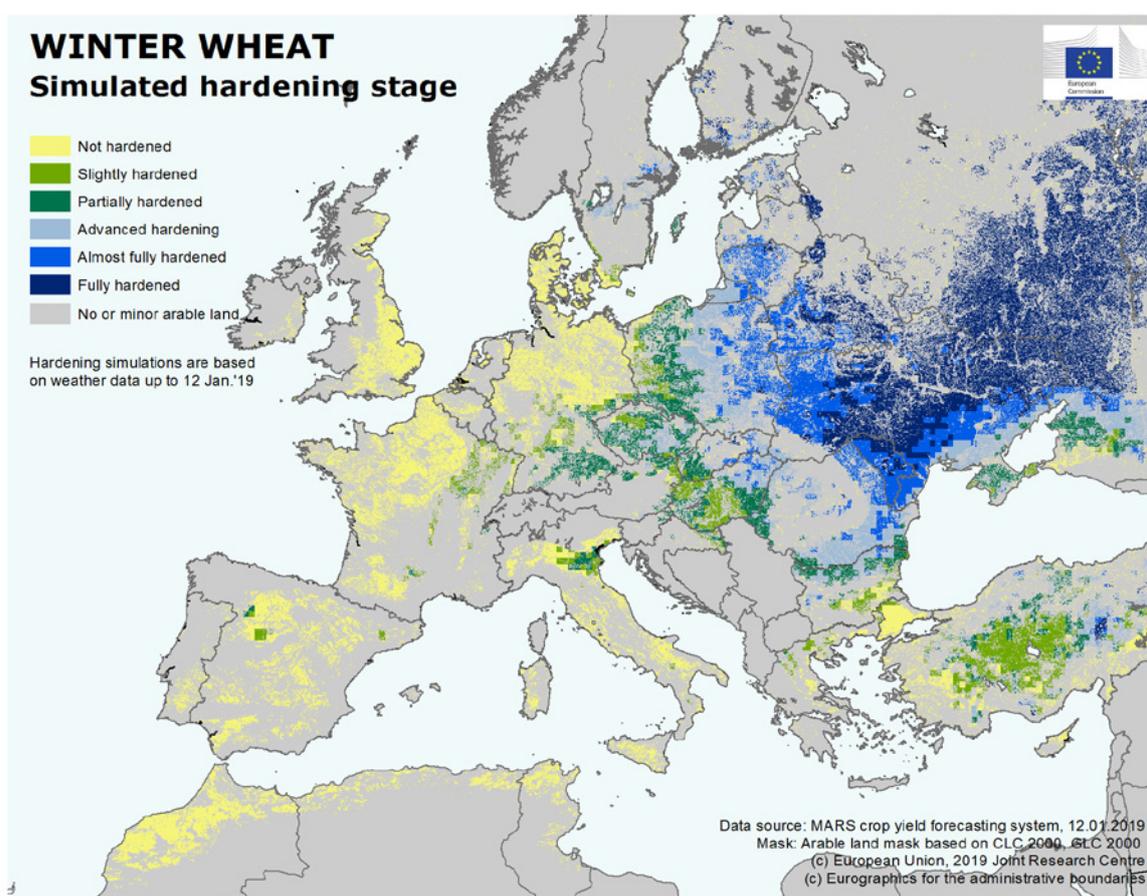
Issued: 21 January 2019

JRC MARS Bulletin Crop monitoring in Europe

January 2019

Continued mild winter

Improved hardening of winter cereals in central and eastern Europe



According to our frost-kill model simulations, winter crops in western and southern Europe have acquired little frost tolerance, due to mild winter temperatures so far.

Meanwhile, in central and eastern Europe, the frost tolerance of winter cereals has increased considerably since mid-December, following the arrival of colder wintry weather

conditions. Since the start of winter, frost damage in the EU has been mostly limited to minor occurrences. In the coming days, frost tolerance of winter cereals is expected to further increase in central, northern and eastern parts of Europe. No further frost-kill damage is expected during the forecast period (until 22 January).

1

Winter hardening and frost-kill analysis

2

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Atlas

1. Winter hardening and frost-kill analysis

According to our latest frost-kill model simulations, the frost tolerance of winter cereals has increased considerably in central and eastern Europe since mid-December, following the arrival of colder wintry weather conditions. A snow blanket, covering the areas east of an imaginary line from the Baltic Sea to the Adriatic Sea, provides winter crops with thermal insulation and protection against harsh frosts. The snow blanket is particularly thick (20-60 cm) in northern Europe, eastern Ukraine and most of Russia (except in southern areas).

