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Crop monitoring in Europe
December 2019

Mild start to winter in central and eastern Europe

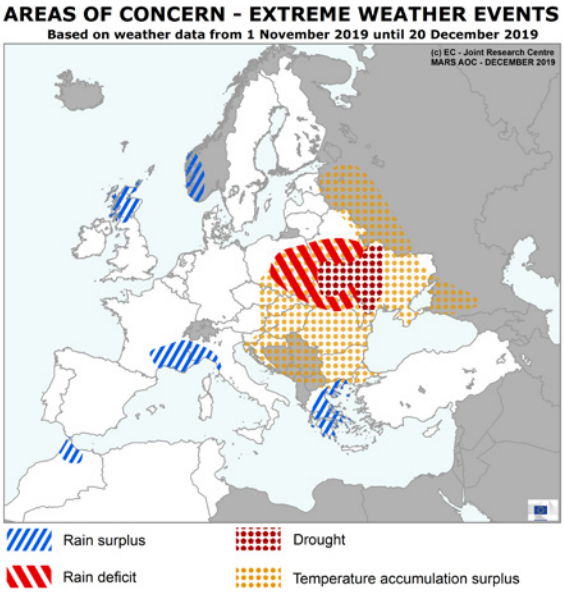
Hardening of winter cereals lags behind

While temperatures in western Europe followed a more or less seasonal pattern, thermal conditions have been much milder than usual in central, eastern and south-eastern Europe. In most of these regions, above-average temperatures have prevailed since early October. Consequently, the build-up of frost tolerance in winter cereals (hardening) has lagged behind and is much weaker than usual. The current situation is delicate, because winter crops in many of these regions are underdeveloped due to delayed sowing and inadequate soil moisture conditions, which, combined with reduced cold tolerance, makes them particularly vulnerable to frost damage. According to the current weather forecast (until 20 December), the warmer-than-usual conditions are likely to continue, with the most pronounced warm anomalies (up to 8 °C above the long-term average) in eastern and south-eastern Europe. As a consequence, no frost damage is expected during this period, but hardening will not progress and some regions will even be subject to dehardening.

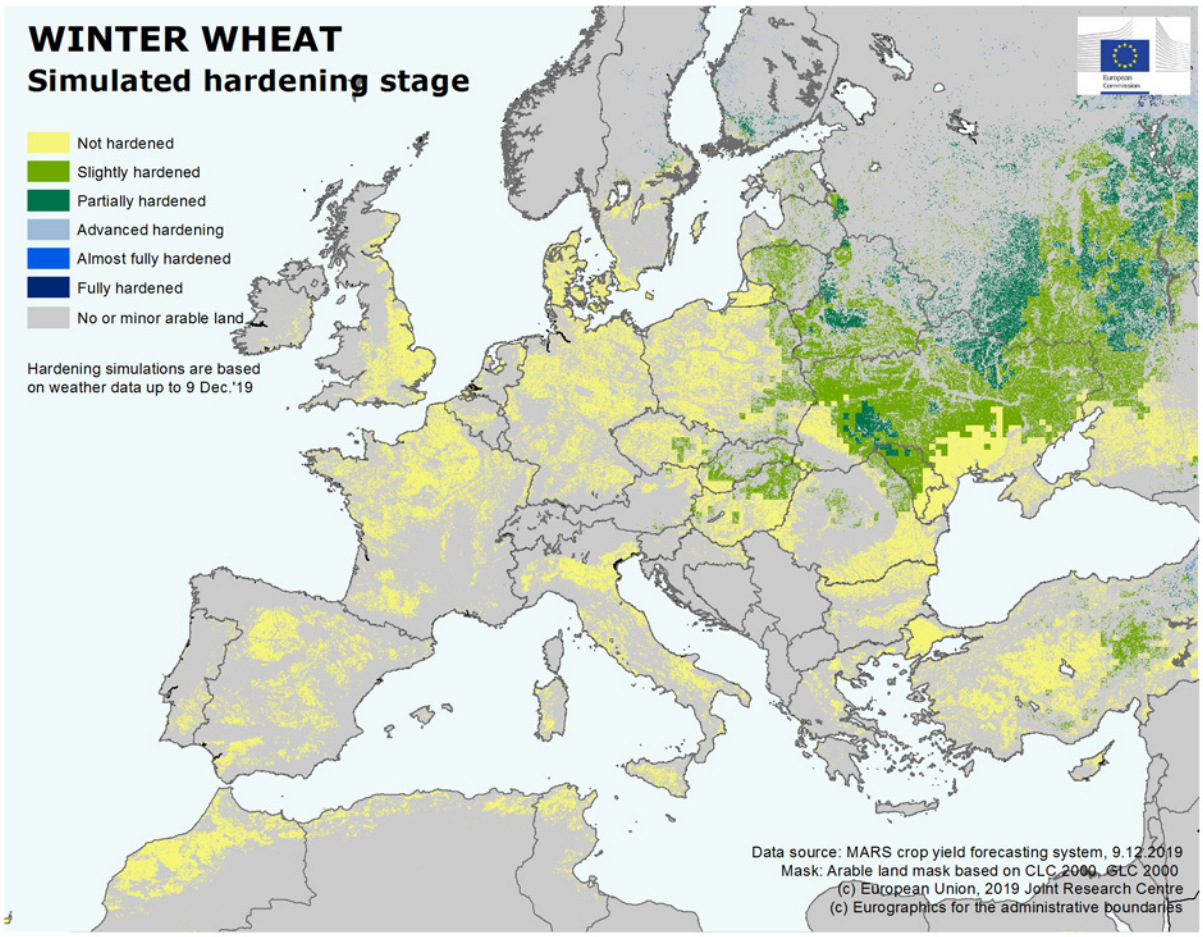
The drought in western Ukraine continued during the period of review, as the sparse rains that occurred in November were insufficient to significantly improve soil moisture conditions. Belarus and Poland experienced a rain deficit that is expected to continue during the coming days.

