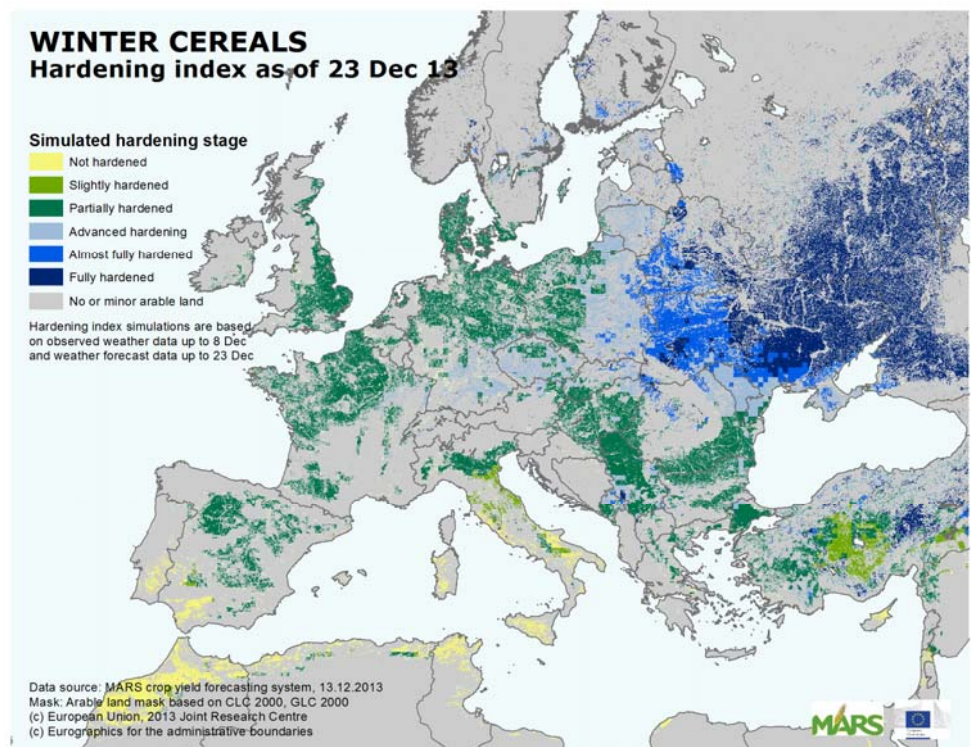


Crop monitoring in Europe

MARS Bulletin Vol. 21 No. 12 (2013)

No frost kill expected in the near future

The decreasing temperatures of late autumn and early winter initiated the hardening of winter cereals. During this process, the freezing point of plant cellular liquids decreases, thus increasing the tolerance of winter crops to low-temperatures, which is crucial to survive harsh winter conditions. Our model simulation results indicate some delay in hardening in central and eastern areas of Europe due to the mild thermal conditions of the last two months. Winter wheat has reached almost maximum winter tolerance in the Near Volga District, and some areas in Finland, Sweden and eastern Turkey.



Hardening is well advanced in southern Germany, the south-western half of the Czech Republic, as well as in northern Europe, most of Belarus, in the Central Okrug of Russia and some areas in northern and eastern Ukraine. Winter crops are partially hardened in a wide region extending from the British Isles and Spain to the Black Sea. No or slight low-temperature tolerance has been reached in the southern Mediterranean regions. No frost kill has been

simulated so far in Europe.

Considering the ten days weather forecast until 23 December, the winter cereals will complete hardening in Russia, Ukraine and Belarus; and frost tolerance will increase significantly in the eastern regions of Poland and the Baltic countries for the last dekad of December. Frost kill events are unlikely to happen during this period.

Agro-meteorological overview (1 November – 10 December)

During November warmer-than-usual weather conditions prevailed in eastern Europe and above-average precipitation was recorded in central Europe and northern Russia. December started with temperatures below the average across Europe and drier than usual conditions in the Mediterranean region and western Europe.