Winter cereals in southern and western Europe are generally not hardened ⁽¹⁾. In the Mediterranean region, the northern and western regions of France, the British Isles, northern Germany, Denmark and in the Benelux countries, winter crops have acquired little low-temperature tolerance, due to mild winter temperatures so far. In the absence of snow cover, winter wheat will not be able to withstand frost events with temperatures below – 12 °C in these areas.

Frost tolerance is slight to moderate in a belt between the Baltic and the Adriatic Seas, as well as in eastern France, southern Germany, southern Sweden, southern Bulgaria, the Crimea, some parts of southern Russia and central Turkey.

The hardening of winter cereals is predominantly advanced in central Poland, eastern Slovakia, north-eastern Hungary, most of Romania and some southern parts of Ukraine and Russia close to the Black Sea, but with substantial spatial variation, depending on local conditions.

Winter crops gained almost full low-temperature tolerance in the Baltic countries, eastern Poland, north-eastern Romania, western Belarus and other parts of southern and western Ukraine. Winter crops are fully hardened in eastern Belarus, north-eastern Ukraine and central, northern and eastern parts of European Russia.

SNOW DEPTH

Averaged values

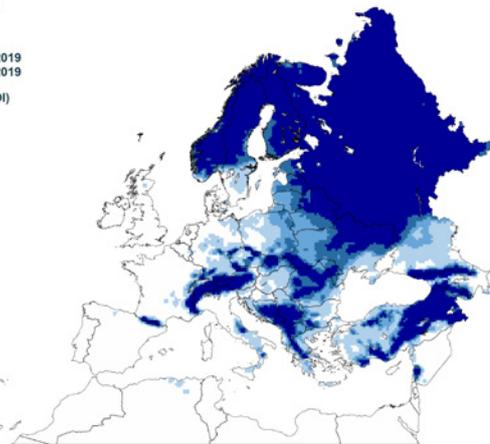
from : 15 January 2019
to : 15 January 2019

Year of interest (YOI)

Unit: cm.d-1

0
> 1 - <= 5
> 5 - <= 10
> 10 - <= 20
> 20

16/01/2019
resolution: 25x25 km



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No significant frost-kill events have occurred since the December 2018 bulletin (mid-December). Since the start of winter, **frost damage in the EU** has been mostly limited to minor occurrences in northern and central Europe (Denmark, Hungary, Poland, Romania and Sweden). Slight frost damage is also likely in the Central and Southern Okrugs of Russia. Moderate (locally considerable) frost-kill damage may have occurred in the Volga Okrug (especially in the western and southern territories) in November.

Taking into consideration the medium-range weather forecast, the frost tolerance of winter cereals is expected to increase in central, northern and eastern parts of Europe where full hardening has not yet been reached. No further frost-kill damage is expected during the forecast period (until 22 January).

⁽¹⁾ Hardening is the biophysiological process whereby the cellular starch of winter cereals is transformed into glucose, thereby raising the freezing point of the cellular liquids and increasing the low-temperature tolerance of the plants.

2. Agrometeorological overview

Meteorological review (1 December 2018-15 January 2019)

Slightly warmer-than-usual conditions prevailed in most of western, central and eastern Europe, the United Kingdom, and most of Turkey, with daily mean temperature anomalies (w.r.t. the LTA) of mainly 0.5 °C to 2 °C. In all these regions — except for eastern Europe and Turkey — daily minimum temperatures remained above – 8 °C throughout the review period. In most parts of eastern Europe and Turkey, minimum temperatures of less than – 8 °C were recorded over 2 days to 8 days (locally more than 10 days).

Substantially warmer-than-usual conditions, with daily mean temperature anomalies ranging from 2 °C to 4 °C (w.r.t. the LTA), prevailed in Ireland, the Netherlands, Denmark, most of Germany and the Scandinavian Peninsula. Aside from in the Scandinavian Peninsula, daily minimum temperatures did not fall below – 8 °C in these regions.

Slightly colder-than-usual conditions occurred in south-eastern Europe, with daily mean temperature anomalies of – 2 °C to – 0.5 °C (w.r.t. the LTA). In most of this region, daily minimum temperatures of below – 8 °C were recorded over 2 days to 5 days (locally more than 10 days).

Drier-than-usual conditions prevailed in the Iberian Peninsula, much of Italy, Slovenia, Croatia and Hungary, where total accumulated precipitation was 50-100 % below the LTA during the analysed period. In all these areas, negative anomalies in the climatic water balance exceeded 80 % w.r.t. the LTA.