In Spain, Portugal, Romania, Russia and Turkey, the dry conditions that were reported in the November issue of the Bulletin ended thanks to beneficial rains at the end of November.

The excess of precipitation since the beginning of November continued in north-west Italy, south-west France, Scotland (United Kingdom), Greece and northern Morocco. The extensive rains that occurred during the first half of November in other parts of western Europe are not repeated on the areas-of-concern map as they were already reported in the November Bulletin.



1. 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.

Winter cereals are underdeveloped in some parts of 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 the emergence and early development of winter cereals.

Thermal conditions have been much milder than usual in large parts of Europe, particularly from early October until mid November in central, eastern and south-eastern Europe. Consequently, the hardening of winter wheat started much later than usual and frost tolerance remained weak, except in the northernmost areas where winter wheat cultivation is marginal.

Around 20 November, a cold-air intrusion reached the southern half of Russia and eastern Ukraine. 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) could have caused frost-kill events during the last dekad of November. Our frost-kill model suggests slight frost-kill damage of winter wheat in eastern Ukraine and along the western border of Russia, whereas moderate (locally considerable) frost-kill damage is likely to have occurred in the eastern parts of the Central Okrug (e.g. Ryazanskaya), north-eastern parts of the Southern Okrug (e.g. Volgogradskaya) and the Volga Okrug (especially in western and southern parts).

As a positive consequence of the colder conditions, the hardening process accelerated in Ukraine, Belarus, the Baltic states and southern and western Russia. Nevertheless, the current frost tolerance remains much weaker than usual, especially in eastern Europe. The current situation is delicate, because underdeveloped crops with reduced cold tolerance are particularly vulnerable to frost damage. Therefore, another cold-air intrusion could cause considerable damage in areas with insufficient snow cover to provide thermal insulation.

Our model simulations indicate no frost tolerance in western, central and southern Europe and in most of Turkey, southern Ukraine and areas of Russia between the Black Sea and the Caspian Sea.

Hardening has started along the eastern border of the EU and further eastward, and winter crops have reached a slight hardening stage in the Baltic states, eastern Poland and north-eastern Romania, along with some parts of Finland, Sweden, Czechia, Hungary and Slovakia.

