European Commission

JRC MARS Bulletin Vol. 28 No 1

Period covered: 1 December 2019 until 20 January 2020
Issued: 27 January 2020

JRC MARS Bulletin
Crop monitoring in Europe
January 2020

Mild winter conditions as in 2018 and 2019

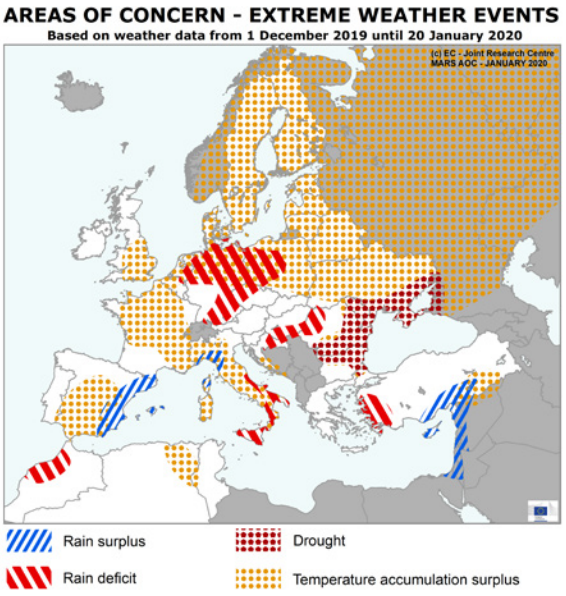
Hardening of winter cereals particularly weak in Germany and northern Europe

Overall, the 1 December to 20 January period was warmer than usual throughout Europe. The most marked anomalies occurred in large parts of France and northern-central and eastern Europe, where this 1 December to 20 January period was one of the warmest in our records. In southern regions, December was very mild but January temperatures have so far been close to average.

It is still too early to assess the impacts of the unusually mild winter conditions on crop yield potentials.

One positive effect of the mild first half of winter is that late-sown winter cereal crops had more time to establish. Moreover, there have been no significant occurrences so far of frost damage to winter crops in the EU. However, there are also negative effects. Primarily, frost tolerance (usually referred to as winter hardening) is weakly developed. Compared to an average year, the hardening of winter crops remains particularly poor in southern Sweden, Germany, Poland, the Baltic countries, Belarus, the north-western part of European Russia and western Ukraine. This means that in these regions, crops are particularly vulnerable to frost damage in the event of a cold air intrusion, although such an event is not expected within the current weather forecast period (until 31 January). Another drawback is that pest and disease pressure can be expected to be higher than usual following a mild winter.

In addition, several parts of Europe experienced much drier-than-usual conditions: this includes the persistent lack of precipitation in southern Italy (in the most important regions for durum wheat); large parts of Germany, western Poland and western Czechia, large parts of the Balkan region, Bulgaria, Romania, central and western Ukraine, western Turkey and western Morocco. In several of these regions, dry conditions have prevailed since autumn. During winter, these conditions mainly affect soil moisture and ground water replenishment, rather than having a direct impact on crops.



The overall balance of positive and negative effects will depend on how the remaining part of the winter evolves.

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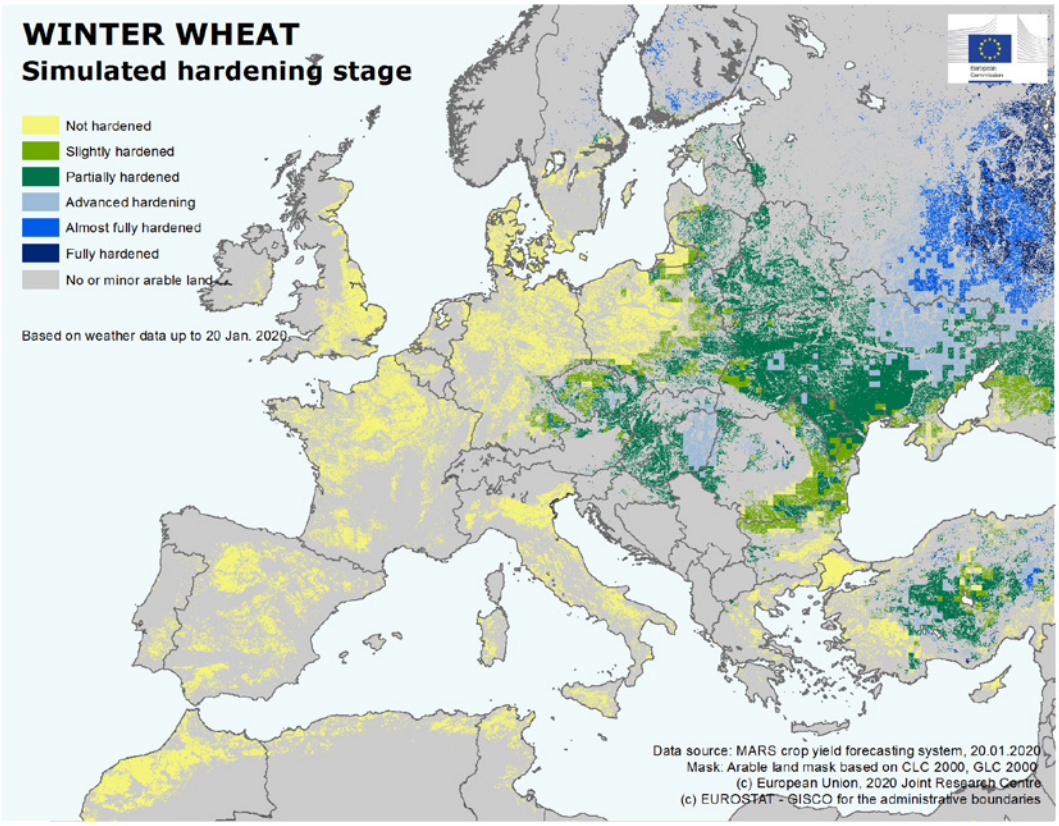
1. Winter hardening and frost kill