Observed temperatures

During November, Europe was divided in two parts: Above-average temperatures prevailed in the east, and also in Italy, while normal or subnormal temperatures prevailed in the west. Daily air temperatures exceeded the average by 4-6°C in Russia, Ukraine, Romania and the eastern part of Belarus; and by 2-4°C in the Baltic countries, Finland, and in the region between the Black Sea and the Balkan Peninsula. By contrast, negative average temperature anomalies in the range of -0.5 to -2°C were observed in central and southern France, the UK, Spain and southern Portugal. The first dekad of December was characterised by colder-than-usual weather conditions over Europe. The mean daily air temperature was 6 to 8°C below the long-term average

over northern Russia, the Scandinavian Peninsula and Turkey, and 2 to 4°C below the long-term average in the Iberian Peninsula, France, northern and central Italy, the Balkan Peninsula, Romania, Hungary and Bulgaria. The coldest period was recorded between 28 November and 4 December with minimum temperatures in the range of -10 - -15°C in Russia, Belarus and northern Europe, and in the range of -6 - -10°C in some areas of the eastern Europe, southern Germany, central France, northern Spain, the Alpine region and the Balkan Peninsula. The cumulated active temperatures ($T_{base}=0^{\circ}\text{C}$) since the beginning of September remained above the average over whole Europe, with the exception of Turkey and the eastern part of the Black Sea region.

Observed rainfall

Cumulated rainfall recorded in November exceeded the long-term average, by more than 50% in south-western and northern parts of France, northern Spain, central and southern Italy, Austria, Slovenia, Croatia, Greek, southern Poland, Belarus and the western part of Russia. In contrast, the Iberian Peninsula and Ireland were much drier than usual, with cumulated rainfall up to 80% below average. Below-average rainfall was also observed in Ukraine and Turkey. During the first dekad of December drier than usual conditions continued over the Iberian Peninsula, and were also observed in France,

the southern part of the United Kingdom, the Benelux Countries, southern Germany, northern and central Italy and also in the area between the Balkan Peninsula and the Black Sea region. During this period rainfall was scarce or absent (<5 mm) in the Iberian Peninsula, southern France, northern Italy, Slovenia, Hungary and the eastern part of Romania. Rainfall was slightly above average in northern Europe. In the period from 29 November to 3 December, cumulated rainfall above 100 were recorded in Basilicata, Puglia and Calabria (south Italy), causing floods.

AVERAGE DAILY TEMPERATURE

Averaged values

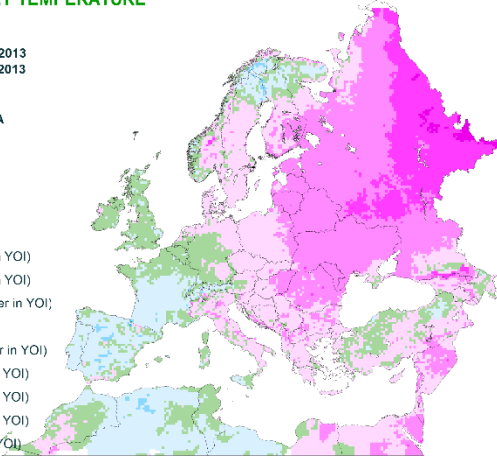
from : 01 November 2013
to : 10 December 2013

Deviation:

Year of interest - LTA

Unit: degrees Celsius

- $-6 - -4$ (cooler in YOI)
- $-4 - -2$ (cooler in YOI)
- $-2 - -0.5$ (cooler in YOI)
- no difference
- $>0.5 - 2$ (warmer in YOI)
- $2 - 4$ (warmer in YOI)
- $4 - 6$ (warmer in YOI)
- $6 - 8$ (warmer in YOI)
- > 8 (warmer in YOI)



12/12/2013
resolution: 25x25 km



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TEMPERATURE SUM

from : 01 September 2013
to : 10 December 2013

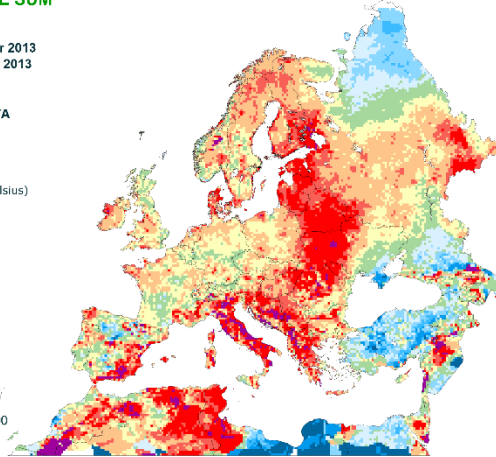
Deviation:

