

JRC MARS Bulletin

Crop monitoring in Europe

December 2021

Fair start to winter

Frost tolerance weakly developed in the east

Continued fair autumn weather in most parts of Europe allowed farmers to conduct field operations where needed and sustained adequate development of the newly sown crops. However, the build-up of frost tolerance has been weak in most parts of central, eastern and south-eastern Europe; particularly in the Black Sea region.

By early November, the sowing campaign was completed or almost completed in most of the European countries. A moderate delay was registered around the Black Sea, especially in Romania, Bulgaria and Ukraine, where the sowings continued for several more weeks.

In northern and central Europe, above-average temperatures and near-seasonal precipitation in November have been favourable for crop emergence and early development. In south-eastern Europe, temperatures dropped in late November and are expected to have slowed the development of the already delayed winter cereals. In western Europe, particularly in France, the prevalence of below-average temperatures since early October hampered the early development of winter wheat and only a few fields entered the tillering stage.

According to our crop model simulations, there has been no frost damage to winter cereals so far. However, the

build-up of frost tolerance (hardening) is weaker than usual in most parts of central, eastern and south-eastern Europe; particularly in the Black Sea region. Areas where the development of winter cereals is delayed are likely to be even more vulnerable to frost damage. Although frost tolerance is expected to increase with the forecast colder temperatures, the current hardening status could expose winter cereals to frost damage in the event of severe cold spells in the weeks to come.

Marked rain deficits in the British Isles and the Iberian Peninsula had no negative impact on crops. However, Morocco has faced a difficult start to the winter-crops season, as autumn rains were scarce and winter crops are clearly delayed.

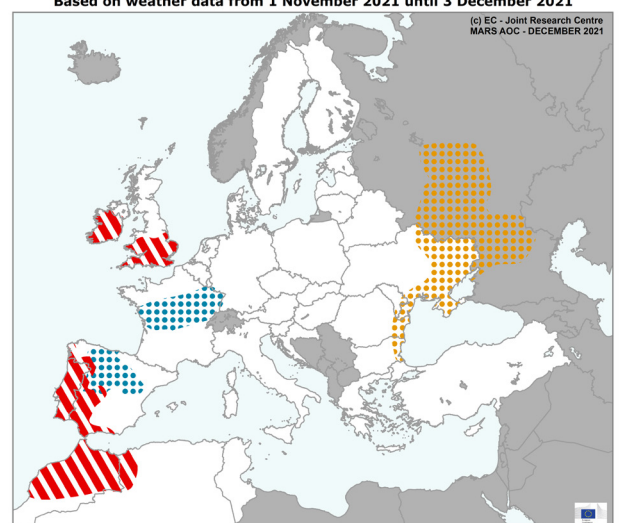
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1. Agrometeorological overview
2. Winter hardening and frost kill
3. Sowing update
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Covers the period from 1 November until 3 December