Winter cereals are underdeveloped in the eastern Balkan region and in large parts of eastern Europe, including southern Russia and eastern Ukraine, due to delayed sowing and below-optimal soil moisture conditions for emergence and early development during autumn.

Thermal conditions have been much milder than usual in most parts of Europe since the beginning of December. Since early January, the hardening process ([1]) has progressed in the Balkan region and in a large area between Czechia and Ukraine. The frost tolerance of winter cereals remains weak in southern and western Europe. In central Europe and in the Baltic Sea, Black Sea and Caspian Sea regions, winter cereals are partially hardened, while advanced hardening prevails in northern Europe and the eastern half of European Russia. Compared to an average year, the hardening of winter crops remains particularly poor in southern Sweden, Germany, Poland, the Baltic countries, Belarus, the north-western part of European Russia and western Ukraine.

During the cold air intrusion event around 20 November, the combination of inadequate crop frost tolerance, absence of protecting snow cover and low minimum temperatures (mostly between – 20 °C and – 13 °C, but locally down to – 25 °C in the eastern part of the Volga okrug) is likely to have caused frost-kill events, as already reported in the December issue of the Bulletin. Since then, no additional frost-kill damages have occurred, according to our models.

Taking into consideration the latest medium-range weather forecast (until the end of January), low-temperature tolerance will remain unchanged in most parts of central and western Europe. Dehardening is expected to occur in the Balkan region and southern Finland. Winter hardening will progress slightly in Turkey and western Russia.

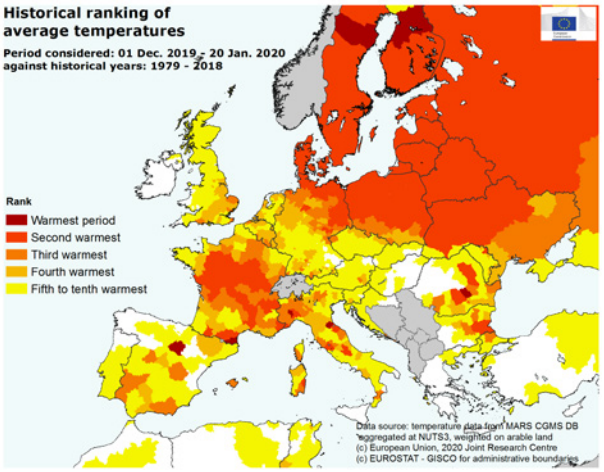
Our frost-kill simulations suggest no further damage during the forecast period.

([1]) Hardening is the bio-physiological process whereby winter cereals gain low-temperature tolerance to withstand freezing conditions that occur during the winter dormancy period.

2. Agrometeorological overview

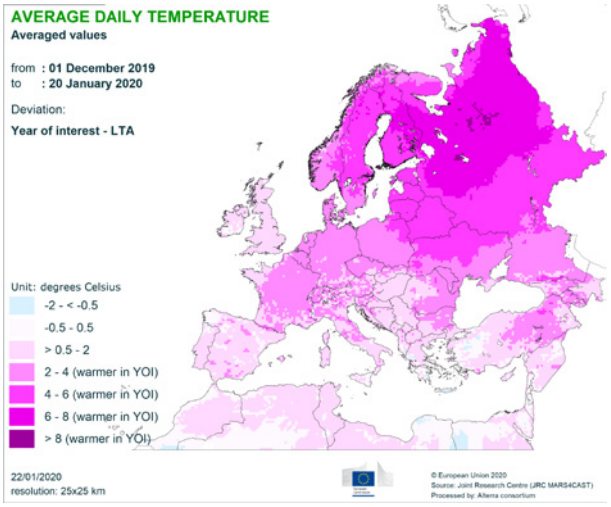
2.1. Meteorological review (1 December 2019–20 January 2020)