Year of interest - LTA

Base temperature: 0

Unit: degree days (Celsius)

- ≥ 150
- <math>\geq 100 - < 150</math>
- <math>\geq 80 - < 100</math>
- <math>\geq 50 - < 80</math>
- <math>\geq 20 - < 50</math>
- <math>\geq -20 - < 20</math>
- <math>\geq -50 - < -20</math>
- <math>\geq -80 - < -50</math>
- <math>\geq -100 - < -80</math>
- <math>\geq -150 - < -100</math>
- <math>< -150</math>



12/12/2013
resolution: 25x25 km



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RAINFALL

Cumulated values

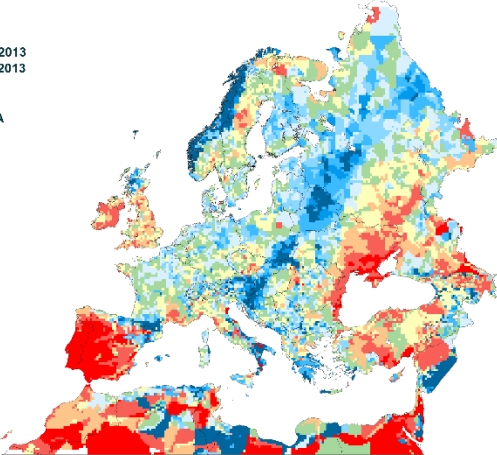
from : 01 November 2013
to : 10 December 2013

Deviation:

Year of interest - LTA

Unit: %

- <math>\geq -100 - < -80</math>
- <math>\geq -80 - < -50</math>
- <math>\geq -50 - < -30</math>
- <math>\geq -30 - < -10</math>
- <math>\geq -10 - < 10</math>
- <math>\geq 10 - < 30</math>
- <math>\geq 30 - < 50</math>
- <math>\geq 50 - < 80</math>
- <math>\geq 80 - < 100</math>
- ≥ 100



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RAINFALL

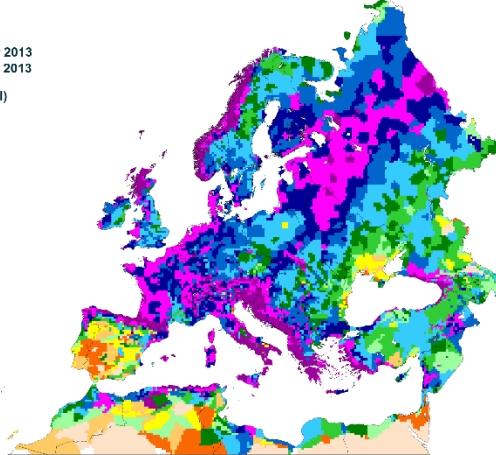
Cumulated values

from : 01 November 2013
to : 10 December 2013

Year of interest (YOI)

Unit: mm

- <math>\geq 0 - < 1</math>
- <math>\geq 1 - < 5</math>
- <math>\geq 5 - < 10</math>
- <math>\geq 10 - < 15</math>
- <math>\geq 15 - < 20</math>
- <math>\geq 20 - < 30</math>
- <math>\geq 30 - < 40</math>
- <math>\geq 40 - < 60</math>
- <math>\geq 60 - < 80</math>
- <math>\geq 80 - < 100</math>
- <math>\geq 100 - < 150</math>
- ≥ 150



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SNOW DEPTH

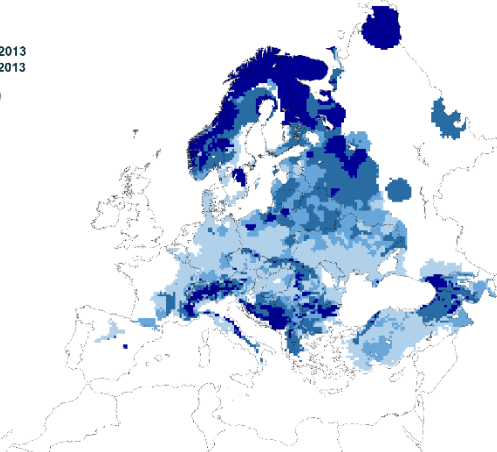
Highest values

from : 01 November 2013
to : 10 December 2013

Year of interest (YOI)