AREAS OF CONCERN - EXTREME WEATHER EVENTS

Based on weather data from 1 November 2021 until 3 December 2021



 Rain deficit

 Temperature accumulation deficit

 Temperature accumulation surplus

1. Agrometeorological overview

1.1 Meteorological review (1 November – 3 December 2021)

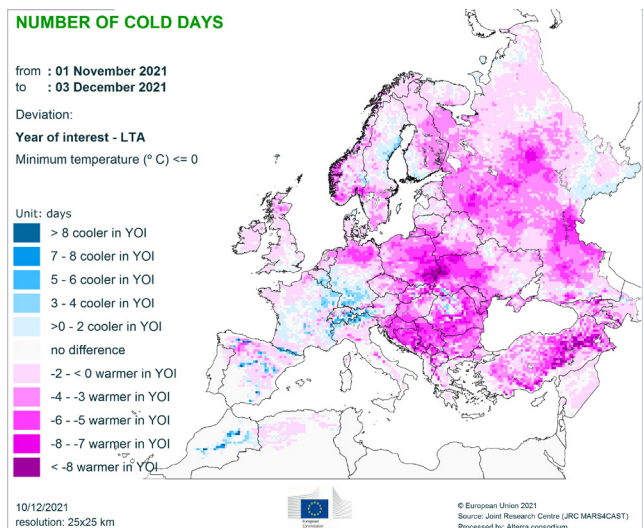
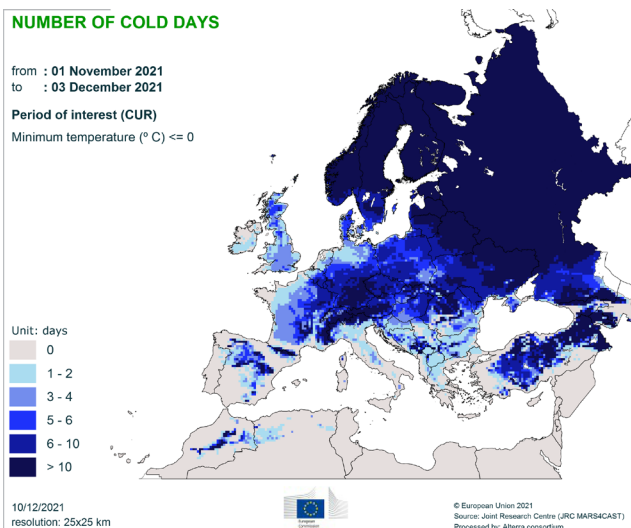
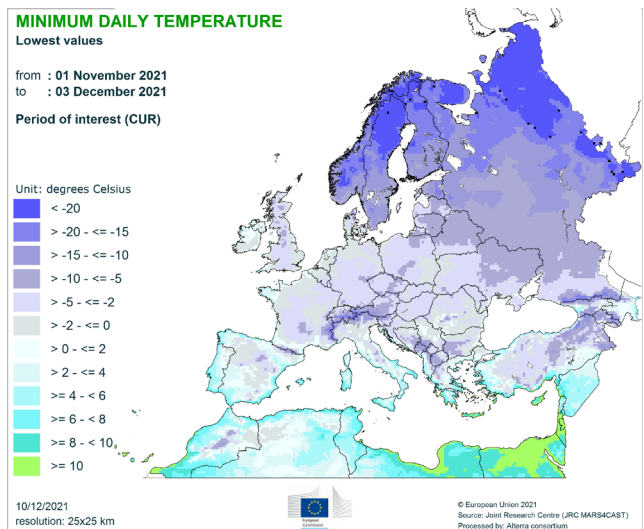
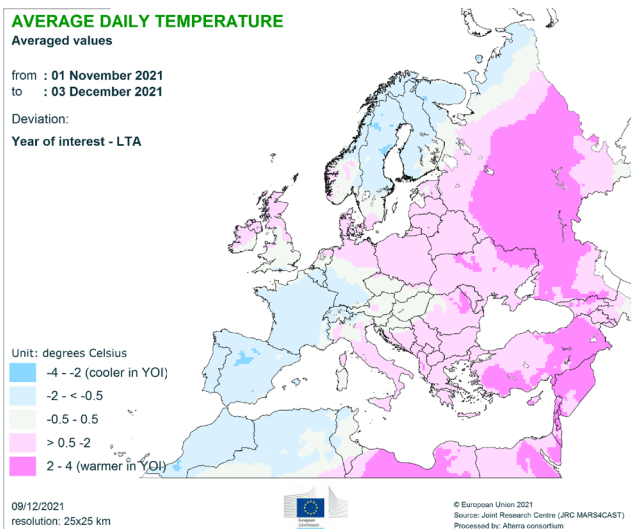
Slightly warmer-than-usual conditions were recorded in most parts of central and eastern Europe, as well as in Ireland and the North Sea region, and in the central and eastern