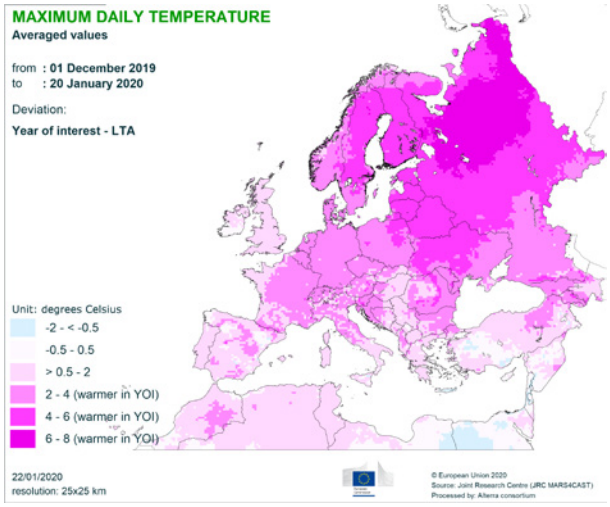
Warmer-than-usual conditions throughout Europe. In many parts of Europe, this 1 December to 20 January period ranked among the warmest in our records (since 1979). In the Iberian and Italian peninsulas, south-eastern Europe, the United Kingdom, Ireland and Turkey, average daily temperature anomalies with respect to the long-term average (LTA) were mainly limited to 2 °C. In central Europe, the anomalies ranged between 2 °C and 4 °C. In eastern and northern Europe, anomalies between 4 °C and 6 °C were reported. In north-western Russia and part of Finland, daily mean temperature anomalies between 6 °C and 8 °C were observed. Daily maximum and minimum temperatures had the same spatial pattern, with very high warm anomalies (above 8 °C) in a large area of north-western Russia.

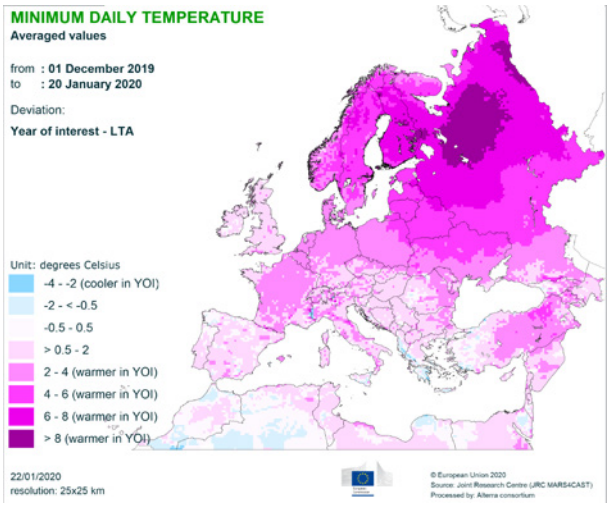


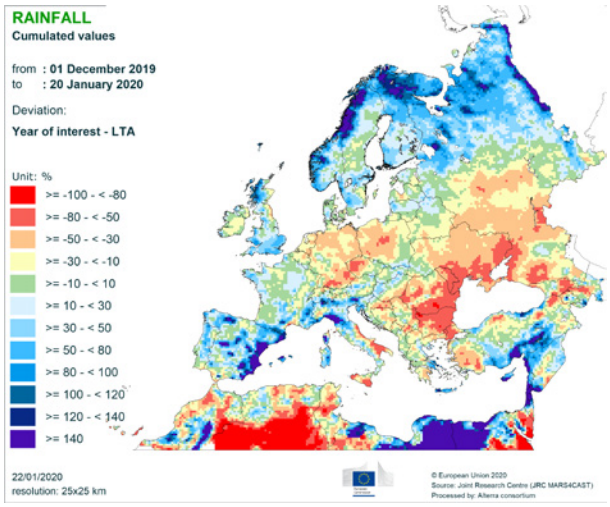
Drier-than-usual conditions occurred in large regions of south-eastern Europe along the Black Sea, as well as in Ukraine. Anomalies in accumulated precipitation during the entire period mainly ranged from – 80 % to – 50 % with respect to the LTA (in Ukraine mainly between – 50 % and – 30 %). Some areas of central Europe, Italy and western Turkey also experienced drier-than-usual conditions, with anomalies mainly between – 50 % and – 30 %.

Wetter-than-usual conditions were observed in large areas of the Iberian peninsula, central-northern Italy, the United Kingdom, the Scandinavian peninsula, north-western Russia and Mediterranean Turkey. Anomalies in accumulated precipitation during the period analysed were mainly between 30 % and 100 %, but locally higher than 140 %, above the LTA.









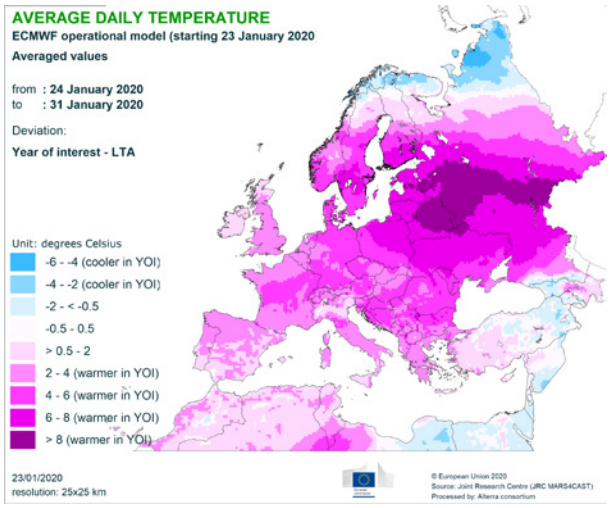
2.2. Weather forecast (24–31 January)