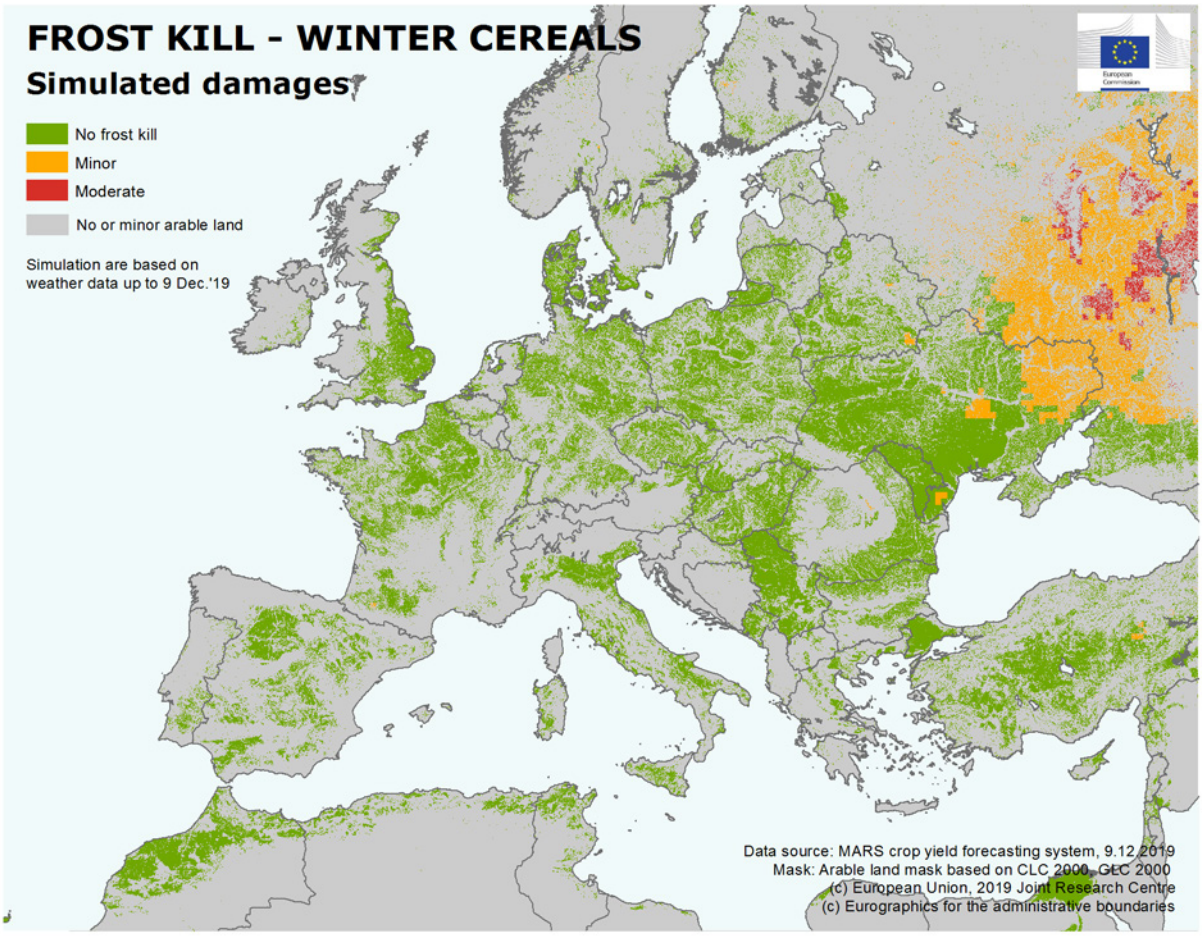
Slight or partial hardening status is typical in Belarus, the northern two thirds of Ukraine, western Turkey and most of south-western Russia, including the Central Okrug, the

southern part of the Volga Okrug and northern parts of the Southern Okrug. Advanced or full hardening has only been reached in Scandinavia (except southern Sweden), the northern part of the Volga Okrug and most of the North-Western Okrug of Russia.

Taking into consideration the latest medium-range weather forecast (until 20 December), low temperature tolerance will remain weak in most parts of Europe due to milder conditions than usual. Dehardening is expected to occur in central Europe (Czechia, Slovakia, Romania, Hungary and Poland), Ukraine and south-western Russia.

Winter hardening will progress further in eastern Russia and northern Europe thanks to low winter temperatures.

Our frost-kill simulations suggest no additional/new frost-kill damage during the forecast period.



2. Agrometeorological overview

2.1. Meteorological review (1 November-10 December)

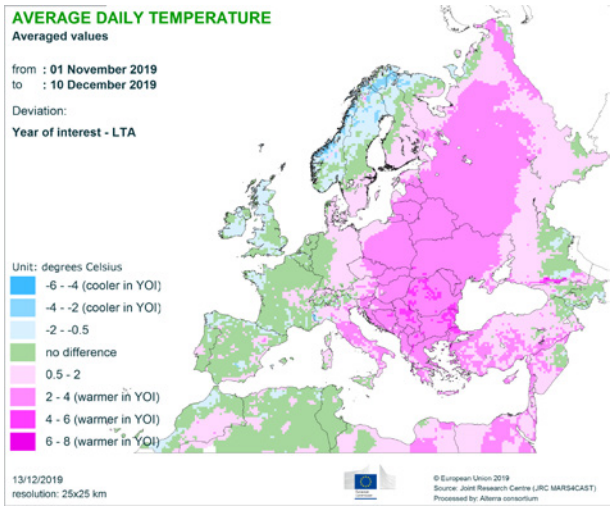
Warmer-than-usual conditions in central, eastern and south-eastern Europe, Italy, and large areas of northern Europe. Daily mean temperature anomalies (with respect to the long-term average (LTA)) in these regions were mainly between 2 °C and 4 °C.

