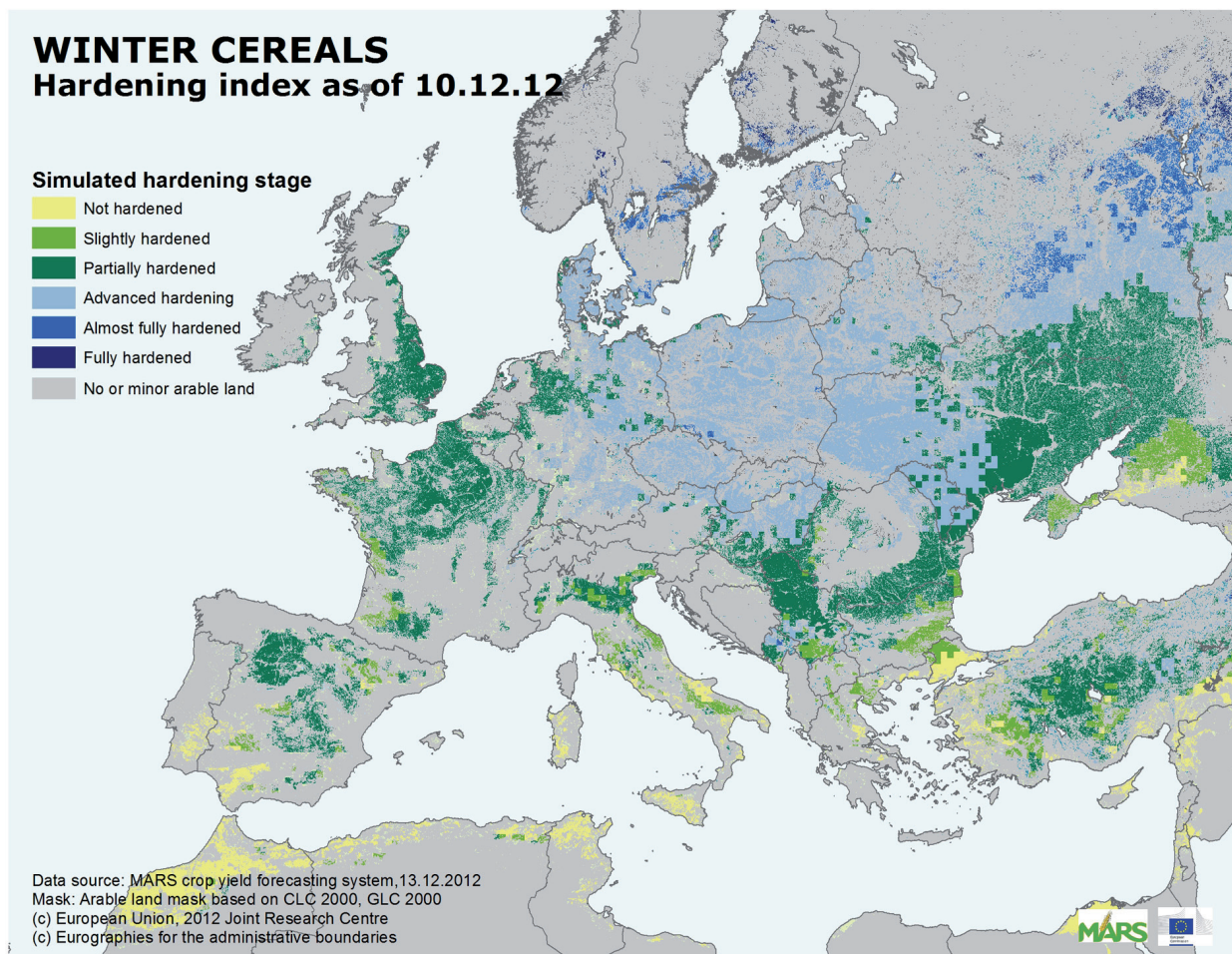


# Crop Monitoring in Europe

MARS BULLETIN Vol.20 No. 12 (2012)

## Winter cereal hardening is progressing well



The last dekad of November presented milder thermal conditions than usual in late autumn. Weather conditions changed in the first dekad of December and real winter conditions established across Europe. Severe and frequent frost events ruled the continent. Excessive precipitation was recorded for the British Isles and in the northern Mediterranean, though precipitation was abundant in most of Europe.

Currently thick and contiguous snow covers not only northern and eastern Europe, but also central Europe and the Balkan Peninsula. According to our simulations winter cereals hardening is progressing well and so far no frost kill damage has been simulated.