Wetter-than-usual conditions occurred in much of central and eastern Europe, Ukraine and Turkey, with total accumulated precipitation (in the form of rain and snow) 50-100 % above the LTA during the period analysed. In all these areas, anomalies in the climatic water balance were distinctly positive (greater than 80 % w.r.t. the LTA).

AVERAGE DAILY TEMPERATURE

Averaged values

from : 01 December 2018
to : 15 January 2019

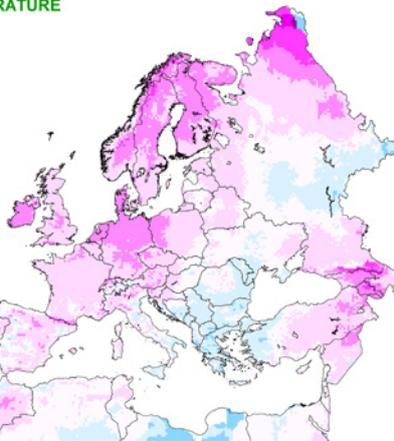
Deviation:

Year of interest - LTA

Unit: degrees Celsius

-6 - -4 (cooler in YOI)
-4 - -2 (cooler in YOI)
-2 - -0.5
-0.5 - 0.5
> 0.5 - 2
2 - 4 (warmer in YOI)
4 - 6 (warmer in YOI)
6 - 8 (warmer in YOI)
> 8 (warmer in YOI)

17/01/2019
resolution: 25x25 km



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Source: Joint Research Centre (JRC COMS 12)
Processed by: Alberta consortium

NUMBER OF COLD DAYS

from : 01 December 2018
to : 15 January 2019

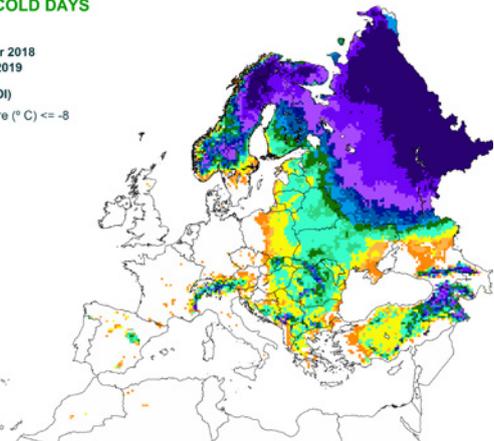
Year of interest (YOI)

Minimum temperature (°C) <= -8

Unit: days

0
1
>1 - <= 2
>2 - <= 5
>5 - <= 8
>8 - <= 10
>10 - <= 13
>13 - <= 15
>15 - <= 18
>18 - <= 20
>20 - <= 25
>25 - <= 30
> 30

17/01/2019
resolution: 25x25 km



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RAINFALL

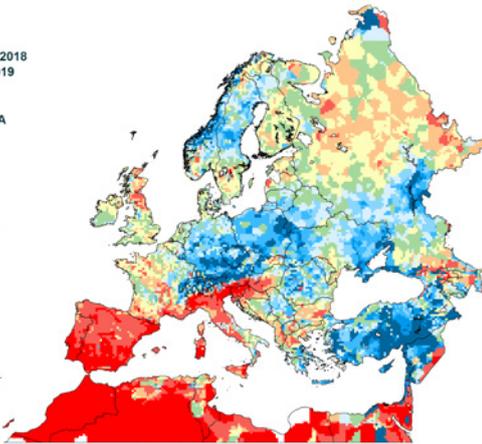
Cumulated values

from : 01 December 2018
to : 15 January 2019

Deviation:

Year of interest - LTA

Unit: %



17/01/2019
resolution: 25x25 km



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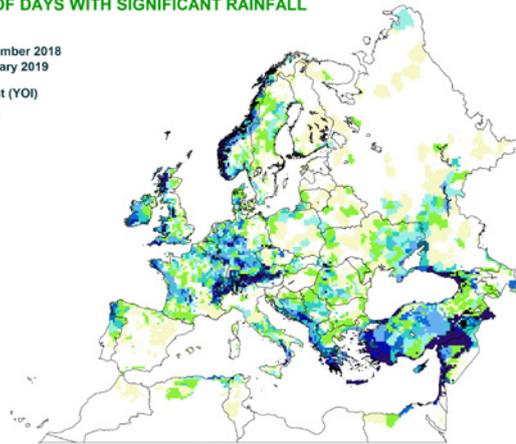
NUMBER OF DAYS WITH SIGNIFICANT RAINFALL

from : 01 December 2018
to : 15 January 2019

Year of interest (YOI)