Mediterranean. Daily mean temperature anomalies were mainly from +0.5 °C to +2 °C in these regions. More substantial temperature anomalies (up to +4 °C) occurred in eastern parts of Ukraine, Turkey and Russia.

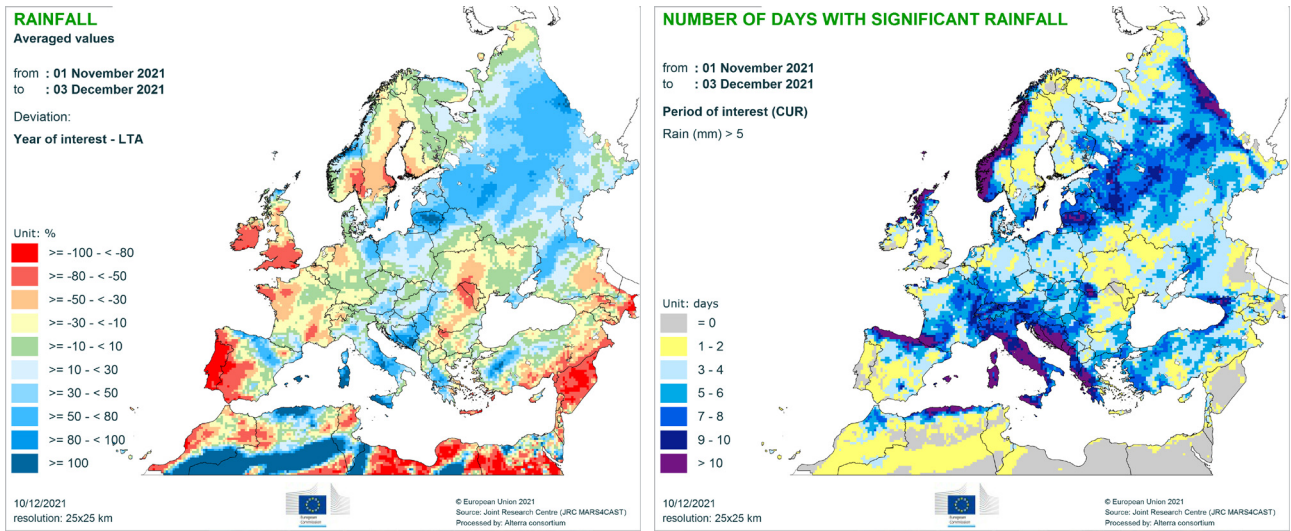
Slightly colder-than-usual conditions, with daily mean temperature anomalies from -2 °C to -0.5 °C, were recorded in a large region extending from the western Mediterranean to southern Germany and Belgium, as well as in northern Scandinavia. However, in most regions, the number of days with minimum temperatures below 0 °C was equal to or less than the LTA; and minimum