**1**

Agro-meteorological  
overview

**2**

Atlas maps

## 1. AGRO-METEOROLOGICAL OVERVIEW

**The last dekad of November presented milder thermal conditions than usual in late autumn. Weather conditions changed dramatically in the first dekad of December and real winter conditions established across Europe. Severe and frequent frost events ruled the continent. Excessive precipitation was recorded for the British Isles and in the northern Mediterranean, though precipitation was abundant in most of Europe. Currently thick and contiguous snow covers not only northern and eastern Europe, but also central Europe and the Balkan Peninsula.**

### Observed temperatures

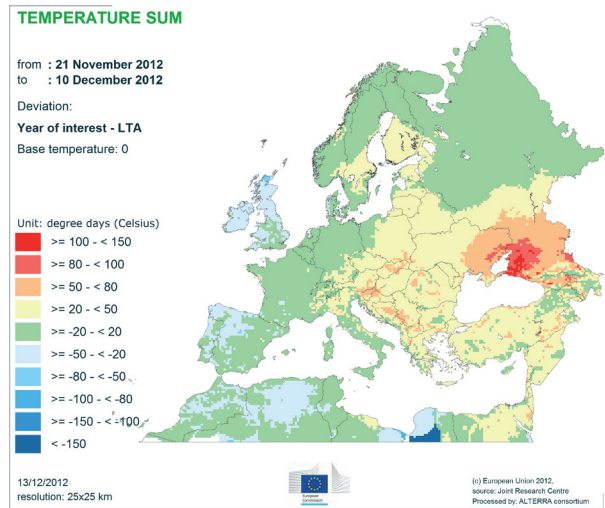
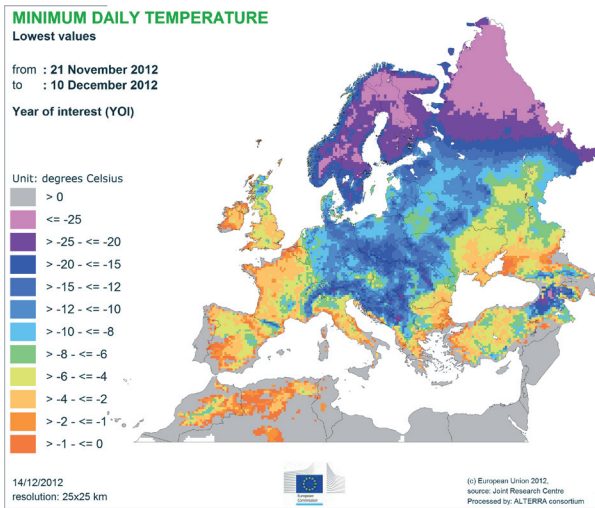
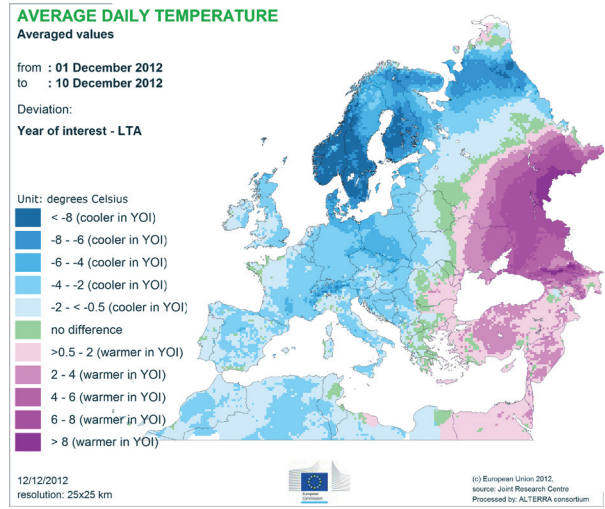
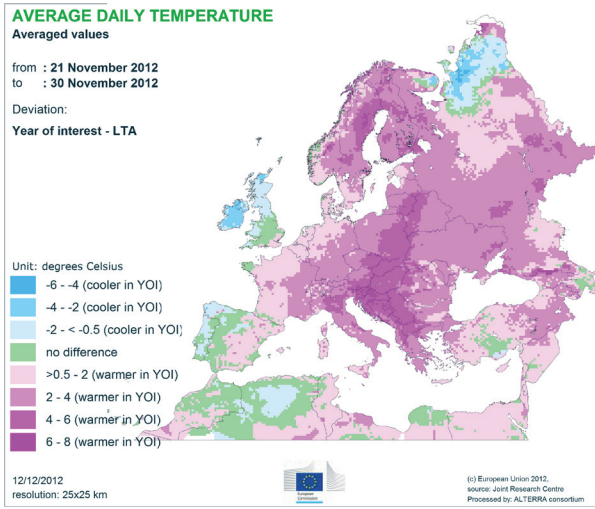
During November the temperature showed significant fluctuation, but the overall seasonal decreasing of temperatures was moderate and less than climatologically expected. The last dekad of November was warmer than usual for most of Europe with the exception of the western part of the Iberian Peninsula, some regions in Maghreb and the British Isles. Positive thermal anomalies from +4 to +6°C compared to the average temperature manifested in a wide strip between the Adriatic and northern Baltic regions. In the last days of November an arctic cold air intrusion started causing sharp decreases in temperature and consequently below average thermal conditions characterized the first dekad of December for most of Europe, with the exception of south eastern Europe including eastern Mediterranean. Also the Black Sea area and southern Russia remained warmer than usual. After 6 December harsh winter frosts occurred in central Europe. The temperature decreased below -10°C between the Baltic and Adriatic Sea, but in Poland, the Czech Republic and Slovakia as low as -15°C- -18°C minimum values were recorded. Only the southern coastline of the Atlantic and the Mediterranean Sea remained frost free. The cold spell of December brought the risk of winter kill damage. To evaluate the risk a frost kill model is run. Our model simulates the hardening index of a crop and thus provides an estimate of the low-temperature tolerance of cereals, taking into account plant physiology (hardening process, i.e. transformation of the cellular starch into glucose, thereby raising the freezing point of the cellular liquids). In our model a fully hardened winter cereal is considered to tolerate -18°C. The results of model runs based on observed weather conditions up to 10 December 2012 indicate no or slight low-temperature tolerance of winter cereals along the shore of southern Europe. Crops achieved medium frost tolerance in France, Benelux countries, the UK, central Spain, northern Balkan, Turkey, eastern Ukraine and southern districts of Russia. Winter crops are almost or fully hardened in an area from Germany to Belarus and western Ukraine just as the northern agricultural zones of Europe. No frost damages are simulated until now on the basis of our frost kill analysis. Taking into account the medium range weather forecast until 26 December the period is simulated to remain free of damage. The active temperature sum ( $T_{base}=0^{\circ}\text{C}$ ) for the considered time-period indicates characteristically +20-+50 growing degree days surplus eastward of Poland-Croatia with a remarkable local maximum close to the Sea of Azov and further with decreasing intensity towards the Caspian Sea. The above average thermal conditions on these territories favoured the development of winter crops.

