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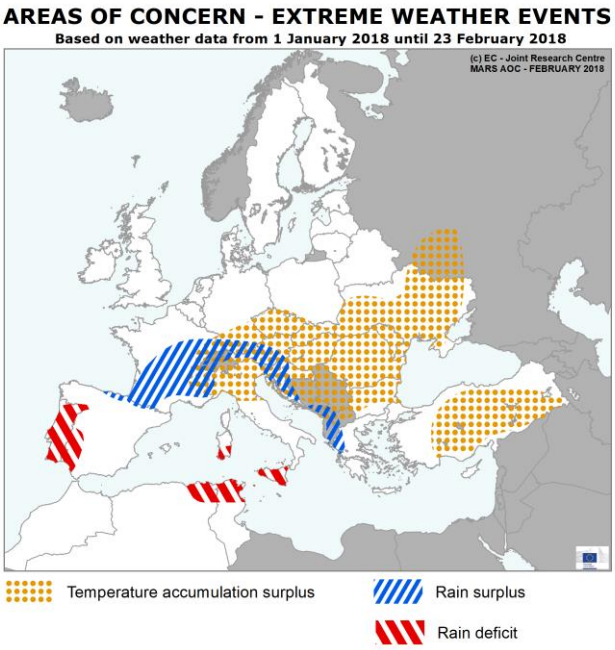
Crop monitoring in Europe
February 2018

Frost tolerance remains weak
Winter conditions so far present no threat to winter crops

The review period was predominantly warmer than usual in most of Europe. The most distinct positive thermal anomalies were experienced in the central, eastern and north-eastern regions of Europe, where (on average, for the period as a whole) daily mean temperatures were 2-7°C higher than the long-term average. Slightly colder-than-usual conditions characterised the British Isles, western Scandinavia, the Iberian Peninsula and the western Maghreb region.

As a consequence of the predominantly mild conditions, the low-temperature acclimatision of winter cereals remains weak in large parts of Europe and is particularly weaker than usual in Hungary, Romania, Bulgaria and the Balkan Peninsula where very mild conditions have prevailed since early December. Thanks to the same mild weather conditions, frost damage has been insignificant so far and no further frost kill losses are expected in the medium term (until the end of February), despite a forecast of colder weather in central and central-eastern Europe in the coming week.

Several parts of Europe recorded a rain deficit. It was most evident in large parts of Portugal, south-eastern Spain, southern Italy and the eastern Maghreb region. Rain would be welcomed in these regions to restore soil water reserves and groundwater as spring approaches. So far, these dry conditions generally do not represent an immediate concern for crops.



In contrast, central and southern France, the eastern Adriatic coast and Ireland experienced more than 250 mm of rainfall within the analysis period, which often corresponds to more than double the average amount in these regions.

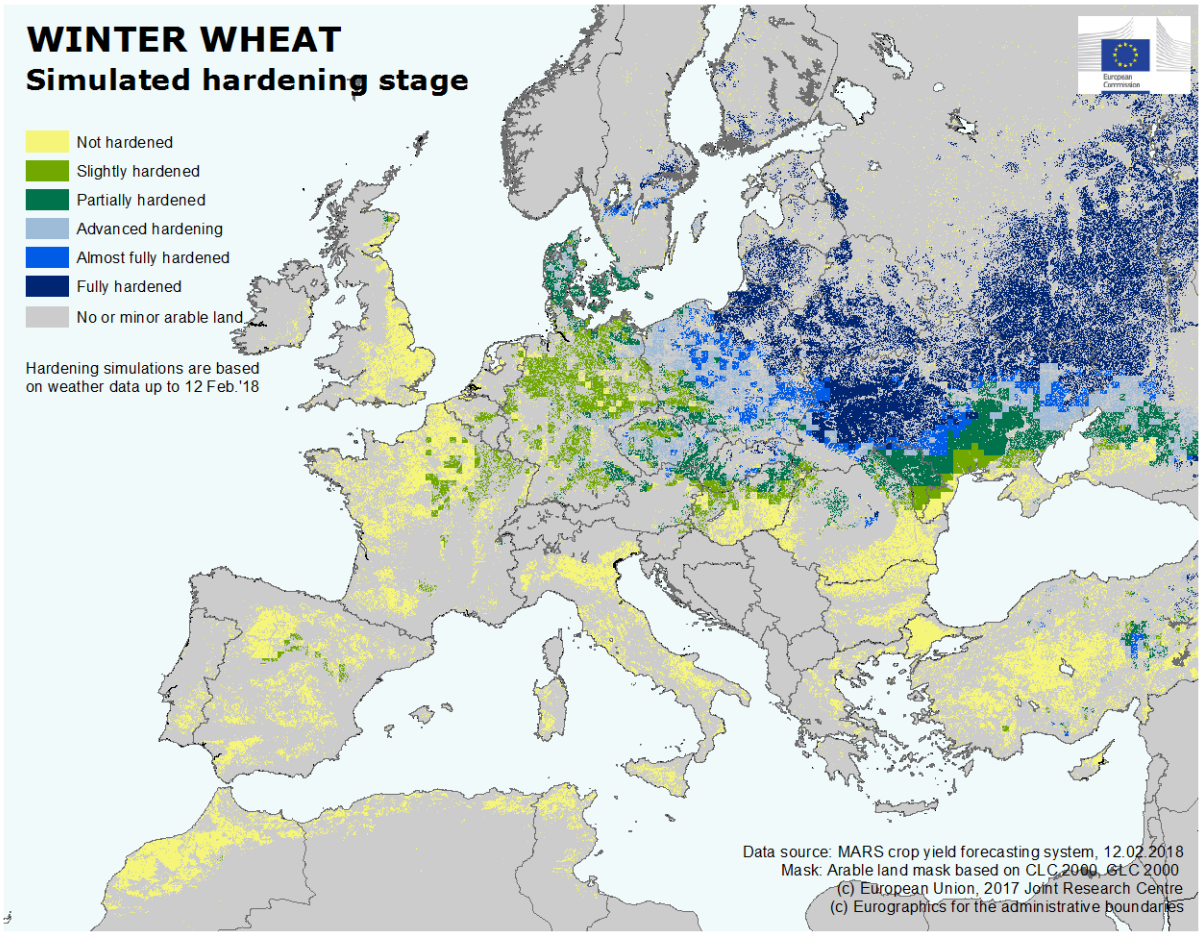
Content:

1. Winter hardening and frost-kill analysis
2. Agro-meteorological overview
3. Update durum wheat
4. Atlas

Covers the period from 1 January to 13 February 2018

Joint Research Centre

1. Winter hardening and frost-kill analysis



Our winter frost kill model simulations indicate that winter wheat is not- or just slightly hardened ([1]), in most of western and southern Europe. In these regions, a severe frost event (T_{min} < -12°C) can cause injuries to crops in the absence of protective snow cover. During the second half of January and early February, low-temperature tolerance strengthened in the region between eastern France and western Russia. Winter wheat is now generally in an advanced or almost fully hardened state in the Czech Republic, eastern Slovakia, western Poland and central Ukraine, but remains only slightly or partially hardened to the west and south of these areas, as well as in the coastal regions of Denmark and southern Sweden. In particular, hardening of winter cereals is considerably weaker than usual in Hungary, Romania, Bulgaria and the Balkan Peninsula because of the very mild weather conditions that have dominated since early December. Full hardening has been reached and is maintained in Finland, the Baltic countries, eastern Poland, Belarus, northern Ukraine, the cold inland regions of eastern Turkey and most of Russia, except its milder south-western regions.