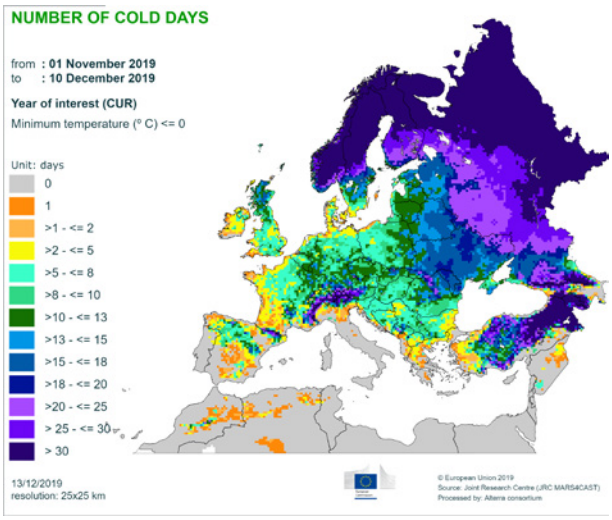
Slightly colder-than-usual conditions in Ireland and large parts of the United Kingdom and of the Scandinavian peninsula, with daily mean temperature anomalies (with respect to the LTA) between – 2 °C and – 0.5 °C.

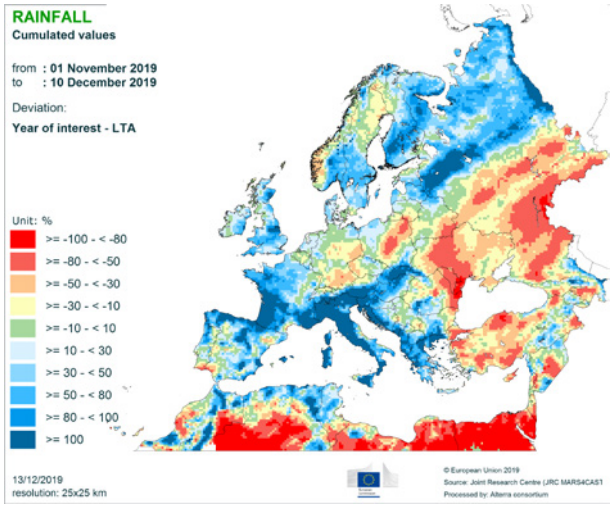
Wetter-than-usual conditions were mainly observed in large areas of western and southern Europe, with anomalies (with respect to the LTA) of total precipitation above 140 % over the analysed period.

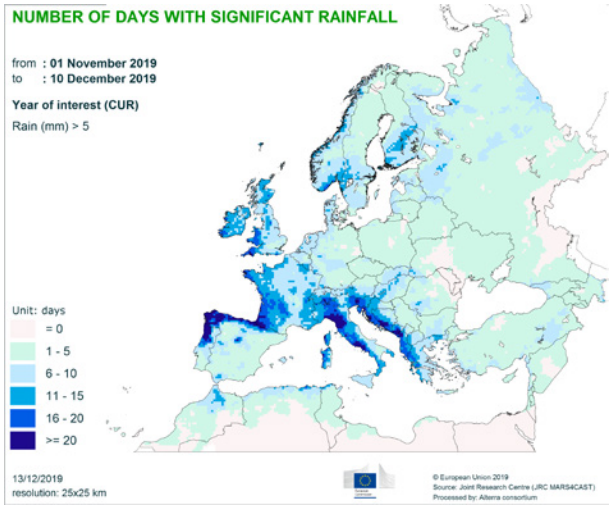
Drier-than-usual conditions in large regions surrounding the Black Sea and western Russia, with anomalies (with respect to the LTA) of total precipitation cumulated over the analysed period mainly between – 80 % and – 50 %. Large areas of Germany and Poland were also drier than usual, with anomalies ranging from – 50 % to – 10 %.

Extreme events were observed in many European countries. Severe wind events were reported along the Atlantic coast of France and the western coast of Italy. Flood events were reported in areas of the United Kingdom, France, Italy and Slovenia.