### Observed precipitation

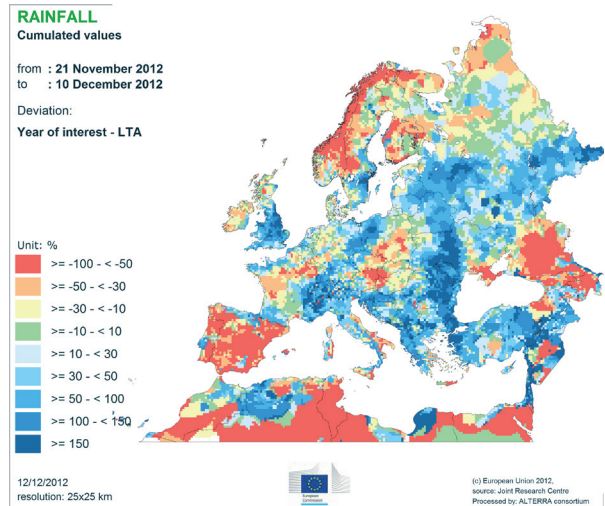
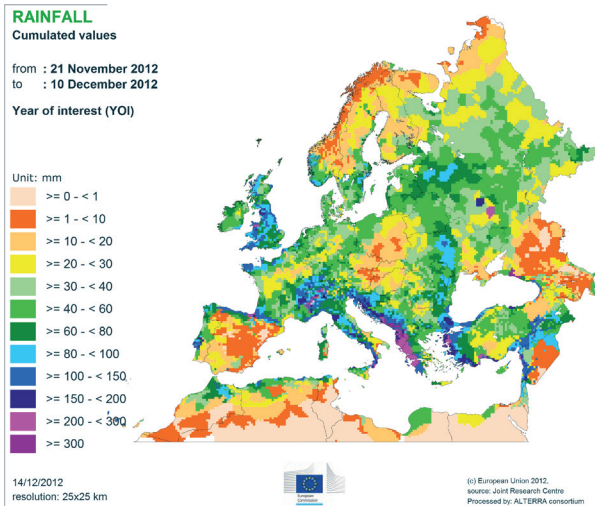
The precipitation amount from 21 November until 10 December was above average in Germany, Bulgaria, Romania, Turkey, Belarus, most of Ukraine and large areas of central Russia. Excessive precipitation surpassed 150 mm in *Middle England*, in some regions on the western and northern shore of the Iberian Peninsula as well as in the Alpine region, northern Italy, and along the western coast of Tyrrhenian, Adriatic, Ionian and Aegean Sea. These areas received a rain surplus of over 75 mm as compared to the long term average. Favourably plentiful rain was also recorded in Morocco and Algeria. Hardly any precipitation (<10 mm) was measured in eastern Spain, in western Scandinavia, and in smaller districts of Austria, Hungary, Slovakia and Poland. Primarily most of Scandinavia and the northern areas of Russia were snow covered, but starting the last days of November, more and more thick snow covered central Europe. On 10 December snow covered not only most of Scandinavia, but also areas from eastern France and Germany to Russia including Poland, central Europe, northern Italy, the Balkan Peninsula and Ukraine as well as Turkey. Snow depth has a significant spatial variability, but reaches characteristically 5-15 cm on the lowlands and exceeds 20 cm on given regions of the Balkan, Romania and Ukraine.