Our frost kill model suggests only slight and localised frost kill damage so far in southern Ukraine and Russia. Taking into consideration the medium-range weather forecast, no further frost kill losses are expected until late February.

([1]) Hardening is a bio-physiological process in winter cereals that occurs when, in response to cold conditions, crops transform cellular starch to sugar thus gaining low-temperature tolerance to survive harsh winter conditions.

2. Agrometeorological overview

Meteorological review (1 January to 13 February 2018)

The review period **was predominantly warmer than usual** in most of Europe. The most distinct positive thermal anomalies were experienced in the central, eastern and north-eastern regions of Europe, where (on average, for the period as a whole) daily mean temperatures were 2-7°C higher than the long-term average, making the current review period one of **the mildest in our 43 years of meteorological records** in Hungary, Romania, Bulgaria, Serbia, the western Balkan countries and Turkey. In contrast, near-normal thermal conditions characterised the British Isles, Sweden, Norway, the Iberian Peninsula, Sicily, southern Greece, the Maghreb region and parts of Russia close to the Caspian Sea.

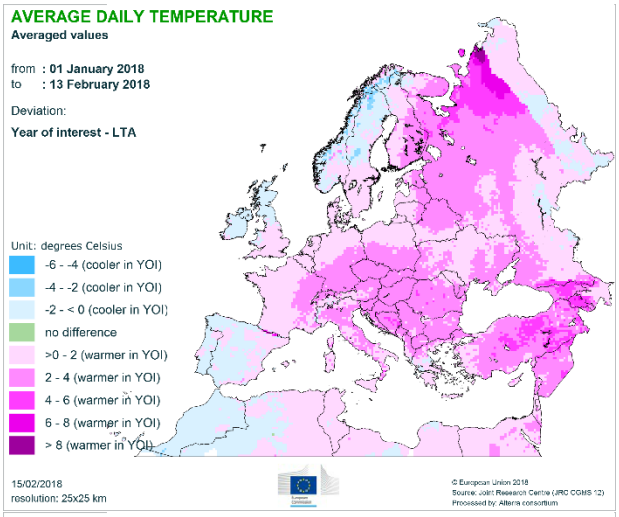
The **number of cold days** (T_{min} < 0°C) was 5-20 days fewer than usual in central and south-eastern Europe, in a wide region between the North Sea and the Caspian Sea. During the most severe frost events, minimum temperatures did not decrease below -10°C in western and southern Europe, whereas in eastern and northern Europe values between -15°C and -30°C were measured during the coldest nights.

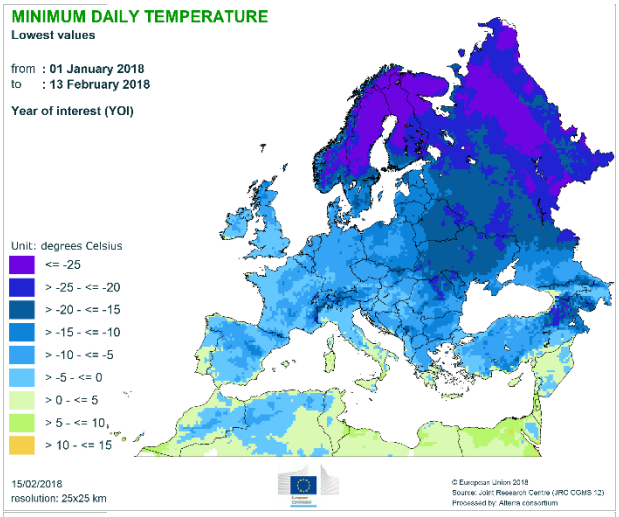
Considerably **wetter-than-usual conditions** prevailed in Ireland, along the western coast of the UK, and in southern Scandinavia, France, north-eastern Spain, the Alpine region, the Balkan region, parts of Romania, Ukraine and European Russia, and northern Morocco. Precipitation surplus (compared with the seasonal average) reached or exceeded 50 mm along the western coastline of the British Isles, in southern Norway, France, northern Spain, the Alpine region and southern Germany, along the eastern coastline of the Adriatic Sea and in some parts of Morocco.

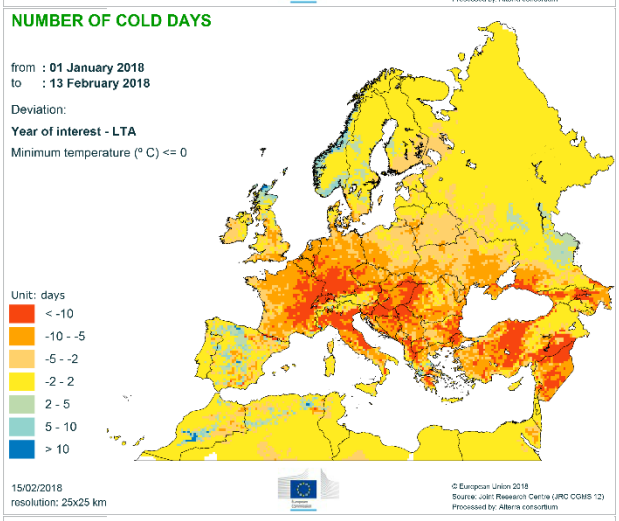
In early February, **intensive precipitation events** with daily rainfall exceeding 100 mm occurred in southern Albania and along the western coast of Greece. Heavy snowfall occurred in the Western Alps close to the French-Italian border in early January, resulting in very deep snow cover in several places.