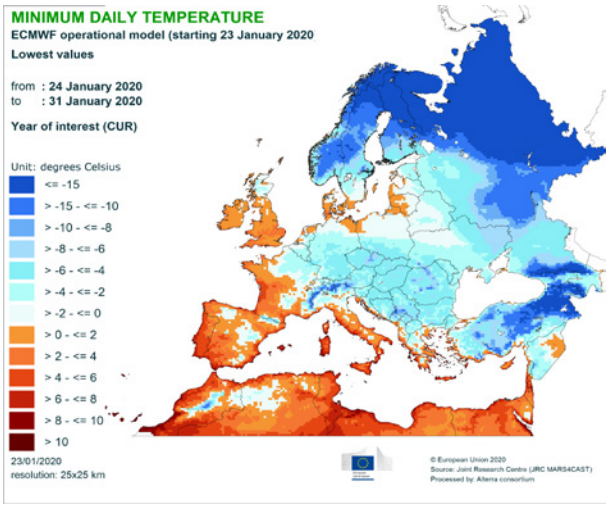
The weather conditions in the first days of the forecast period will be characterised by a weak trough moving quickly through the Mediterranean basin, which will favour instability and precipitation. At the same time, a stronger broad cyclonic perturbation will move from the North Atlantic to the United Kingdom and then towards continental Europe, favouring precipitation and intense winds. Towards the end of the forecast period, a ridge will dominate atmospheric circulation over western and central Europe.

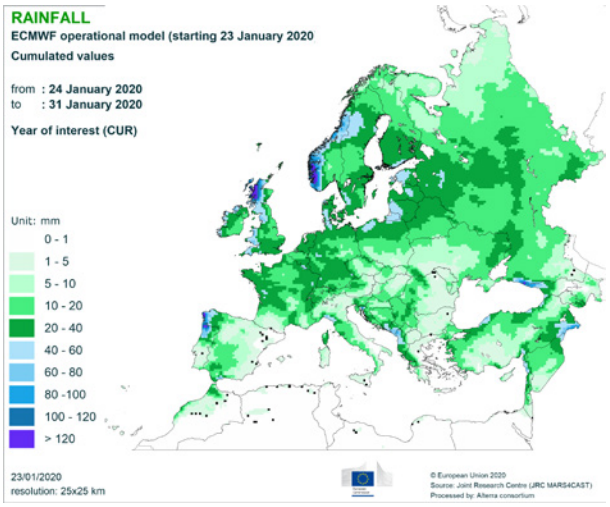
Warmer-than-usual conditions are forecast throughout Europe, with daily mean temperature anomalies mainly ranging from 2 °C to 6 °C with respect to the LTA in western and central Europe, while higher warm anomalies (above 6 °C) are forecast in eastern Europe. Minimum temperatures will remain slightly above 0 °C in most of western Europe and the United Kingdom and are not expected to fall below – 6 °C in most of eastern Europe.

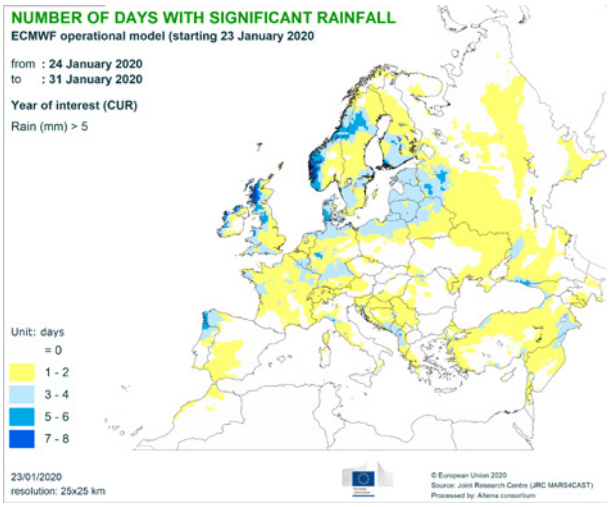
Cumulative precipitation in the forecast period is expected to range between **10** mm and **40 mm** in most of the regions under the influence of the cyclonic disturbances. Higher values, above 40 mm and locally above 100 mm, are forecast in the north-western corner of the Iberian peninsula, the western part of the United Kingdom and the western part of Norway.

The long-range weather forecast for the next 3 months (February, March and April) shows warmer-than-usual conditions likely to occur in the Mediterranean region and in eastern and northern Europe.