Rain (mm) > 10

Unit: days



17/01/2019
resolution: 25x25 km



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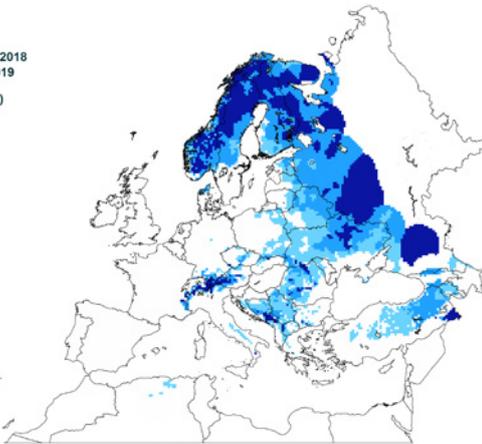
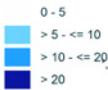
SNOW DEPTH

Averaged values

from : 01 December 2018
to : 15 January 2019

Year of interest (YOI)

Unit: cm



17/01/2019
resolution: 25x25 km



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CLIMATIC WATER BALANCE

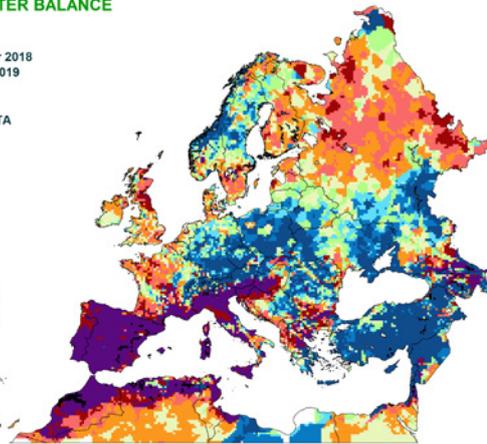
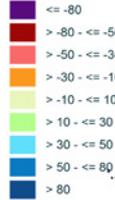
Cumulated values

from : 01 December 2018
to : 15 January 2019

Deviation:

Year of interest - LTA

Unit: %



17/01/2019
resolution: 25x25 km



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3. Atlas

Temperatures

TEMPERATURE SUM

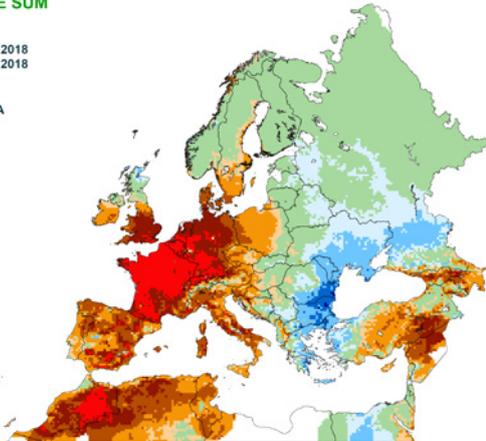
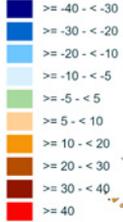
from : 01 December 2018
to : 10 December 2018

Deviation:

Year of interest - LTA

Base temperature: 0

Unit: degrees Celsius



15/01/2019
resolution: 25x25 km



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TEMPERATURE SUM

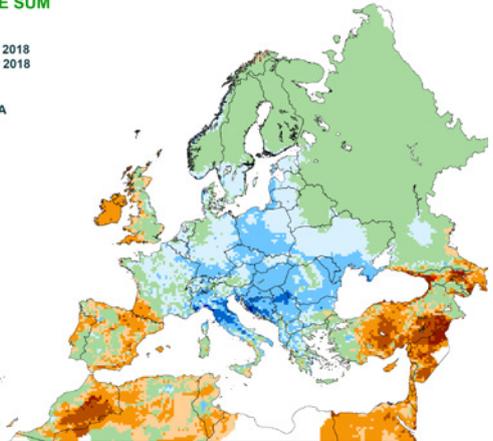
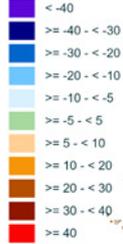
from : 11 December 2018
to : 20 December 2018

Deviation:

Year of interest - LTA

Base temperature: 0

Unit: degrees Celsius



15/01/2019
resolution: 25x25 km



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TEMPERATURE SUM

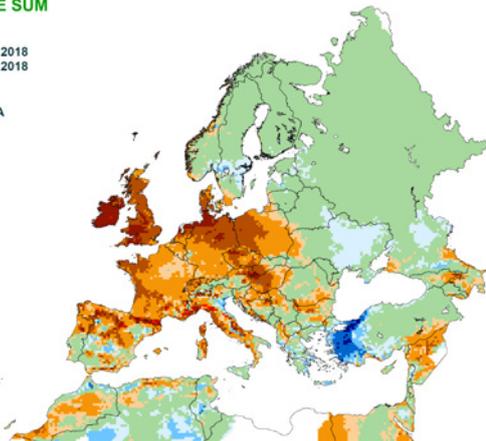
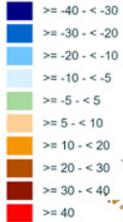
from : 21 December 2018
to : 31 December 2018

Deviation:

Year of interest - LTA

Base temperature: 0

Unit: degrees Celsius



15/01/2019
resolution: 25x25 km



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TEMPERATURE SUM

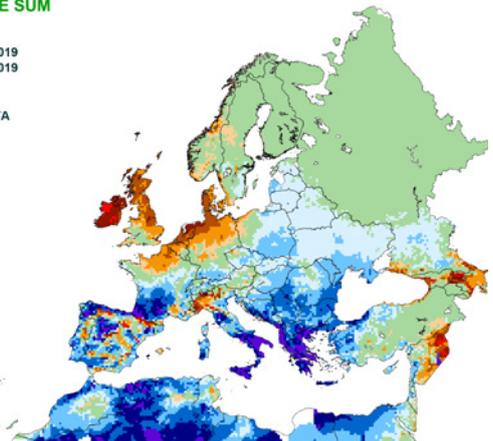
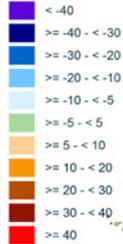
from : 01 January 2019
to : 15 January 2019

Deviation:

Year of interest - LTA

Base temperature: 0

Unit: degrees Celsius



18/01/2019
resolution: 25x25 km



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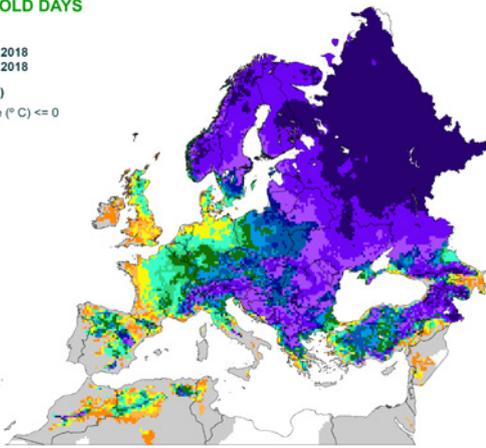
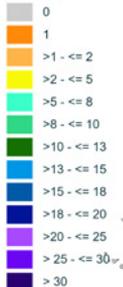
NUMBER OF COLD DAYS

from : 01 December 2018
to : 31 December 2018

Year of interest (YOI)

Minimum temperature (°C) <= 0

Unit: days



15/01/2019
resolution: 25x25 km



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NUMBER OF COLD DAYS

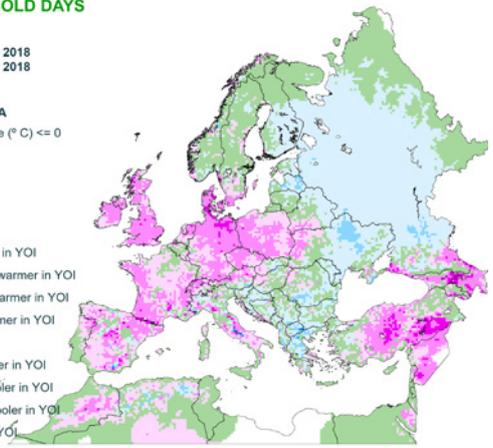
from : 01 December 2018
to : 31 December 2018

Deviation:

Year of interest - LTA

Minimum temperature (°C) <= 0

Unit: days



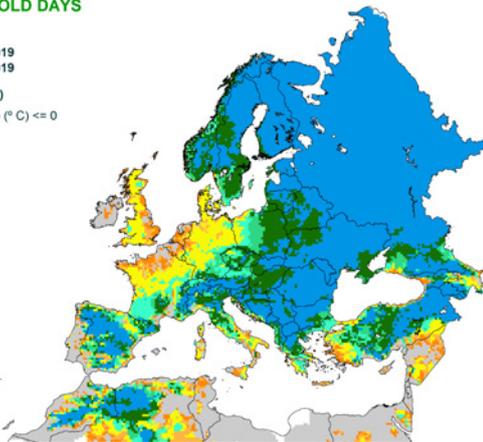
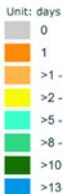
15/01/2019
resolution: 25x25 km