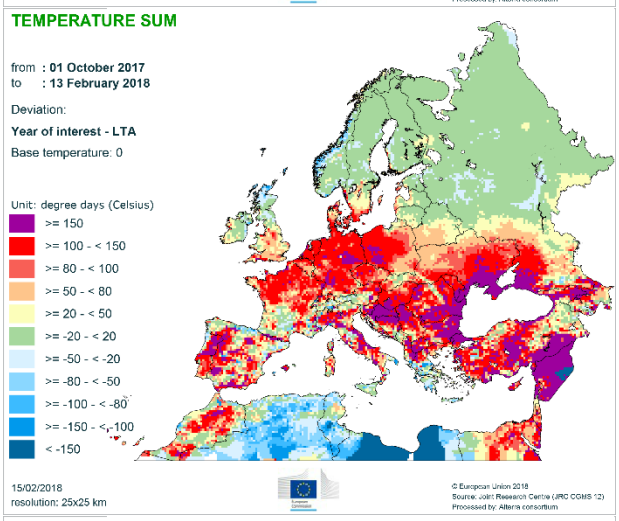
Drier-than-usual conditions occurred in Portugal and western Spain, most of Italy, Poland, the northern half of Scandinavia, south-eastern Russia, western and south-eastern Turkey and the eastern half of the Maghreb region. These areas typically recorded less than 50 mm of precipitation since the beginning of the year. The precipitation deficit is most distinct in Portugal, south-eastern Spain, southern Italy and the eastern Maghreb region. In fact, large part of the Iberian Peninsula, the Maghreb, south-eastern France, Italy, some regions of Turkey, south-eastern Ukraine and southern Russia present a substantially negative climatic water balance anomaly since the beginning of autumn

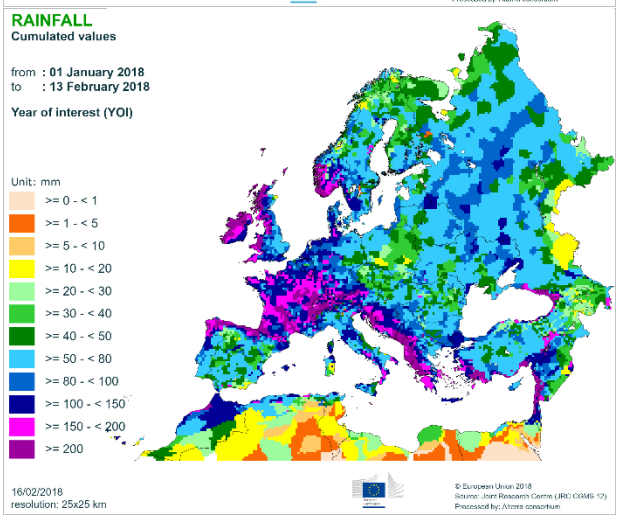
In the first dekad of January, **snow cover** was present in most of Scandinavia, eastern Europe and the mountainous areas of other parts in Europe. After mid-January, snowfall started in large areas, forming snow cover in central Europe and increasing the snow depth in northern and eastern Europe. In late January, the snow cover disappeared/melted in central Europe, but in the first half of February, a new snow blanket was formed in many parts of western and central Europe, including large areas from France to Poland, Romania and Bulgaria.

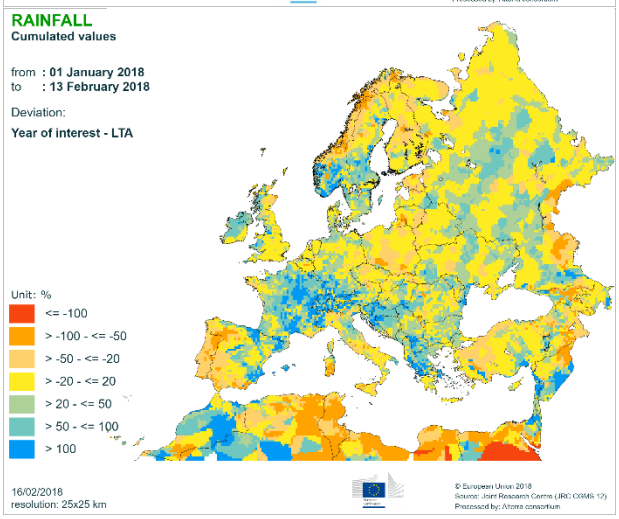

AVERAGE DAILY TEMPERATURE
Averaged values
from : 01 January 2018
to : 13 February 2018
Deviation:
Year of interest - LTA
Unit: degrees Celsius
-6 - -4 (cooler in YOI)
-4 - -2 (cooler in YOI)
-2 - < 0 (cooler in YOI)
no difference
>0 - 2 (warmer in YOI)
2 - 4 (warmer in YOI)
4 - 6 (warmer in YOI)
6 - 8 (warmer in YOI)
> 8 (warmer in YOI)
15/02/2018
resolution: 25x25 km
© European Union 2018
Source: Joint Research Centre (JRC CGMS '12)
Processed by: Altera consortium