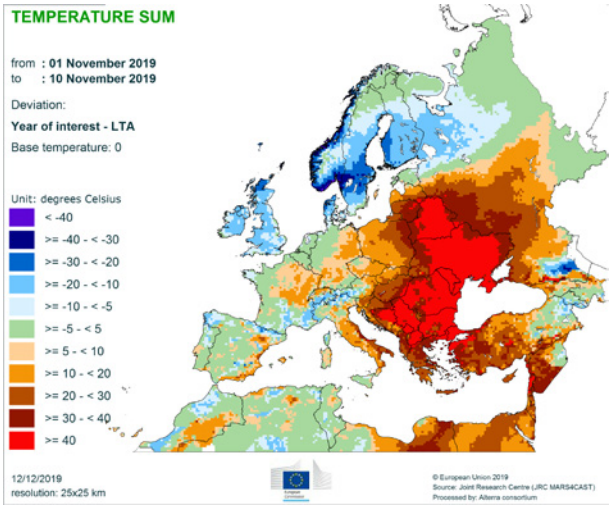


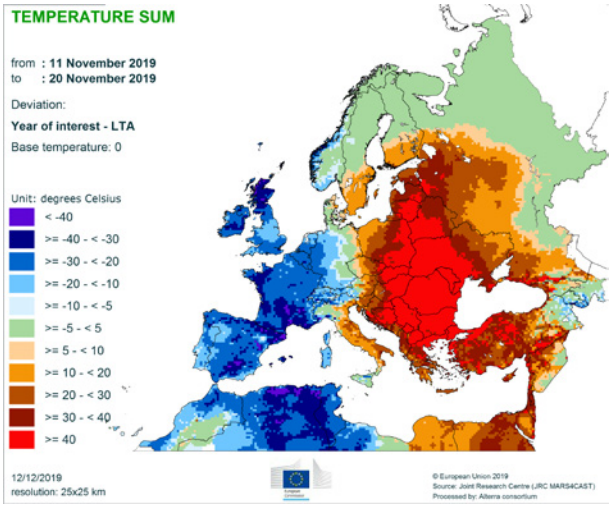


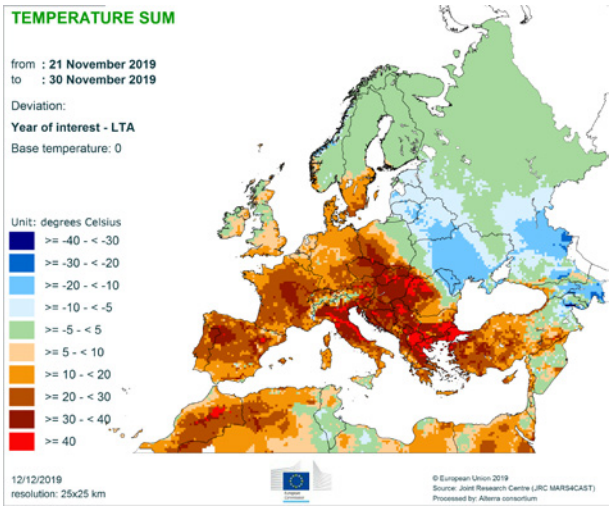


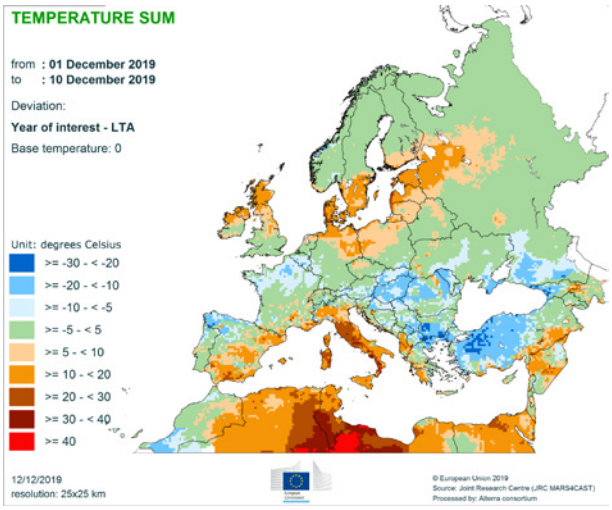
3. Atlas

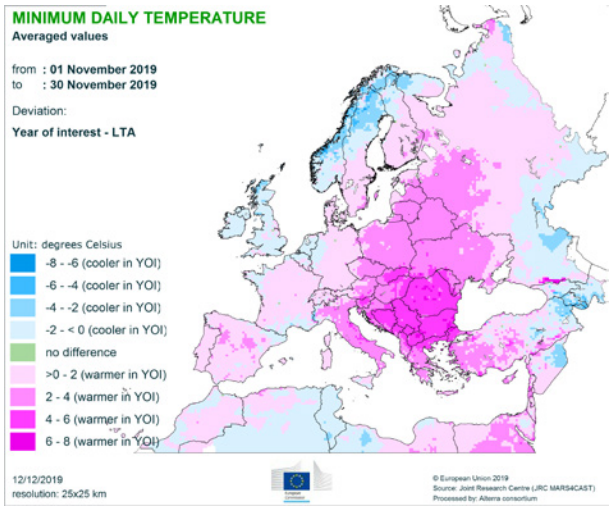
Temperature regime

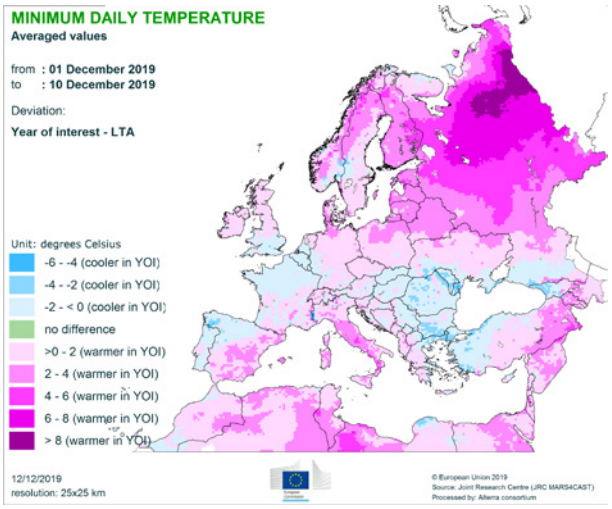