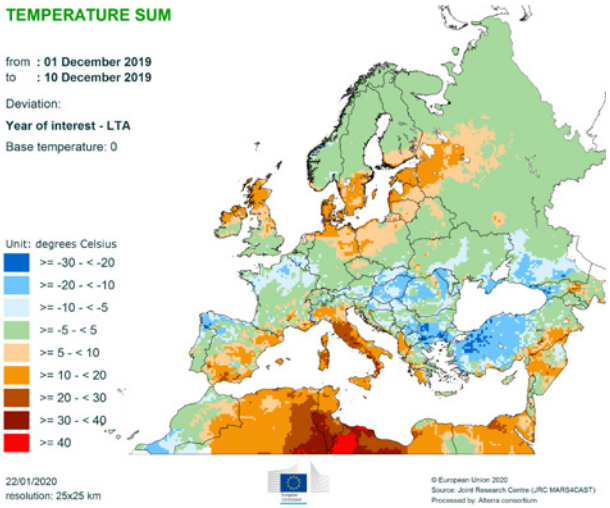


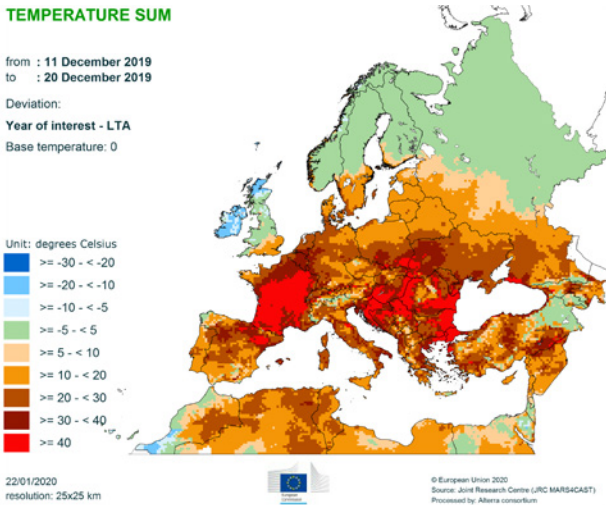


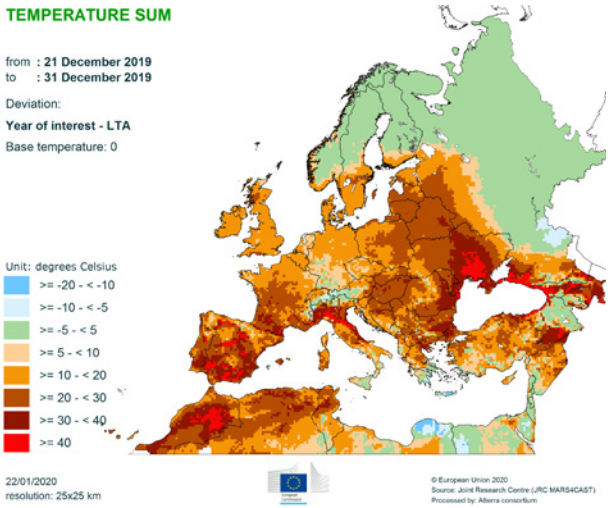


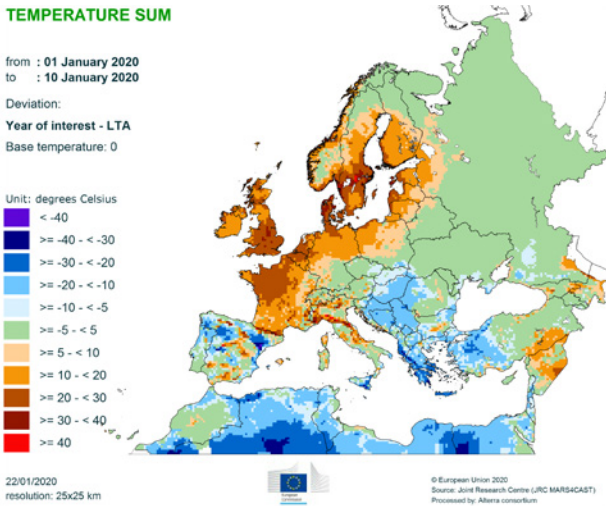
3. Atlas

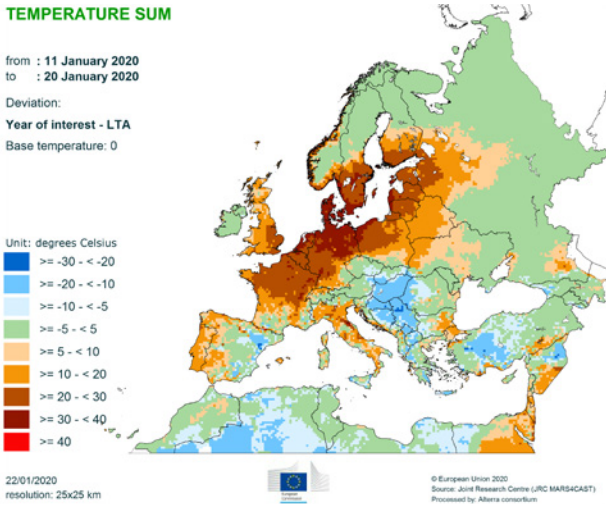
Temperature regime

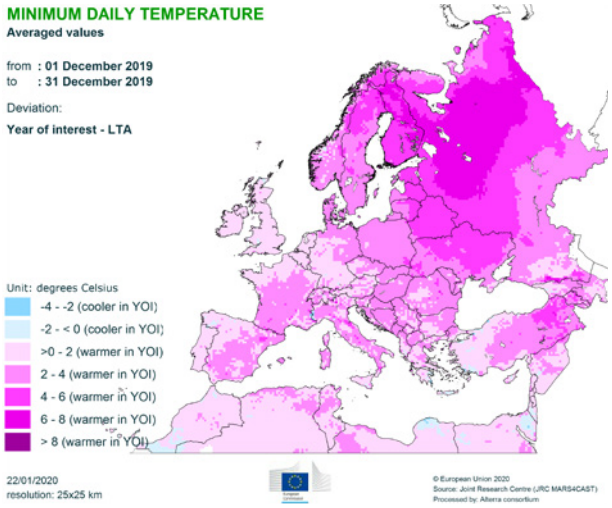


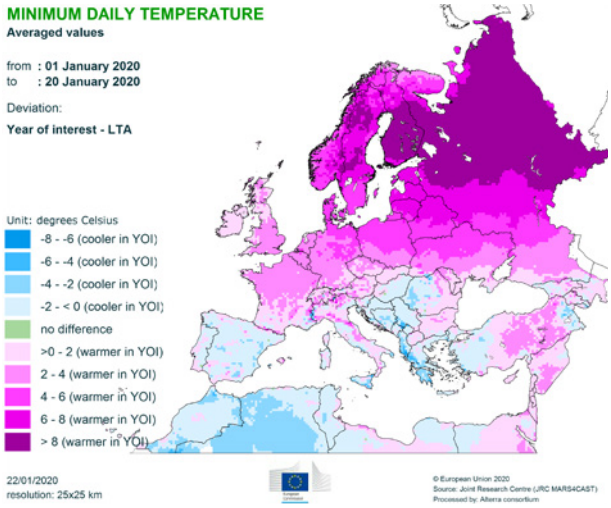


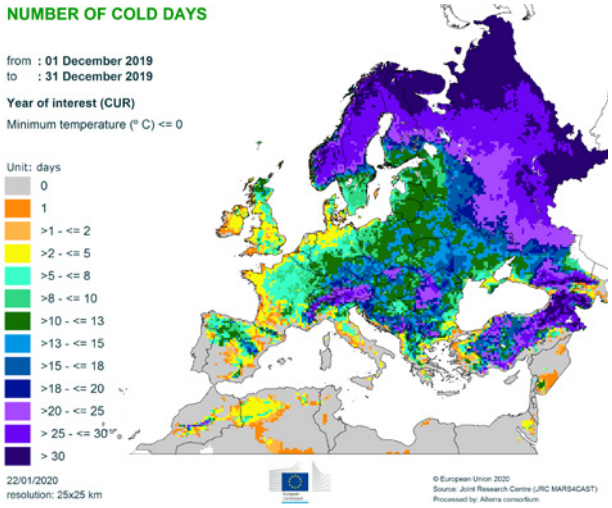


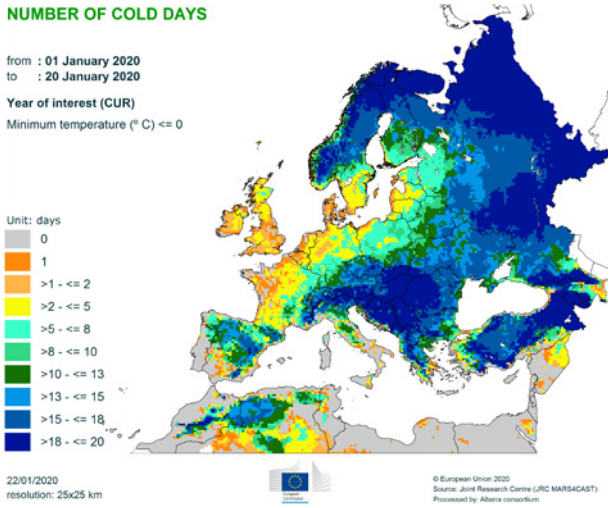




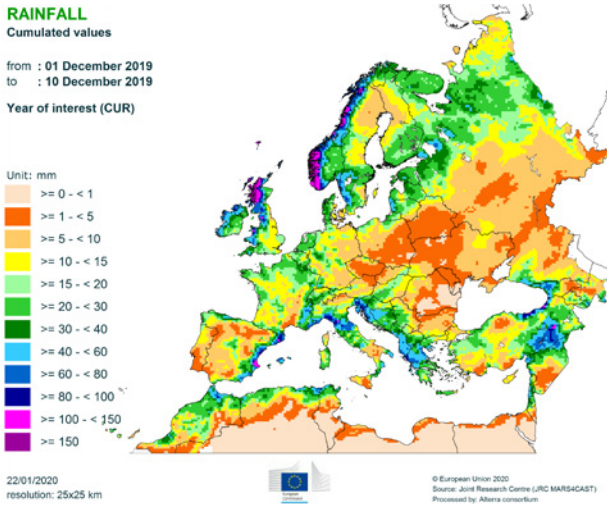


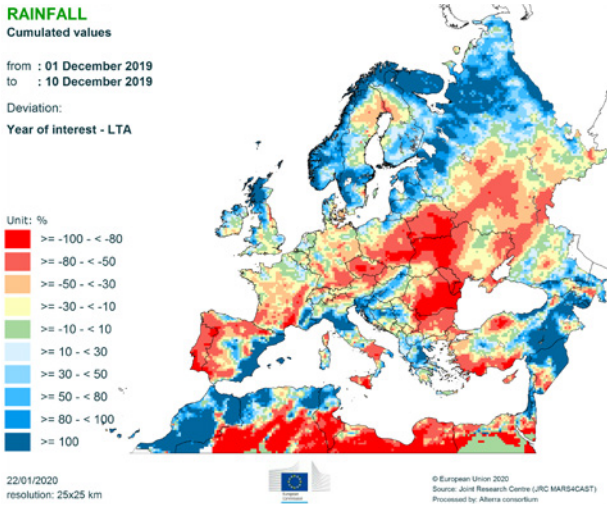


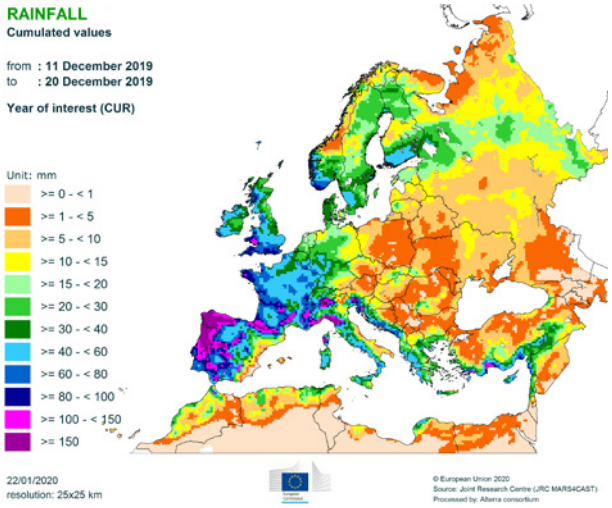




Precipitation