temperatures remained above -5 °C in most agricultural areas of western, central, and south-eastern Europe.

Wetter-than-usual conditions were mainly observed in Italy, the central Mediterranean isles, the northern Adriatic Sea region, and in the Baltic Sea region. Anomalies in total precipitation in these regions were mostly greater than +50% compared with the LTA. Less marked positive rainfall anomalies (+30% to +50%) occurred in northern Spain, north-eastern Germany, northern Poland, and in large parts of Russia.

Drier-than-usual conditions, with anomalies in total cumulative precipitation from -100% to -50%, were observed in the western half of the Iberian Peninsula, Morocco, Ireland, southern United Kingdom, and southernmost parts of Turkey.



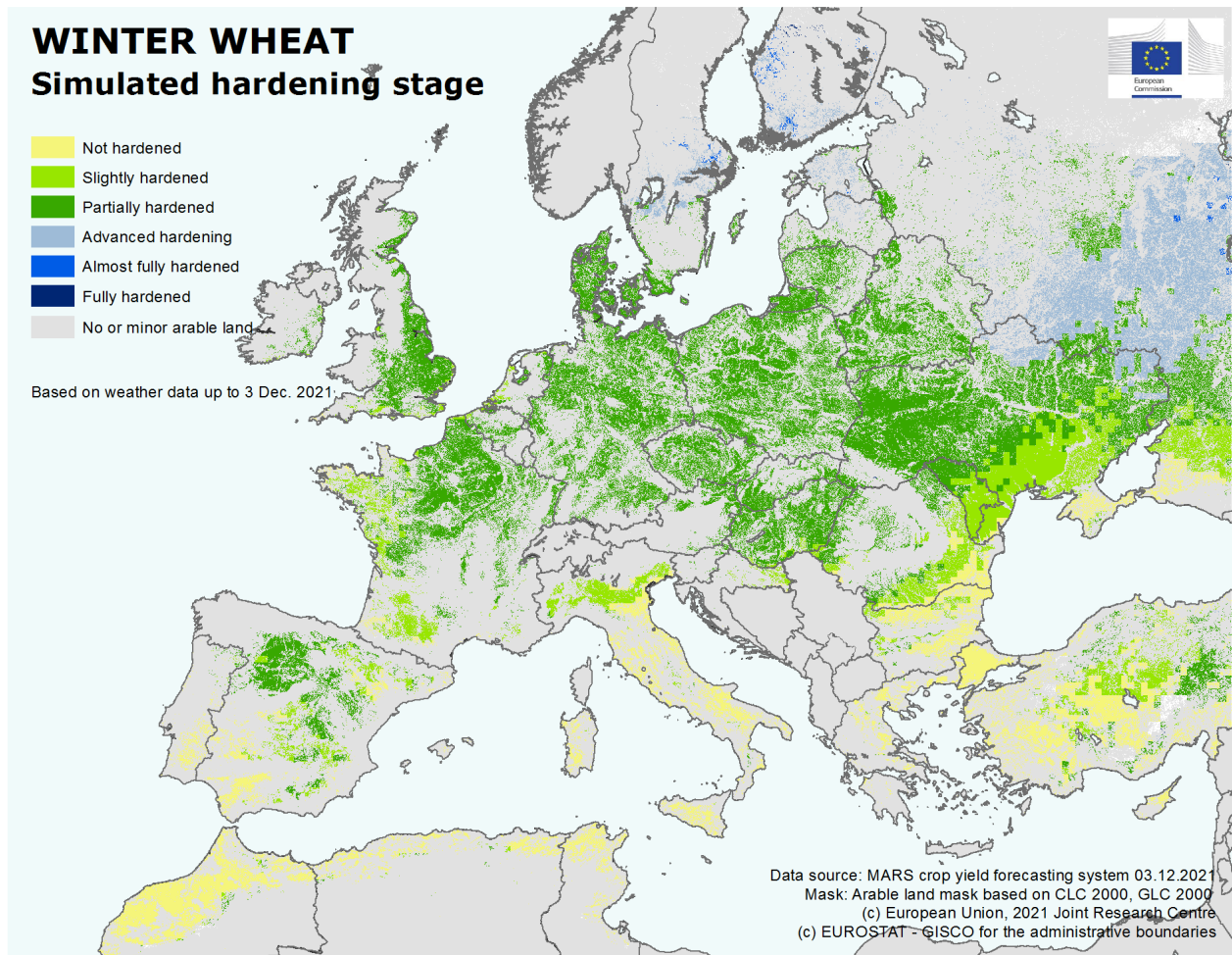


1.2 Weather forecast (11-17 December)

Weather conditions in the coming days will be mainly determined by a deep trough moving from the central Mediterranean region towards south-eastern Europe and the Black Sea / eastern Mediterranean region. This atmospheric circulation will trigger broader precipitation events. At the same time, cyclonic disturbances

approaching western Europe and its northern Atlantic coast will induce precipitation events also in these areas. The large-scale atmospheric circulation will favour milder conditions over western Europe, whereas colder-than-usual conditions are expected in south-eastern Europe.

2. 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.

According to our crop model simulations¹, based on weather data up to 3 December 2021, frost damage to winter cereals has not occurred so far. However, the level of frost tolerance of winter cereals in most parts of Europe remains low. Our data show partially hardened crops in western and central Europe, while hardening is weak in Bulgaria, south-east Romania, and in large parts of southern Russia and Ukraine. Compared with last year, hardening is more advanced in western and northern Europe, but weaker in large parts of central, eastern and

south-eastern Europe, particularly in the Black Sea region. Areas where winter cereals are underdeveloped, due to delayed sowing and/or development (such as in France and the Black Sea region), are likely to be more vulnerable to frost damage than suggested by the simulated hardening stage.