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Processed by: Alterra consortium

NUMBER OF COLD DAYS

from : 01 January 2019
to : 15 January 2019
Year of interest (YOI)
Minimum temperature (°C) <= 0

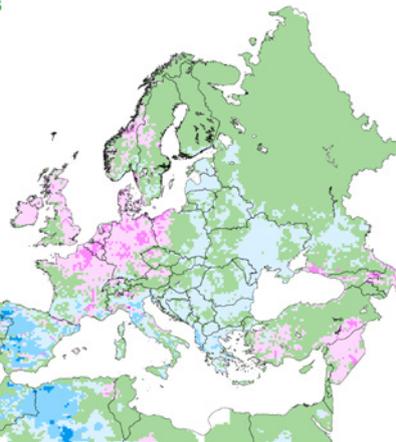


18/01/2019
resolution: 25x25 km

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NUMBER OF COLD DAYS

from : 01 January 2019
to : 15 January 2019
Deviation:
Year of interest - LTA
Minimum temperature (°C) <= 0



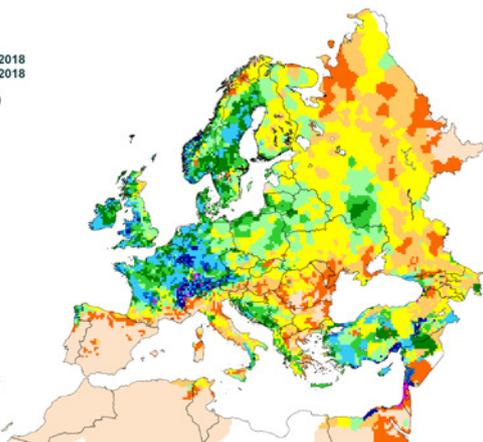
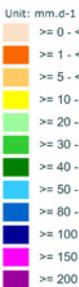
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resolution: 25x25 km

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Precipitation regime

RAINFALL
Cumulated values

from : 01 December 2018
to : 10 December 2018
Year of interest (YOI)

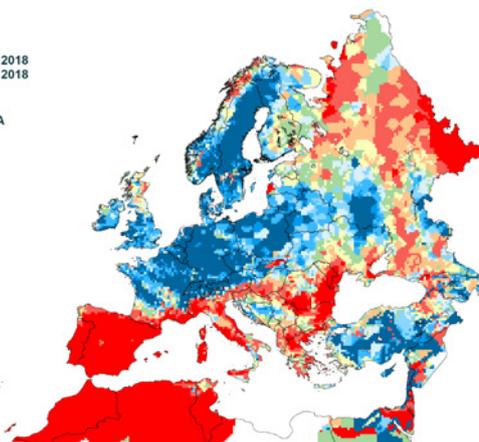
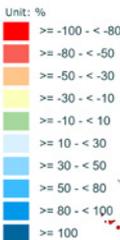


15/01/2019
resolution: 25x25 km

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Processed by: Alterra consortium

RAINFALL
Cumulated values

from : 01 December 2018
to : 10 December 2018
Deviation:
Year of interest - LTA

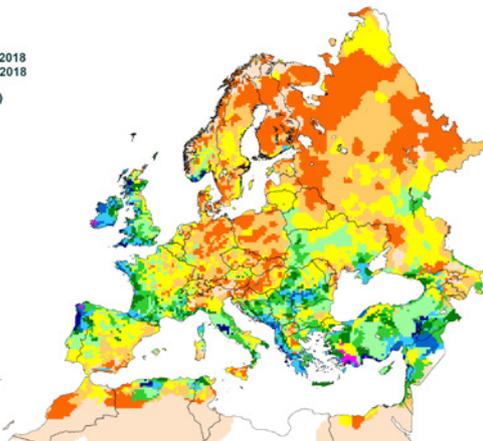


15/01/2019
resolution: 25x25 km

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Processed by: Alterra consortium

RAINFALL
Cumulated values

from : 11 December 2018
to : 20 December 2018
Year of interest (YOI)