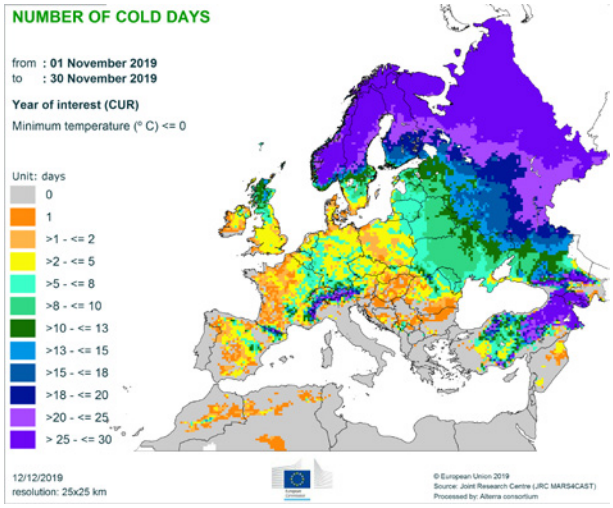


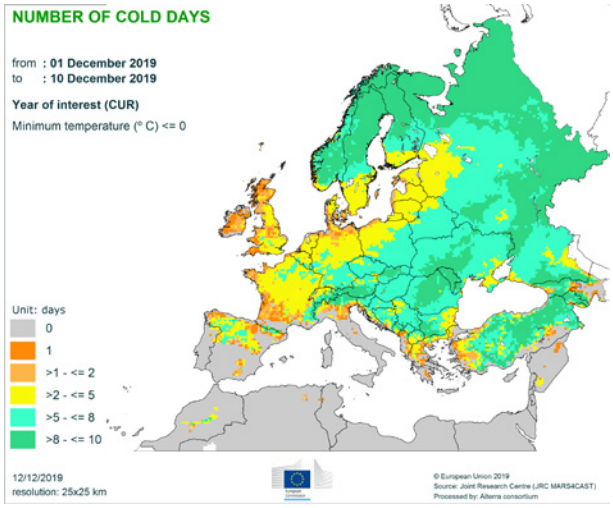




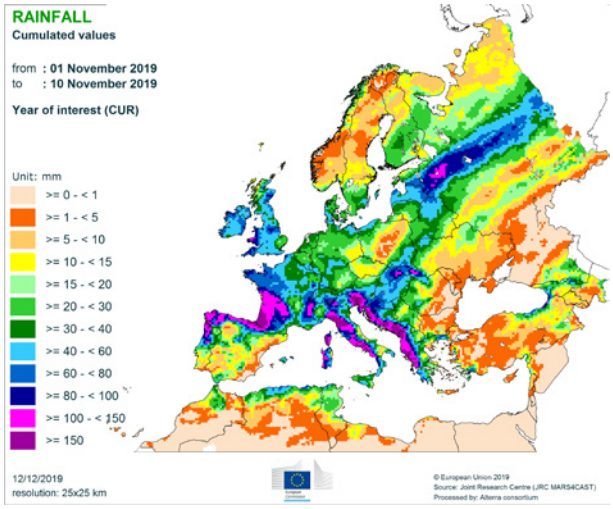


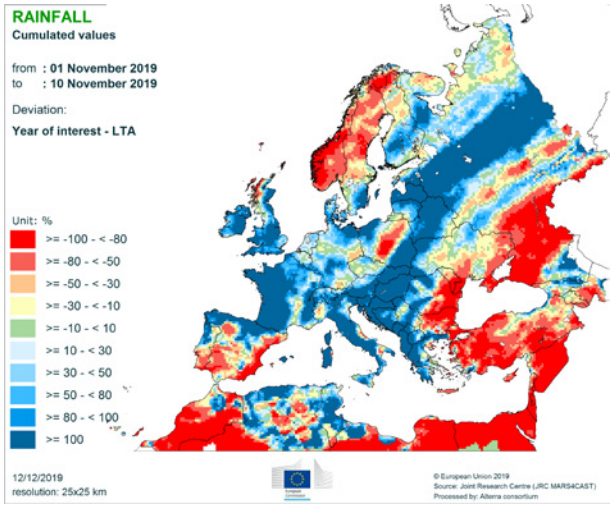


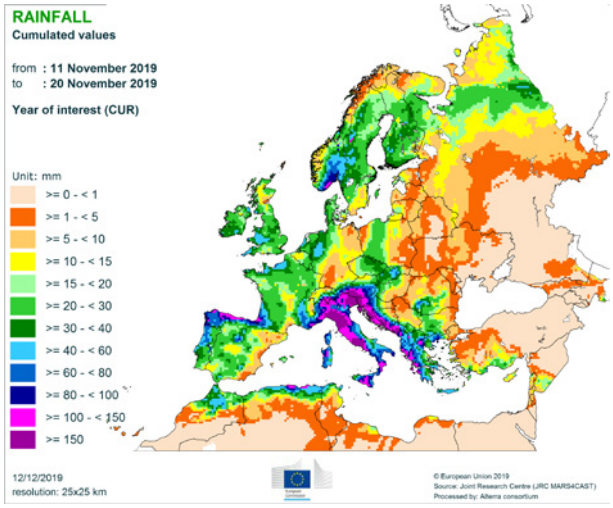


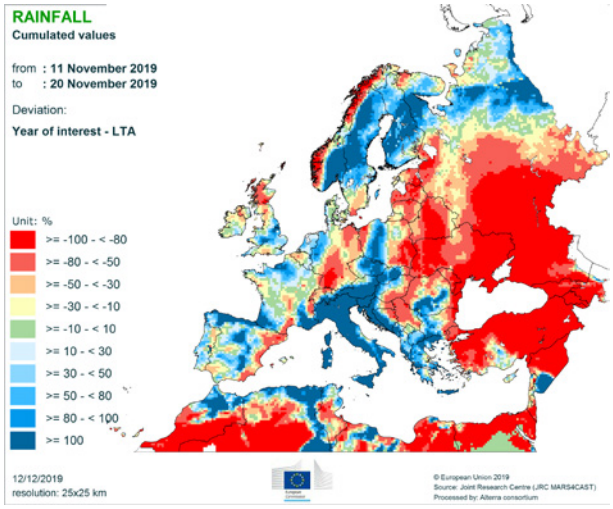


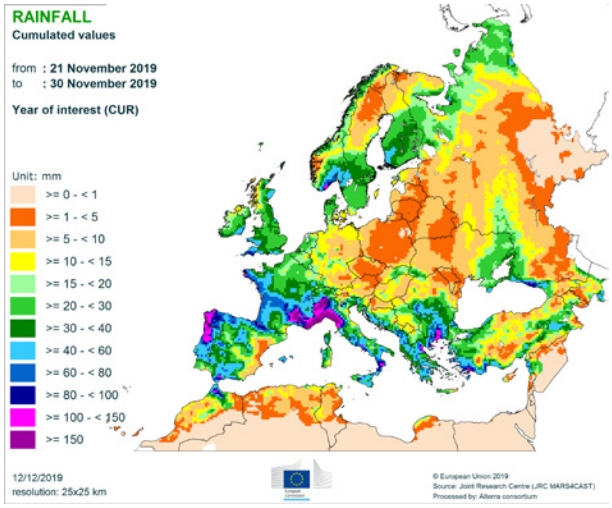
Precipitation