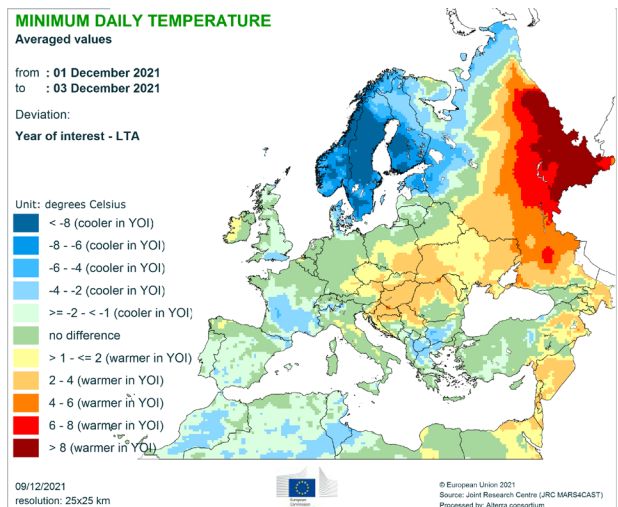
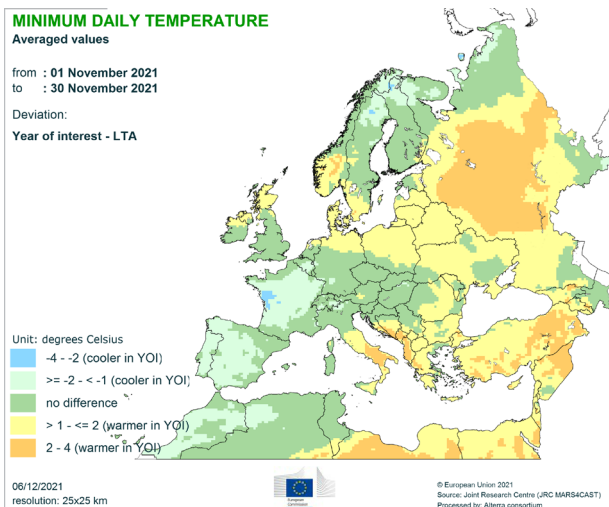
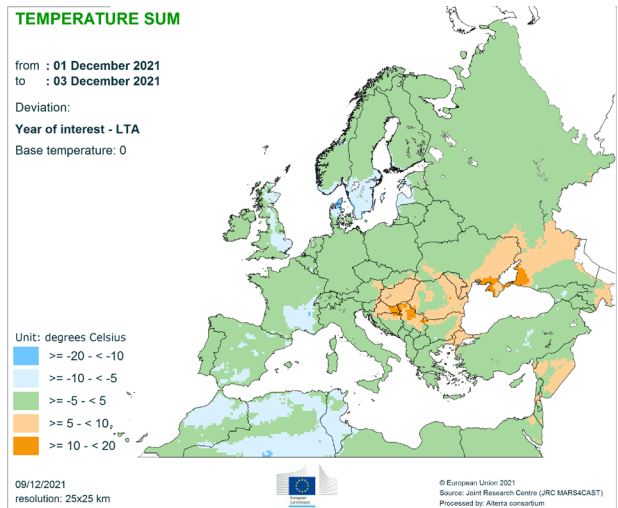
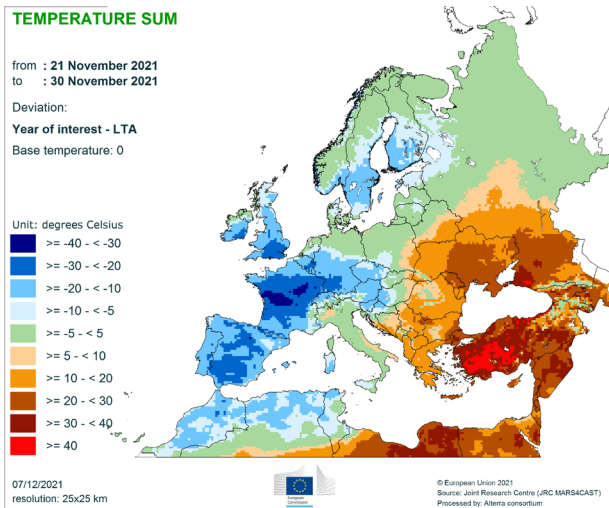
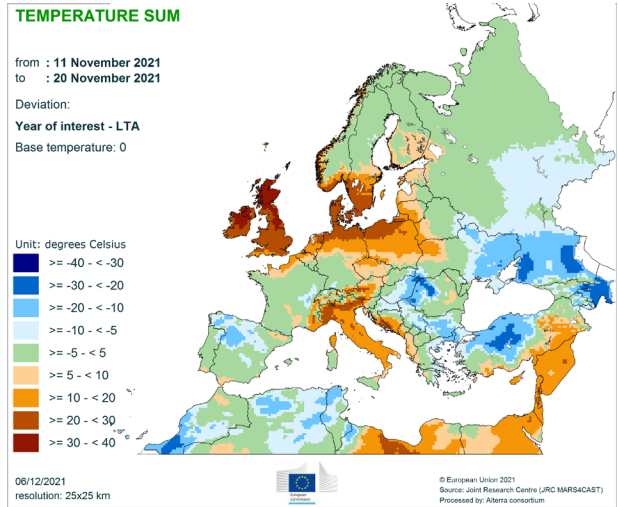
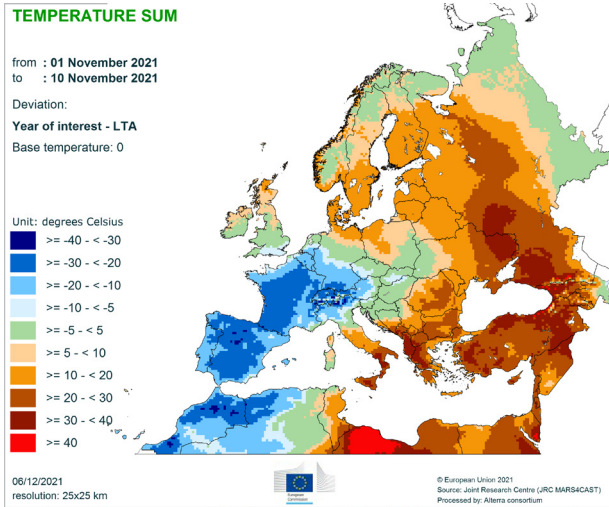
Although frost tolerance is expected to increase with the forecast colder temperatures in the east, the current hardening status could expose winter cereals to frost damage in case of any severe cold spell in the weeks to come.