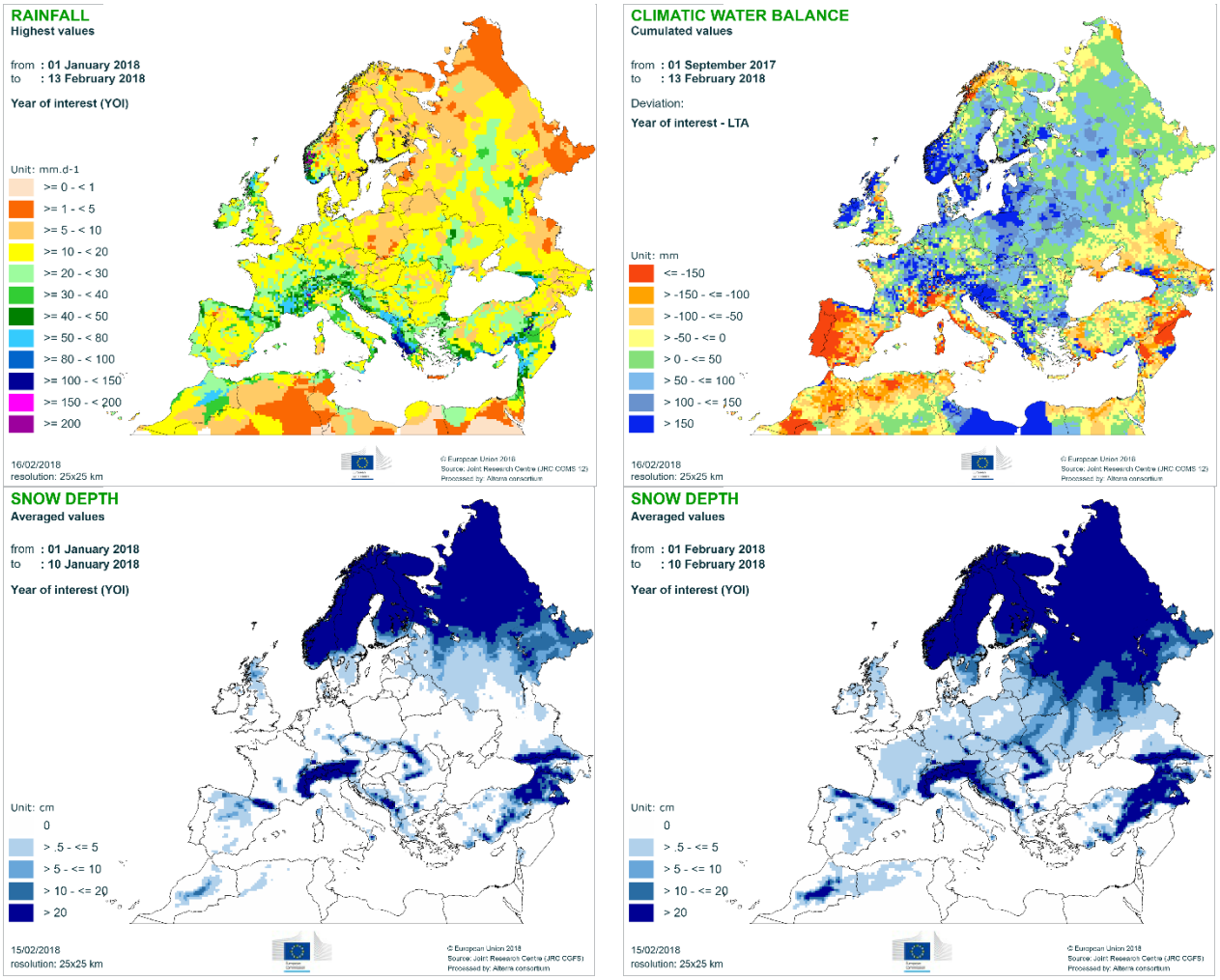

MINIMUM DAILY TEMPERATURE
Lowest values
from : 01 January 2018
to : 13 February 2018
Year of interest (YOI)
Unit: degrees Celsius
<= -25
> -25 - <= -20
> -20 - <= -15
> -15 - <= -10
> -10 - <= -5
> -5 - <= 0
> 0 - <= 5
> 5 - <= 10
> 10 - <= 15
15/02/2018
resolution: 25x25 km
© European Union 2018
Source: Joint Research Centre (JRC CGMS '12)
Processed by: Altera consortium


NUMBER OF COLD DAYS
from : 01 January 2018
to : 13 February 2018
Deviation:
Year of interest - LTA
Minimum temperature (° C) <= 0
Unit: days
< -10
-10 - -5
-5 - -2
-2 - 2
2 - 5
5 - 10
> 10
15/02/2018
resolution: 25x25 km
© European Union 2018
Source: Joint Research Centre (JRC CGMS '12)
Processed by: Altera consortium


TEMPERATURE SUM
from : 01 October 2017
to : 13 February 2018
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
15/02/2018
resolution: 25x25 km
© European Union 2018
Source: Joint Research Centre (JRC CGMS '12)
Processed by: Altera consortium


RAINFALL
Cumulated values
from : 01 January 2018
to : 13 February 2018
Year of interest (YOI)
Unit: mm
>= 0 - < 1
>= 1 - < 5
>= 5 - < 10
>= 10 - < 20
>= 20 - < 30
>= 30 - < 40
>= 40 - < 50
>= 50 - < 80
>= 80 - < 100
>= 100 - < 150
>= 150 - < 200
>= 200
16/02/2018
resolution: 25x25 km
© European Union 2018
Source: Joint Research Centre (JRC CGMS '12)
Processed by: Altera consortium


RAINFALL
Cumulated values
from : 01 January 2018
to : 13 February 2018
Deviation:
Year of interest - LTA
Unit: %
<= -100
> -100 - <= -50
> -50 - <= -20
> -20 - <= 20
> 20 - <= 50
> 50 - <= 100
> 100
16/02/2018
resolution: 25x25 km
© European Union 2018
Source: Joint Research Centre (JRC CGMS '12)
Processed by: Altera consortium



Weather forecast (16–24 February 2018)

A The atmospheric circulation during the forecast period will favour the inflow of polar air in central and south-eastern Europe, leading to colder-than-usual weather. Cyclonic perturbation will affect weather in the eastern Mediterranean and central and southern Balkans after 19 February, bringing abundant rainfall to Greece and the Mediterranean coast of Turkey.

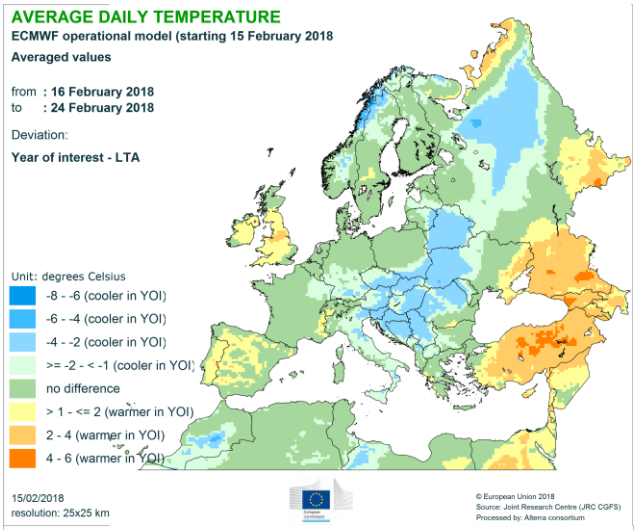
Warmer-than-usual weather conditions will be observed in Turkey, the southern part of European Russia, the Iberian Peninsula and the British Isles. Daily mean temperatures in the eastern Black Sea region will be 2-6°C above the long-term average, whereas the other areas affected by warm-weather anomaly will experience temperatures up to 2°C above the long-term average.

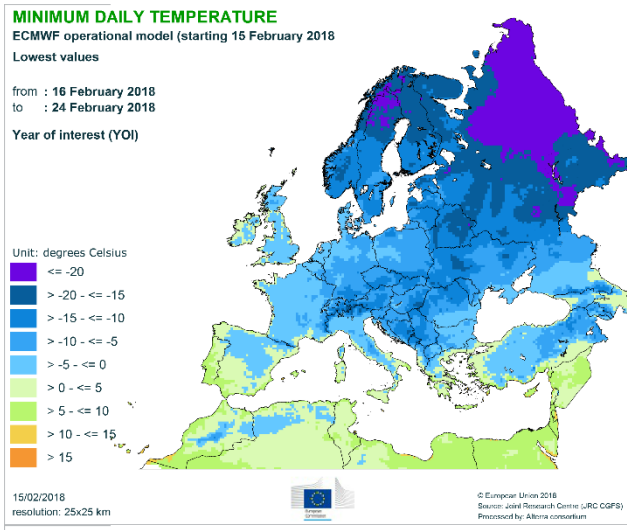
Colder-than-usual weather conditions are expected in central-eastern, central and north-eastern Europe. Daily mean temperatures in these regions will mainly be between 2°C and 4°C below the long-term average. Large parts of central and central-eastern Europe will experience minimum temperatures between -10°C and -5°C; regionally, the minimum air temperatures in these regions can drop below -10°C. Minimum temperatures in northern Scandinavia and north-eastern Europe will drop below -15°C. In the rest of Europe, with exception of the Mediterranean areas, minimum temperatures can drop below 0°C but will remain above -5°C.