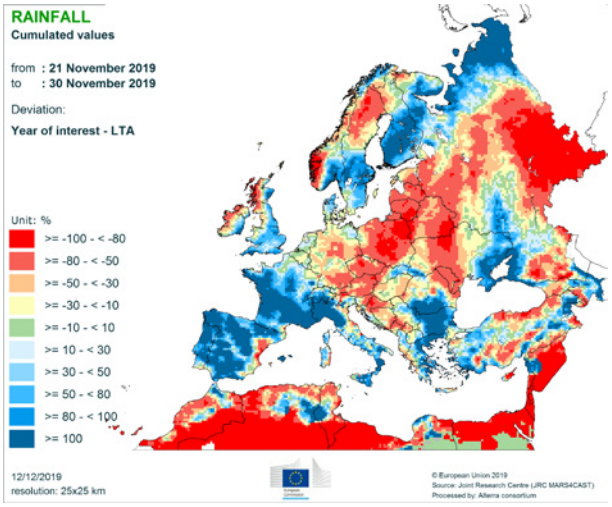


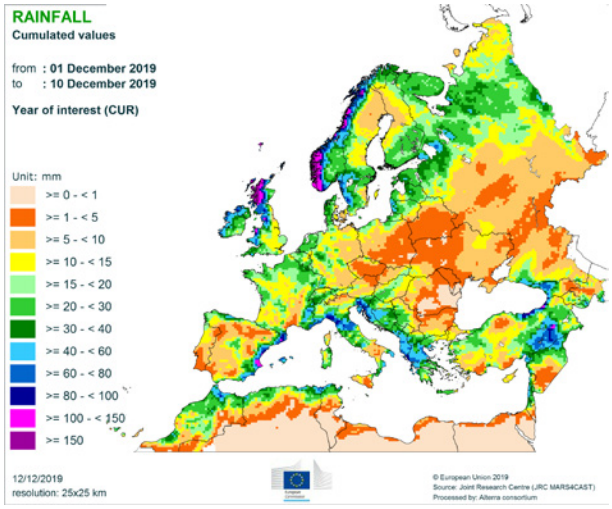


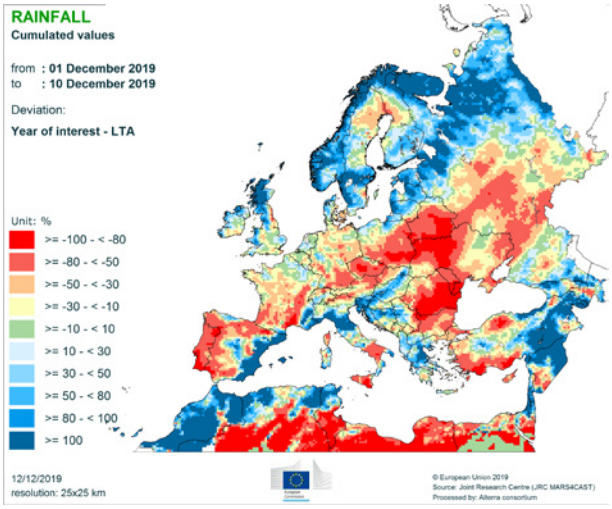




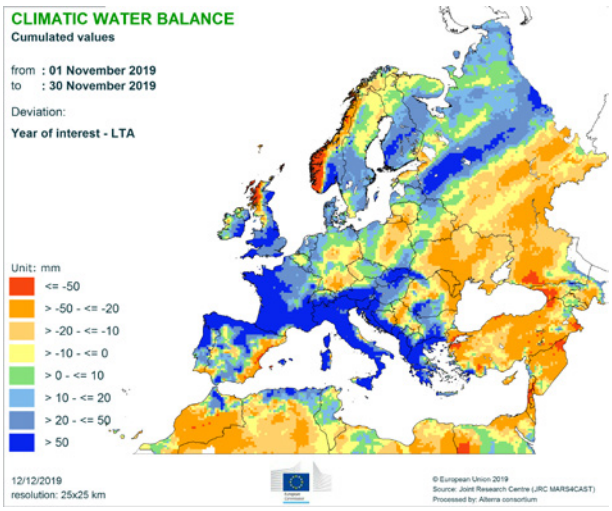


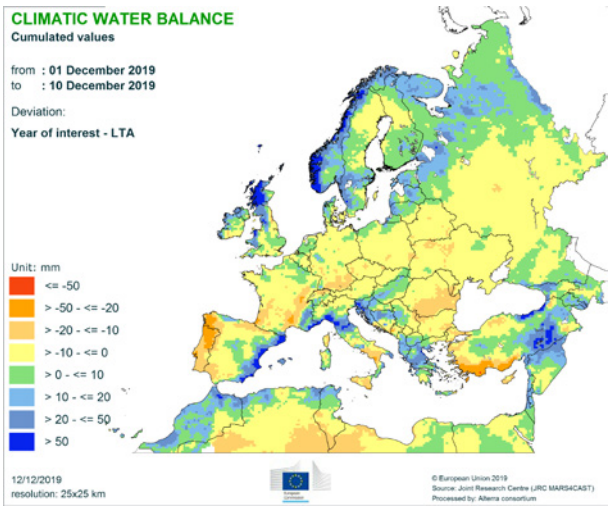






Climatic water balance





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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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Technical note
The long-term average (LTA) used within this Bulletin as a reference is based on an archive of data covering 1979-2018.

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