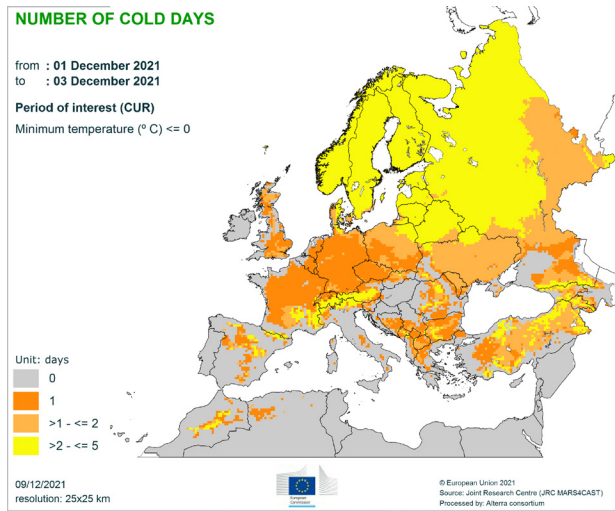
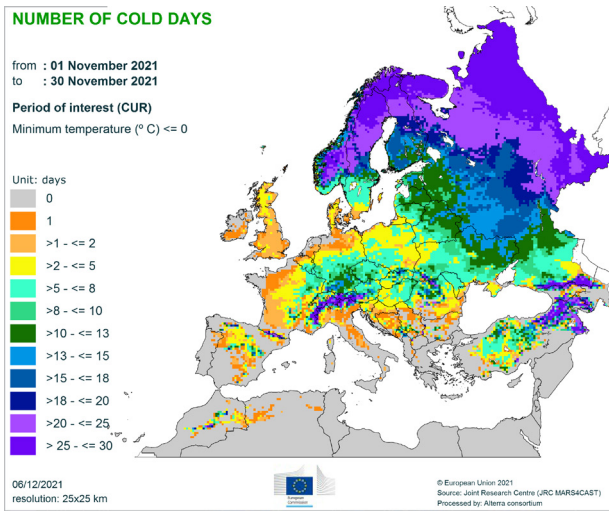
In northern Europe and most of European Russia, the hardening process is more advanced and the winter cereals are better prepared for the dormancy period.

¹ It is noted that, as of this winter, a more refined model is being used to calculate winter hardening. As a consequence, maps generated for this winter are not comparable to the maps published in previous years.

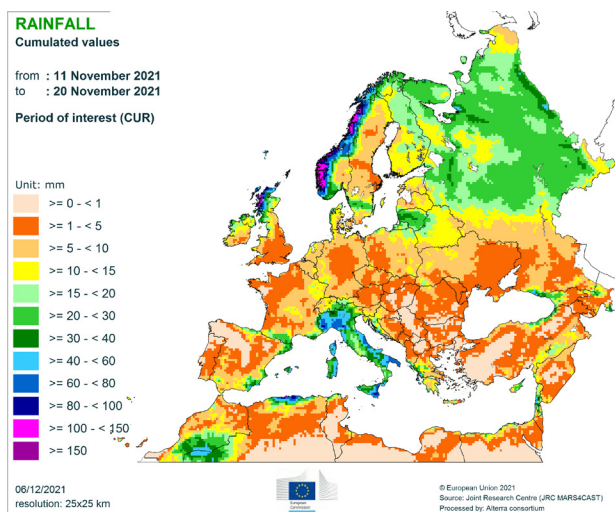
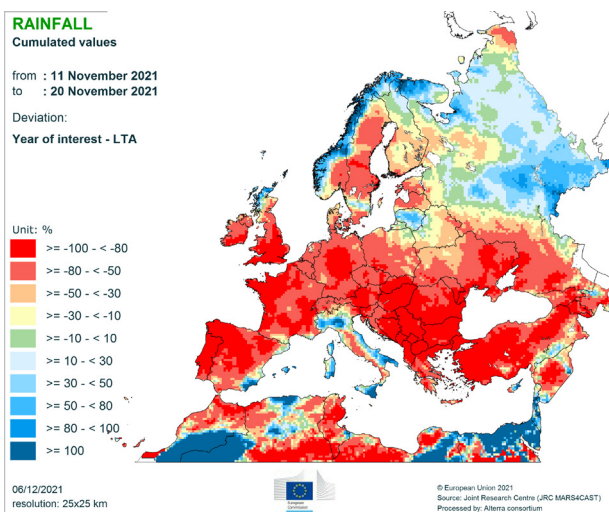
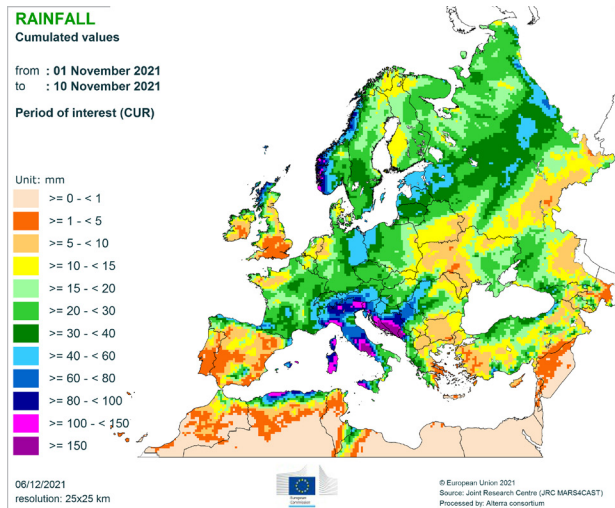
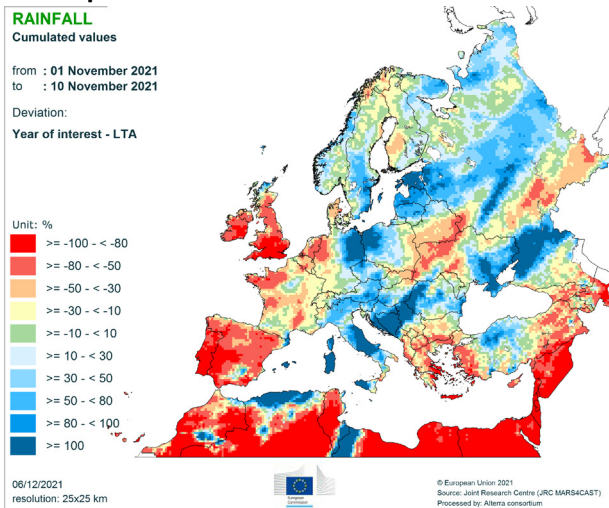
3. Atlas