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resolution: 25x25 km
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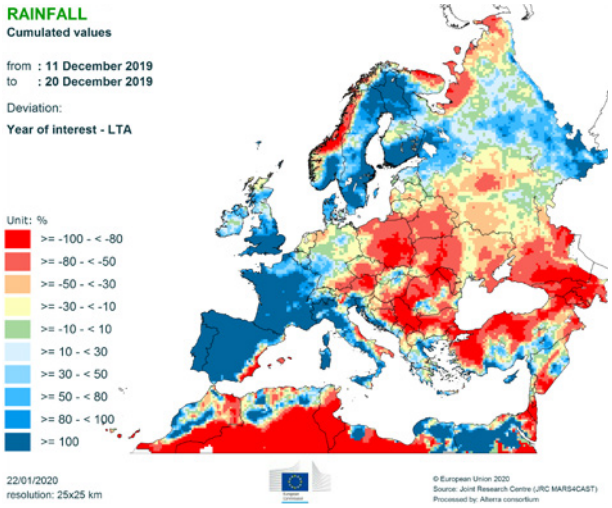
Processed by: Altera consortium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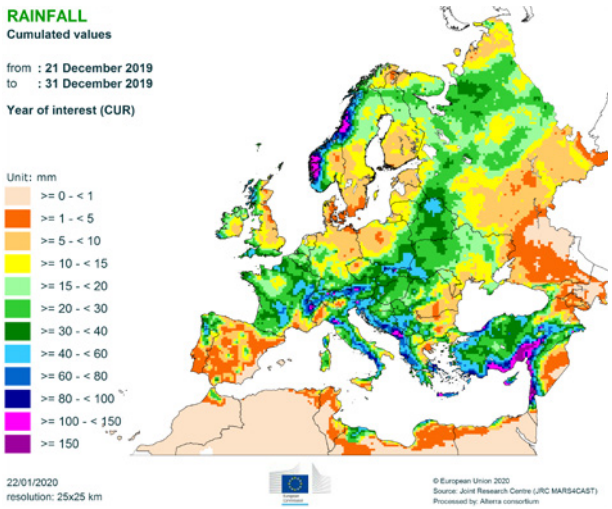
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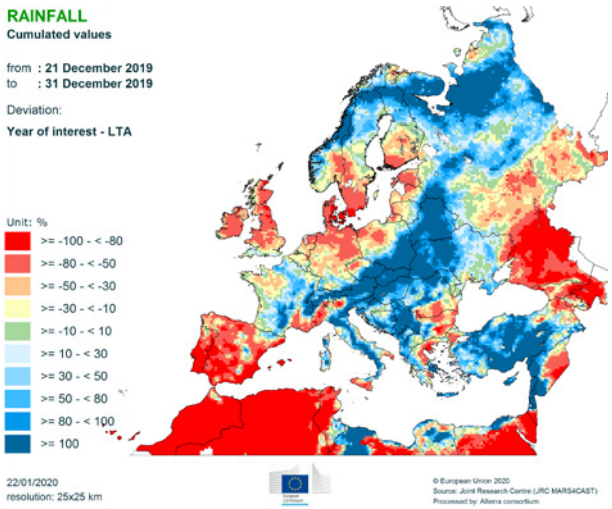
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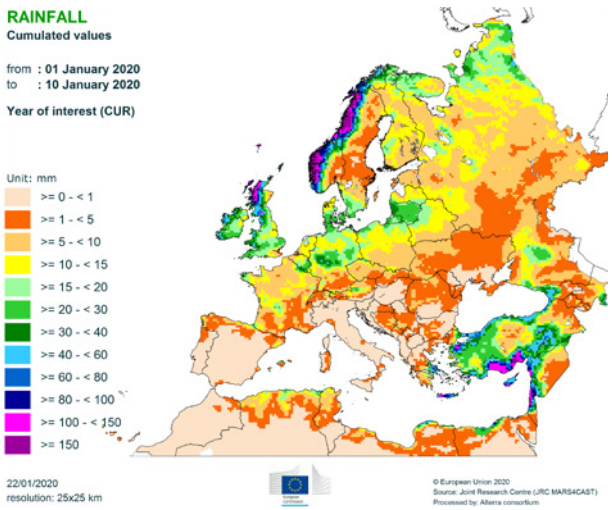
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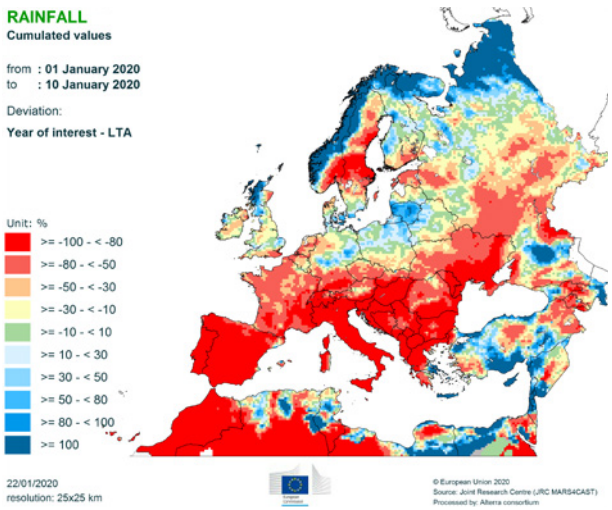