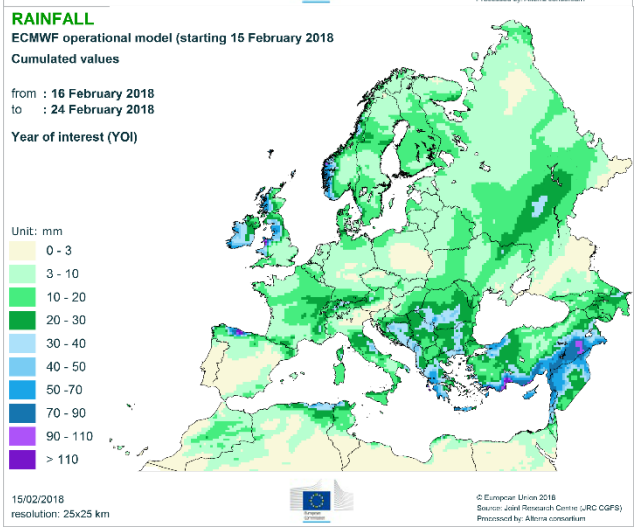
Dry conditions are expected in Portugal and central Spain, north-eastern Italy, central Poland and the north-eastern Black Sea region.

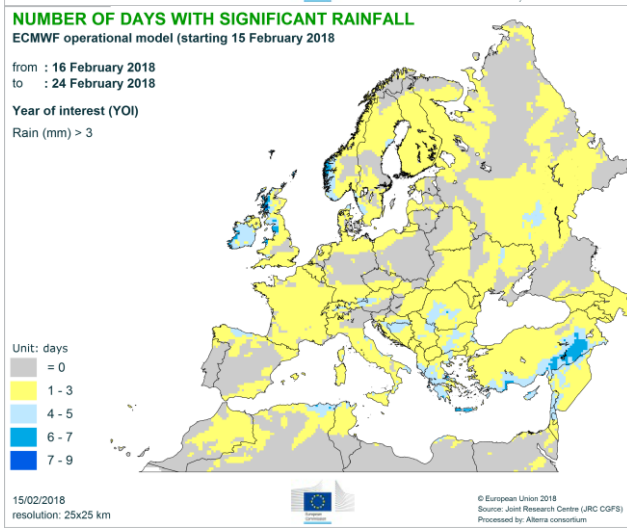
Precipitation of more than 40 mm is forecast in Greece and the Mediterranean coastal part of Turkey, regionally over orographic barriers in south-eastern Europe, and in the western parts of the British Isles.

The long-range weather forecast for the next three months (March-April-May) points to very likely warmer-than-usual conditions in eastern Mediterranean regions.









3. Durum wheat update

Conditions close to the average

Overall, durum wheat crops have made a normal start to the season.

Concerning the main producing regions, in Italy, conditions have generally been favourable in *Puglia* and *Marche*, two of Italy's most important regions for durum wheat. Temperature accumulation (base temperature 0°C) since the beginning of November (sowing period) is above the long-term average (LTA) mainly thanks to the warmer-than-usual conditions in January. Rainfall was abundant around sowing time and sparse during winter, leading to overall close-to-average cumulates in *Puglia* and above-average cumulates in *Marche*. Satellite-based indicators (fAPAR) suggest slightly higher-than-usual vegetation development in these regions. In contrast, in *Sicilia*, rainfall has been substantially below the LTA, and the fAPAR indicator suggests slightly lower-than-usual vegetation development. The situation is not yet critical as precipitation around the sowing period provided a good start to the season.

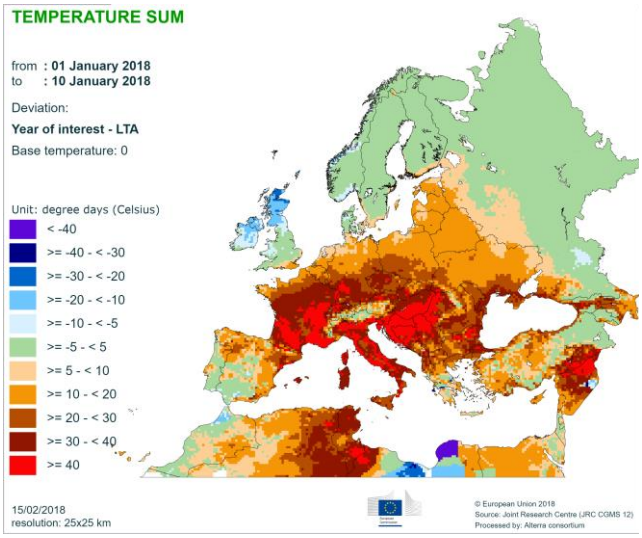
In France, favourable conditions observed in autumn after sowing and emergence are still prevalent. The above-average temperatures and substantial rain surplus recorded since December may have increased the disease pressure, but the below-average temperatures and dry weather observed in autumn strongly limited the spread of inoculum.

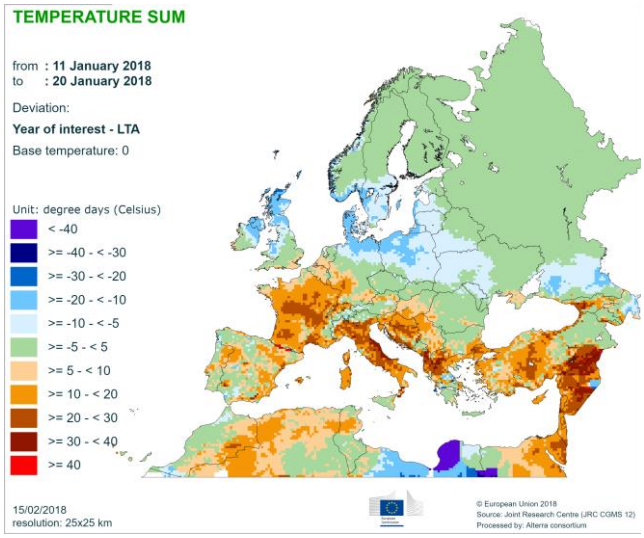
In Spain, where the sowing period extends from the second half of November to the first half of December, rainfall in January has favoured the emergence of durum wheat and no significant growth anomaly has so far been observed in the main producing regions. The crop is currently in the tillering phase and conditions are close to average.

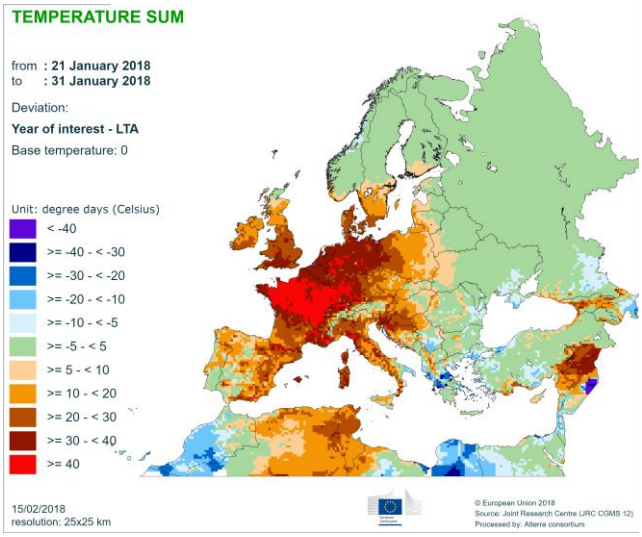
In Greece, winter weather conditions have been wetter than usual in most regions. Temperature presents warm anomalies in northern regions and slightly cold ones in central Greece. Such conditions will support a generally good re-start of vegetative growth, usually expected around the end of February.