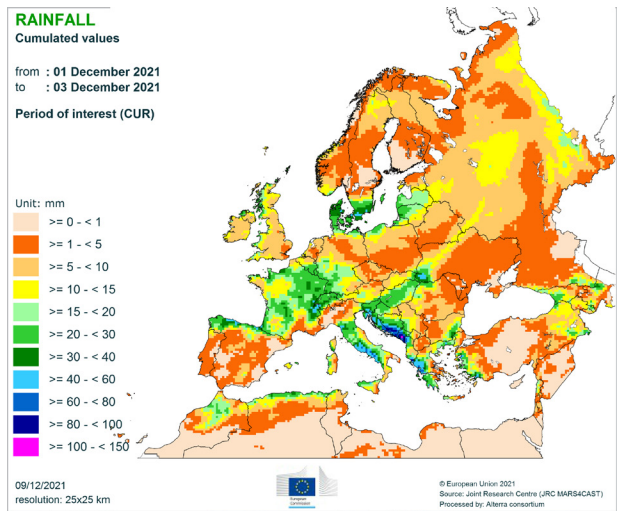
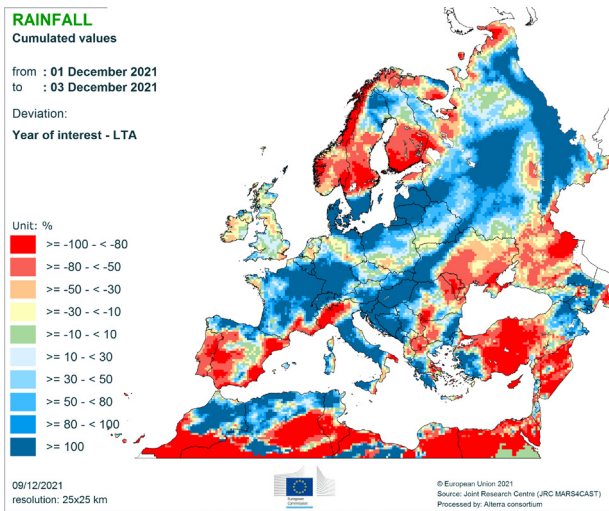
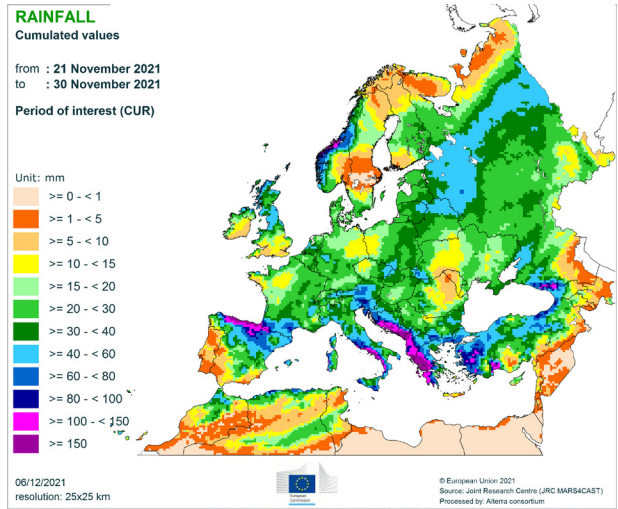
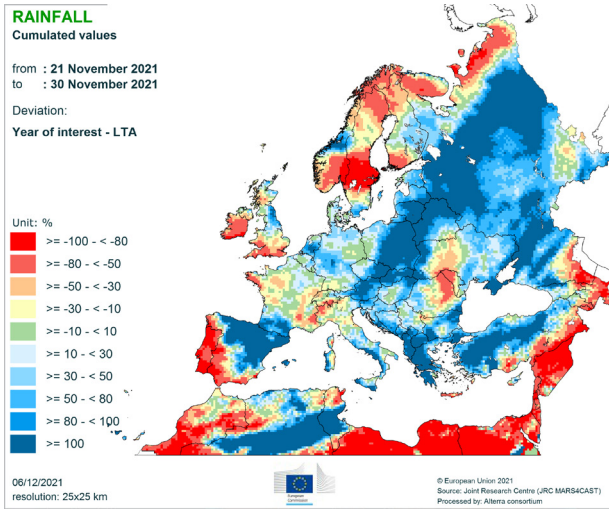
Temperature regime