## 2. ATLAS MAPS

### Temperatures



### Precipitation



## 2012 MARS Bulletins

Date	Publication	Reference
13 Jan	Agromet. analysis	Vol. 20 No. 1
10 Feb	Agromet. analysis	Vol. 20 No. 2
26 Mar	Agromet. analysis and yield forecast	Vol. 20 No. 3
23 Apr	Agromet. analysis, remote sensing analysis, and yield forecast	Vol. 20 No.4
29 May	Agromet. analysis, remote sensing analysis, and yield forecast, pasture analysis	Vol. 20 No. 5
25 Jun	Agromet. analysis, remote sensing analysis, and yield forecast, pasture update	Vol. 20 No. 6
23 Jul	Agromet. analysis, remote sensing analysis, and yield forecast, pasture update, rice analysis	Vol. 20 No. 7
27 Aug	Agromet. analysis and yield forecast, pasture update	Vol. 20 No. 8
24 Sep	Agromet. analysis, remote sensing analysis and yield forecast, pasture update	Vol. 20 No. 9
22 Oct	Agromet. analysis, remote sensing analysis and yield forecast, pasture analysis, rice analysis	Vol. 20 No. 10
26 Nov	Agromet. analysis, campaign review and yield forecast	Vol. 20 No. 11
17 Dec	<a href="#">Agromet. analysis</a>	<a href="#">Vol. 20 No. 12</a>

A great deal of additional information on the European Union is available on the Internet. It can be accessed through the Europa server <http://europa.eu>.

Luxembourg: Publications Office of the European Union

© European Union, 2012

Reproduction is authorised provided the source is acknowledged.

*Printed in Italy*

As the Commission's in-house science service, the Joint Research Centre's mission is to provide EU policies with independent, evidence-based scientific and technical support throughout the whole policy cycle. Working in close cooperation with policy Directorates-General, the JRC addresses key societal challenges while stimulating innovation through developing new standards, methods and tools, and sharing and transferring its know-how to the Member States and international community.

The mission of the JRC-IES is to provide scientific-technical support to the European Union's policies for the protection and sustainable development of the European and global environment.

The current **MARS\* Bulletin** is an EC publication from AGRI4CAST (JRC/IES MARS Unit)

All **MARS Bulletins** are available under:  
<http://mars.jrc.ec.europa.eu/mars/Bulletins-Publications>  
**MARS agro-meteorological data** and data processing is available at the MARS Web Viewer:  
<http://www.marsop.info>

### Analysis and reports

A. Bussay, G. Fontana

### Reporting support

C. Aspinall, I. Biavetti

### Edition

B. Baruth, S. Niemeyer

### Data production

MARS unit AGRI4CAST/JRC and ALTErrA (NL), Meteoconsult (NL), VITO (BE)

### Contacts

JRC-IES-MARS / AGRI4CAST Action  
[info-agri4cast@jrc.ec.europa.eu](mailto:info-agri4cast@jrc.ec.europa.eu)

**JRC 68576**  
**EUR 24736 EN**  
**ISSN 1831-9424**  
**ISSN 1831-9793**

© European Union 2012

\*MARS stands for Monitoring Agricultural Resources

### Legal Notice

Neither the European Commission nor any person acting on behalf of the Commission is responsible for the use which might be made of this publication.

### Disclaimer

The geographic borders are purely a graphical representation and are only intended to be indicative. The boundaries do not necessarily reflect the official EC position.