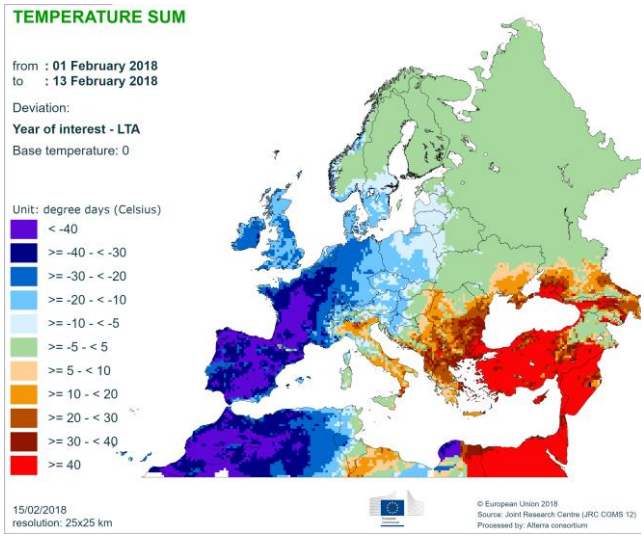
4. Atlas

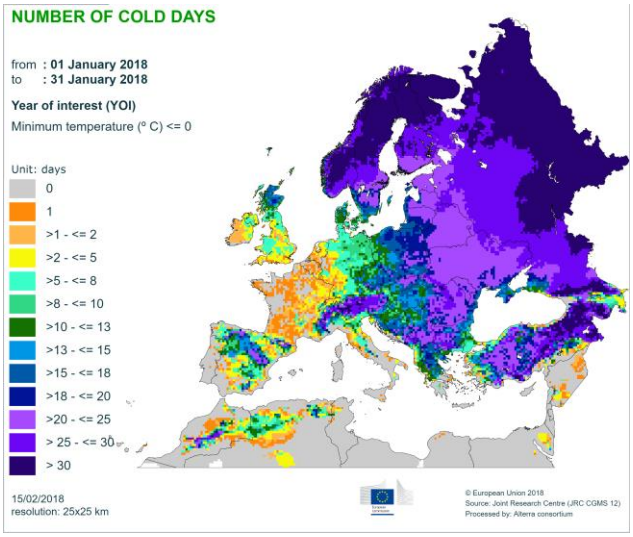
Temperature regime

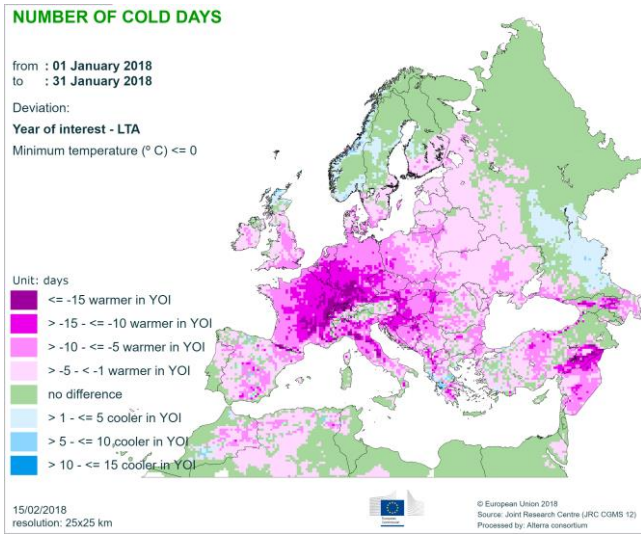


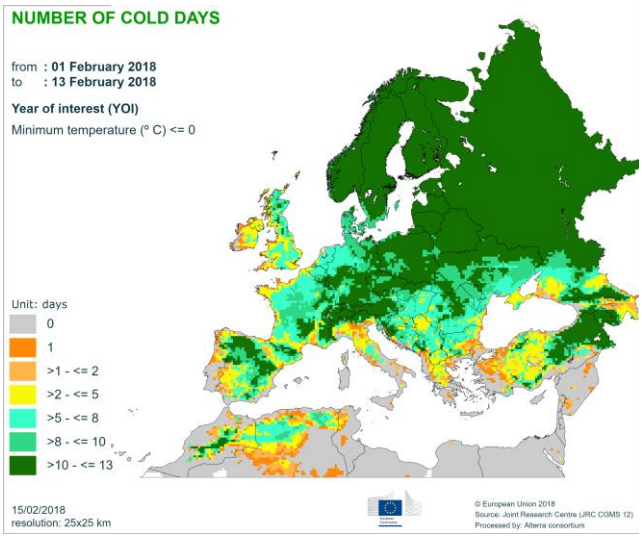


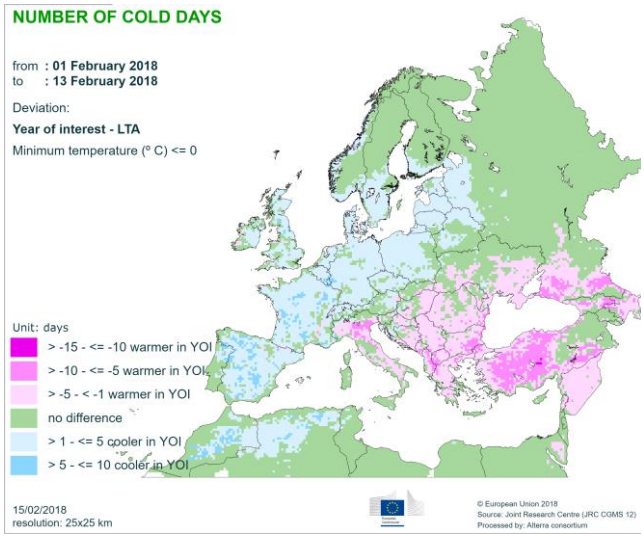




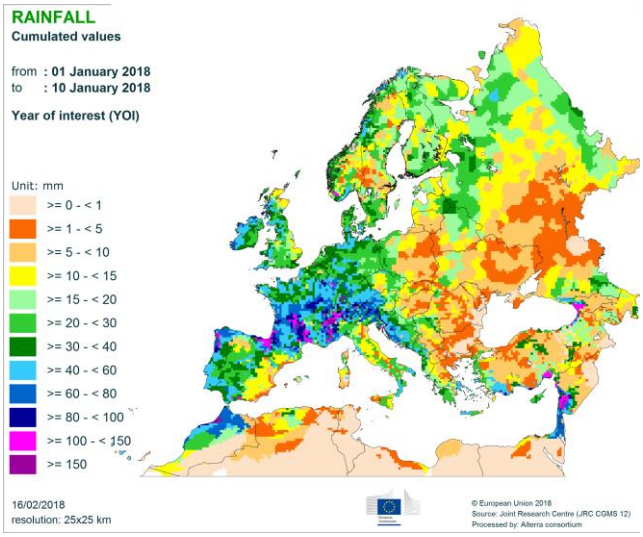


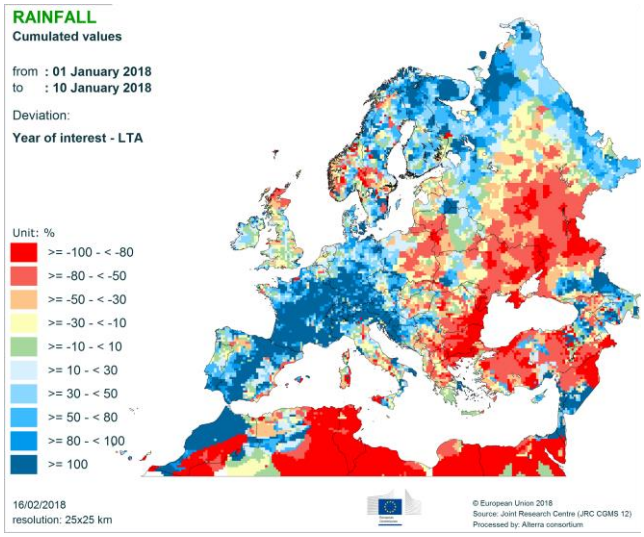


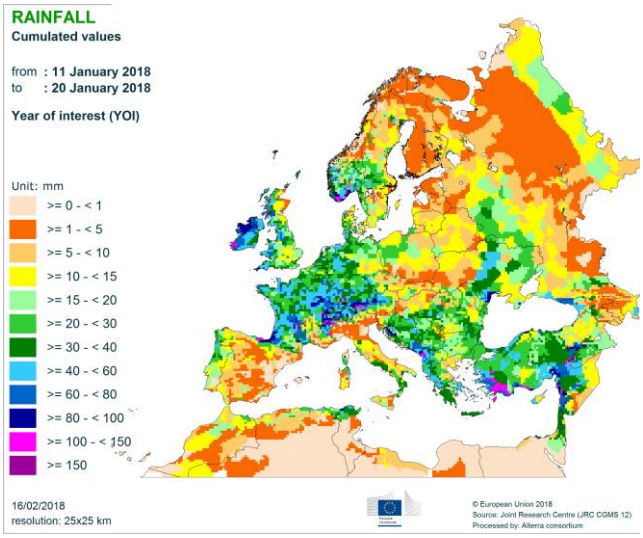


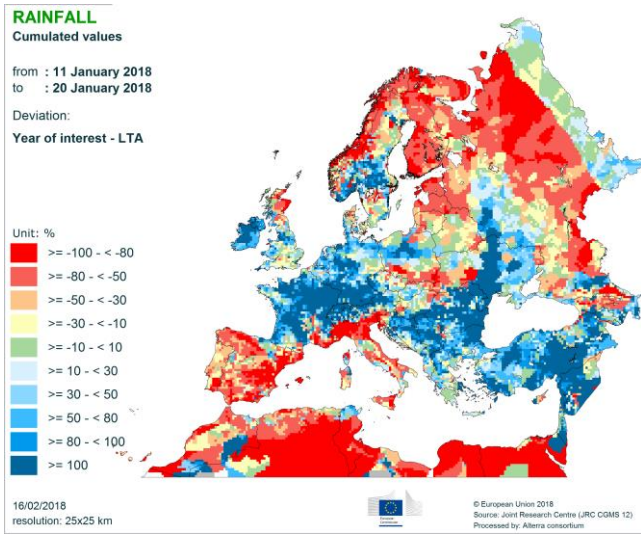


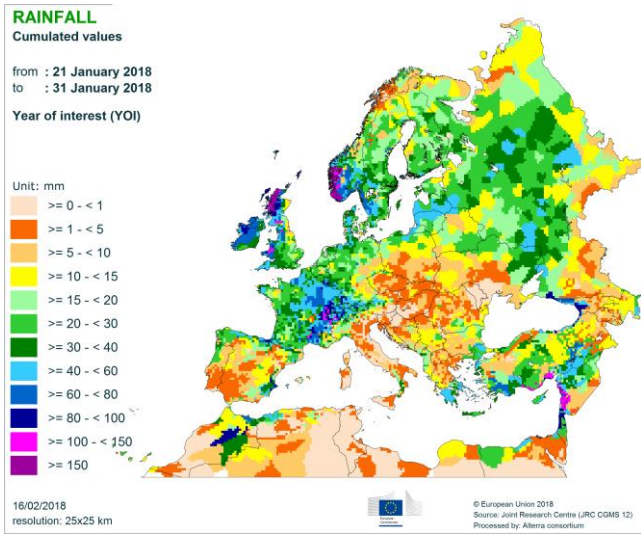