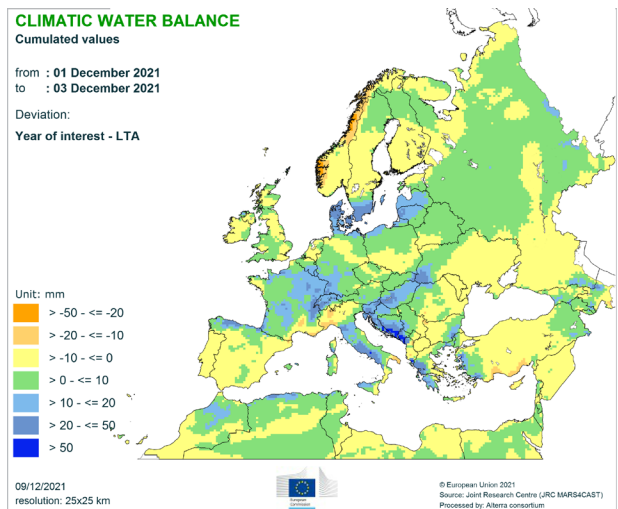
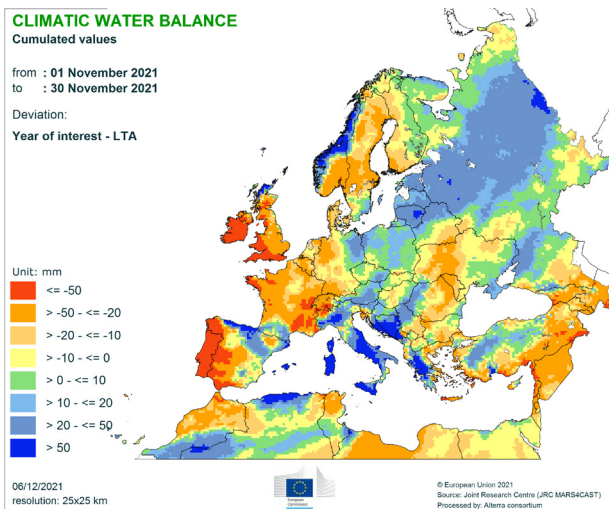


Precipitation





Climatic water balance



JRC MARS Bulletins 2021

Date	Publication	Reference
25 Jan	Agromet analysis	Vol. 29 No 1
22 Feb	Agromet analysis	Vol. 29 No 2
15 Mar	Agromet analysis, yield forecast	Vol. 29 No 3
26 Apr	Agromet analysis, remote sensing, pasture analysis, sowing conditions, yield forecast	Vol. 29 No 4
25 May	Agromet analysis, remote sensing, pasture analysis, sowing update, yield forecast	Vol. 29 No 5
21 Jun	Agromet analysis, remote sensing, pasture analysis, rice analysis, yield forecast	Vol. 29 No 6
26 Jul	Agromet analysis, remote sensing, pasture analysis, harvesting conditions, yield forecast	Vol. 29 No 7
23 Aug	Agromet analysis, remote sensing, pasture update, harvesting update, yield forecast	Vol. 29 No 8
20 Sep	Agromet analysis, remote sensing, pasture analysis, rice analysis, harvesting update, yield forecast	Vol. 29 No 9
25 Oct	Agromet analysis, pasture update, sowing conditions, harvesting update, yield forecast	Vol. 29 No 10
22 Nov	Agromet analysis, sowing update, harvesting update	Vol. 29 No 11
13 Dec	Agromet analysis	Vol. 29 No 12

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Analysis and reports

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