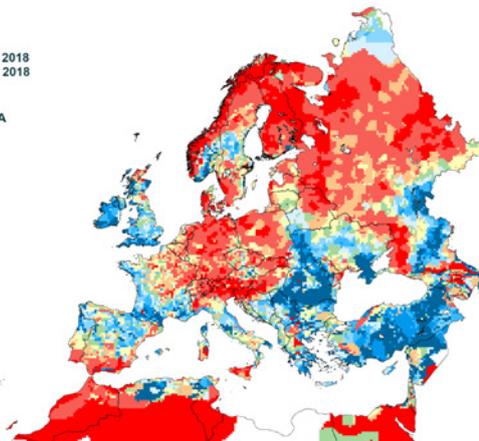
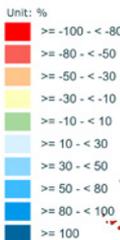


15/01/2019
resolution: 25x25 km

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RAINFALL
Cumulated values

from : 11 December 2018
to : 20 December 2018
Deviation:
Year of interest - LTA



15/01/2019
resolution: 25x25 km

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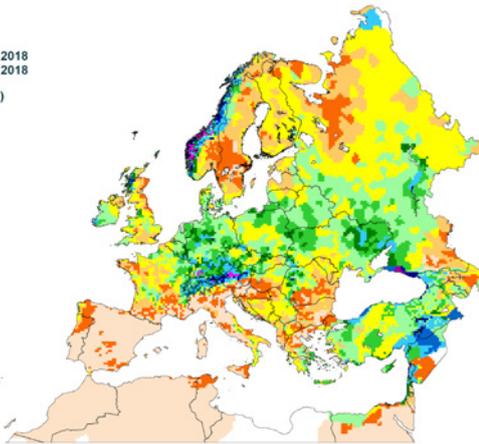
RAINFALL

Cumulated values

from : 21 December 2018
to : 31 December 2018

Year of interest (YOI)

Unit: mm.d-1



15/01/2019
resolution: 25x25 km



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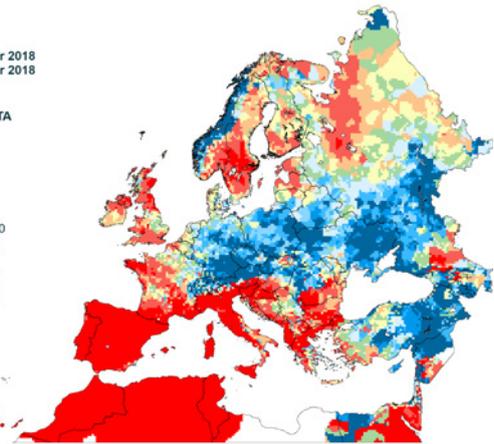
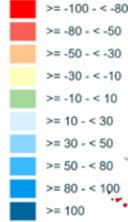
RAINFALL

Cumulated values

from : 21 December 2018
to : 31 December 2018

Deviation:
Year of interest - LTA

Unit: %



15/01/2019
resolution: 25x25 km



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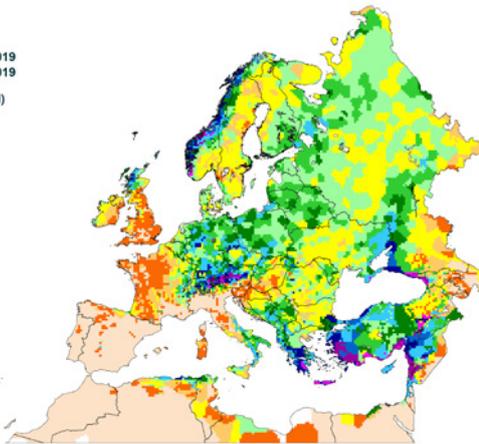
RAINFALL

Cumulated values

from : 01 January 2019
to : 15 January 2019

Year of interest (YOI)

Unit: mm.d-1



18/01/2019
resolution: 25x25 km



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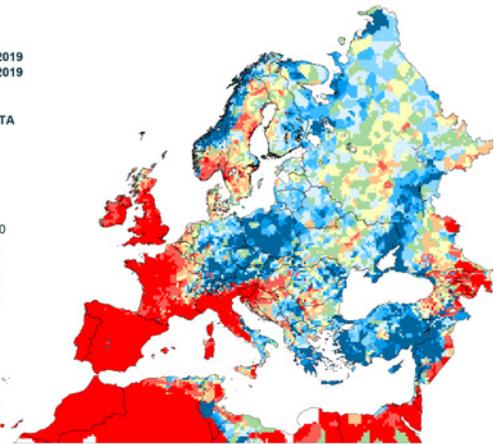
RAINFALL