Precipitation regime










RAINFALL
Cumulated values
from : 21 January 2018
to : 31 January 2018
Year of interest (YOI)
Unit: mm
>= 0 - < 1
>= 1 - < 5
>= 5 - < 10
>= 10 - < 15
>= 15 - < 20
>= 20 - < 30
>= 30 - < 40
>= 40 - < 60
>= 60 - < 80
>= 80 - < 100
>= 100 - < 150
>= 150
16/02/2018
resolution: 25x25 km
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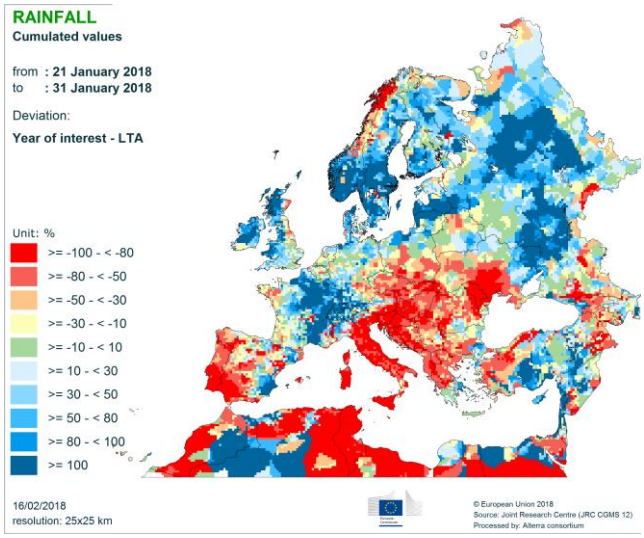
Source: Joint Research Centre (JRC CGMS 12)
Processed by: Alterra consortium