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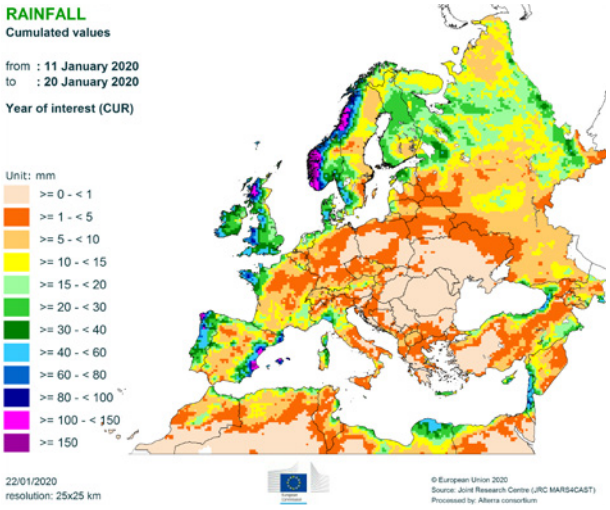
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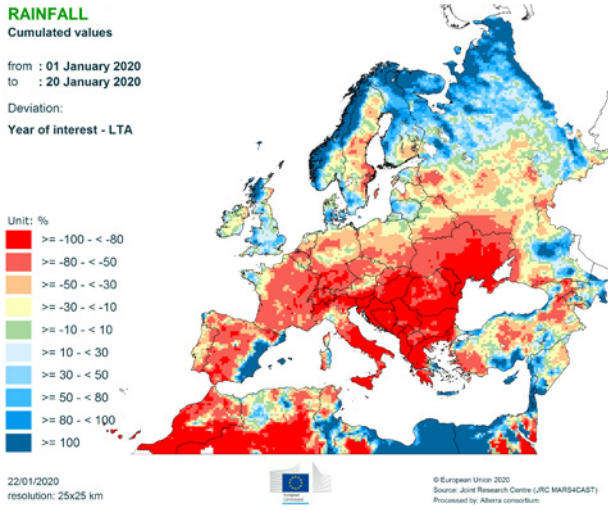
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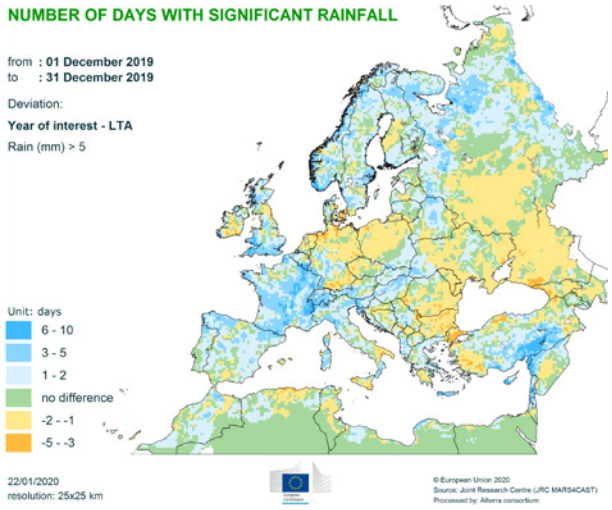
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Unit: days
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3 - 5
1 - 2
no difference
-2 - -1
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resolution: 25x25 km
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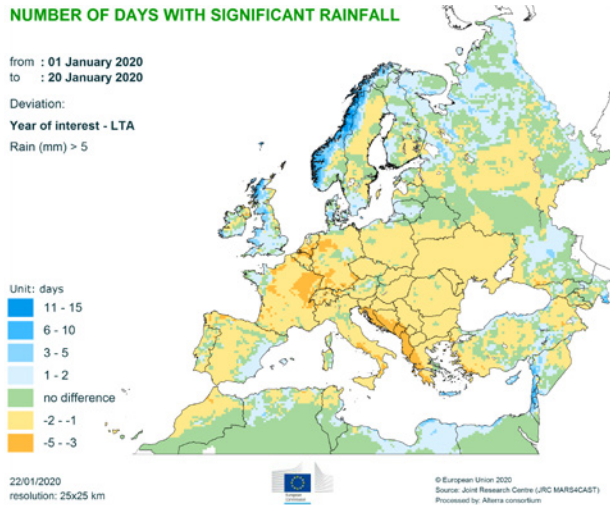
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Unit: days
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3 - 5
1 - 2
no difference
-2 - -1
-5 - -3
22/01/2020
resolution: 25x25 km
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JRC MARS Bulletins 2020

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

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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 1979–2019.

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