Cumulated values

from : 01 January 2019
to : 15 January 2019

Deviation:
Year of interest - LTA

Unit: %



18/01/2019
resolution: 25x25 km



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Source: Joint Research Centre (JRC CGMS 12EUN)
Processed by: Alterra consortium

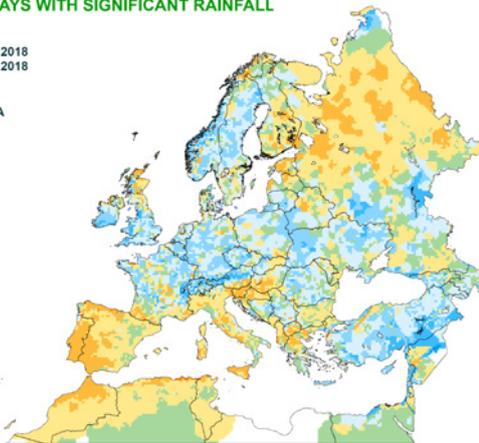
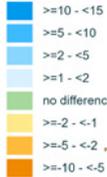
NUMBER OF DAYS WITH SIGNIFICANT RAINFALL

from : 01 December 2018
to : 31 December 2018

Deviation:

Year of interest - LTA
Rain (mm) > 5

Unit: days



15/01/2019
resolution: 25x25 km



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Source: Joint Research Centre (JRC CGMS 12EUN)
Processed by: Alterra consortium

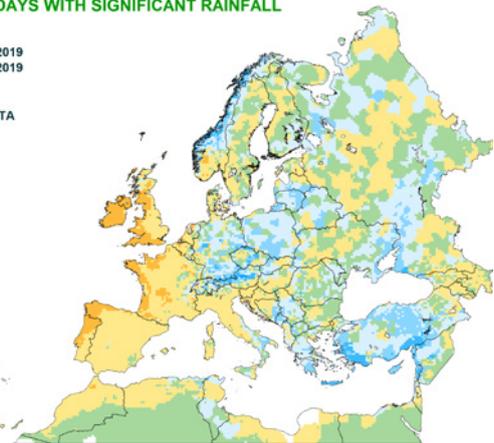
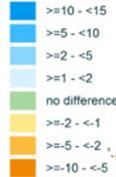
NUMBER OF DAYS WITH SIGNIFICANT RAINFALL

from : 01 January 2019
to : 15 January 2019

Deviation:

Year of interest - LTA
Rain (mm) > 5

Unit: days



18/01/2019
resolution: 25x25 km



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JRC MARS Bulletins 2019

Date	Publication	Reference
21 Jan	Agromet analysis	Vol. 27 No 1
25 Feb	Agromet analysis	Vol. 27 No 2
18 Mar	Agromet analysis, yield forecast	Vol. 27 No 3
15 Apr	Agromet analysis, remote sensing, yield forecast, sowing conditions, pasture analysis	Vol. 27 No 4
20 May	Agromet analysis, remote sensing, yield forecast, sowing update, pasture analysis	Vol. 27 No 5
17 Jun	Agromet analysis, remote sensing, yield forecast, pasture update, rice analysis	Vol. 27 No 6
22 Jul	Agromet analysis, remote sensing, yield forecast, harvesting conditions, pasture update	Vol. 27 No 7
26 Aug	Agromet analysis, remote sensing, yield forecast, pasture update, harvesting update	Vol. 27 No 8
16 Sep	Agromet analysis, remote sensing, yield forecast, rice analysis, harvesting update	Vol. 27 No 9
28 Oct	Agromet analysis, remote sensing, yield forecast, harvesting update, sowing conditions	Vol. 27 No 10
25 Nov	Agromet analysis, harvesting update, sowing update	Vol. 27 No 11
16 Dec	Agromet analysis	Vol. 27 No 12

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Analysis and reports

A. Bussay, I. Cerrani, D. Fumagalli, S. Garcia Condado, A. Toretì, A. Zucchini

Reporting support

G. Mulhern, I. Biavetti

Editors

M. Van den Berg

Data production

MARS4CAST (JRC Unit D5), Wageningen Environmental Research (NL), MeteoGroup (NL) and CMCC (IT)

Contact

JRC D5/MARS4CAST
JRCMARSBULLETIN@ec.europa.eu

*MARS stands for Monitoring Agricultural Resources

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The long-term average (LTA) used within this bulletin as a reference is based on an archive of data covering 1975–2017.

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