RAINFALL
Cumulated values
from : 21 January 2018
to : 31 January 2018
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
16/02/2018
resolution: 25x25 km
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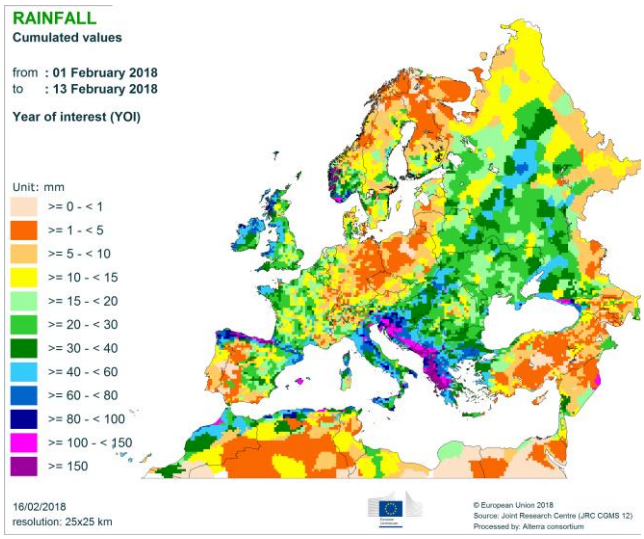
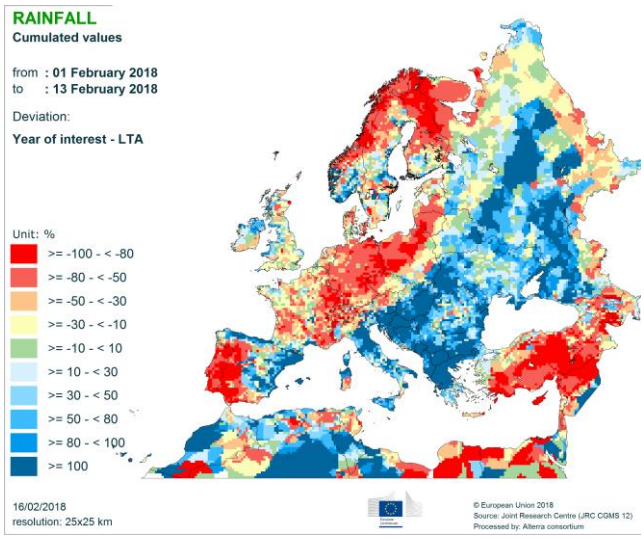
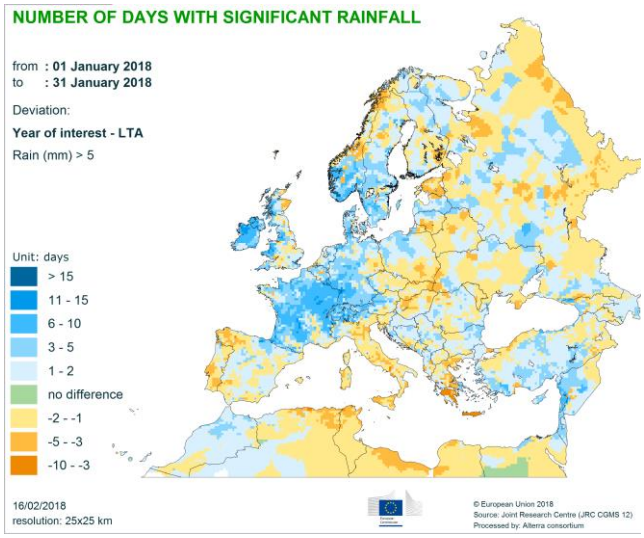
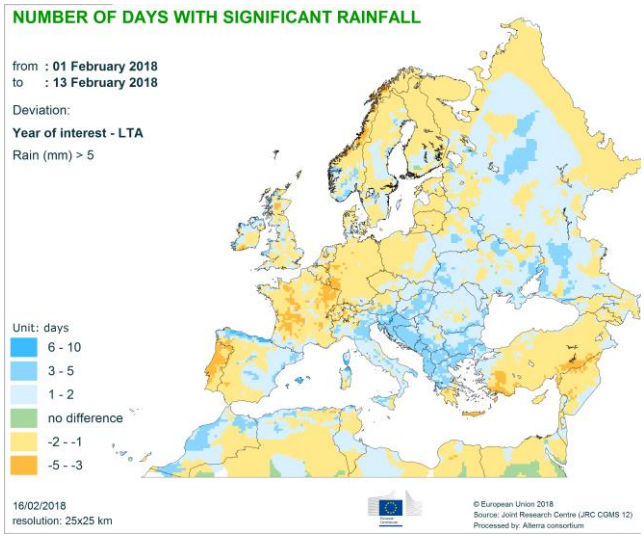
Source: Joint Research Centre (JRC CGMS 12)
Processed by: Alterra consortium


RAINFALL
Cumulated values
from : 01 February 2018
to : 13 February 2018
Year of interest (YOI)
Unit: mm
>= 0 - < 1
>= 1 - < 5
>= 5 - < 10
>= 10 - < 15
>= 15 - < 20
>= 20 - < 30
>= 30 - < 40
>= 40 - < 60
>= 60 - < 80
>= 80 - < 100
>= 100 - < 150
>= 150
16/02/2018
resolution: 25x25 km
© European Union 2018
Source: Joint Research Centre (JRC CGMS 12)
Processed by: Alterra consortium


RAINFALL
Cumulated values
from : 01 February 2018
to : 13 February 2018
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
16/02/2018
resolution: 25x25 km
© European Union 2018
Source: Joint Research Centre (JRC CGMS 12)
Processed by: Alterra consortium


NUMBER OF DAYS WITH SIGNIFICANT RAINFALL
from : 01 January 2018
to : 31 January 2018
Deviation:
Year of interest - LTA
Rain (mm) > 5
Unit: days
> 15
11 - 15
6 - 10
3 - 5
1 - 2
no difference
-2 - -1
-5 - -3
-10 - -3
16/02/2018
resolution: 25x25 km
© European Union 2018
Source: Joint Research Centre (JRC CGMS 12)
Processed by: Alterra consortium


NUMBER OF DAYS WITH SIGNIFICANT RAINFALL
from : 01 February 2018
to : 13 February 2018
Deviation:
Year of interest - LTA
Rain (mm) > 5
Unit: days
6 - 10
3 - 5
1 - 2
no difference
-2 - -1
-5 - -3
16/02/2018
resolution: 25x25 km
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Source: Joint Research Centre (JRC CGMS 12)
Processed by: Alterra consortium

JRC MARS Bulletins 2018

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

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MARS stands for Monitoring Agricultural Resources

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Technical note:

The long-term average (LTA) used within this Bulletin as a reference is based on an archive of data covering 1975-2016.