Unit: cm

- 0
- $> 1 - \leq 5$
- $> 5 - \leq 10$
- $> 10 - \leq 20$
- > 20



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MINIMUM DAILY TEMPERATURE

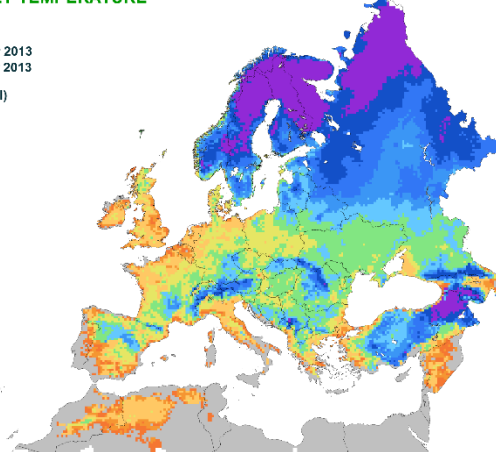
Lowest values

from : 01 November 2013
to : 10 December 2013

Year of interest (YOI)

Unit: degrees Celsius

- > 0
- ≤ -20
- $> -20 - \leq -15$
- $> -15 - \leq -12$
- $> -12 - \leq -10$
- $> -10 - \leq -8$
- $> -8 - \leq -6$
- $> -6 - \leq -4$
- $> -4 - \leq -2$
- $> -2 - \leq -1$
- $> -1 - \leq 0$



12/12/2013
resolution: 25x25 km



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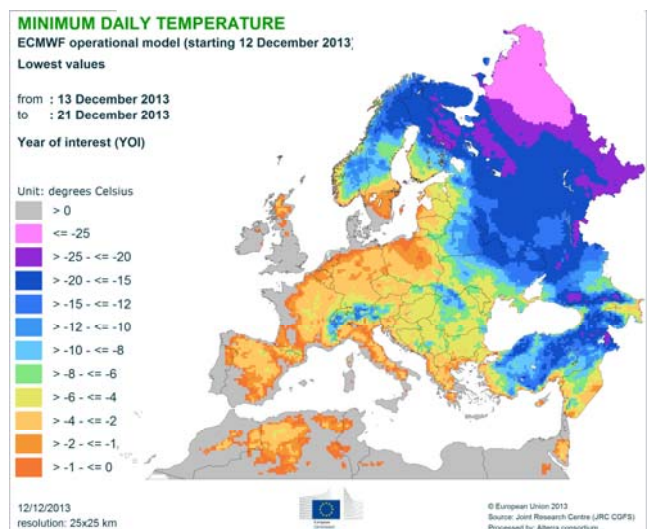
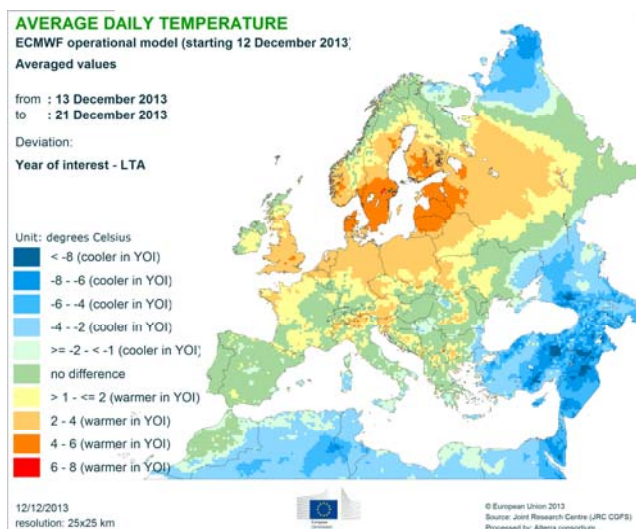
Weather forecast for the coming days (13 – 21 December)

Below-average temperatures are expected over southern Russia, Turkey and northern Africa, whereas warmer-than-usual conditions will prevail in a wide belt extending from the British Isles to the central part of Russia. Frost kill is unlikely to occur during the forecast period. Most of Europe is expected to remain drier-than-usual, with the exception of the British Isles, southern Scandinavia, Denmark, southern Finland and the north-western part of the Iberian Peninsula.

Temperature forecast

Anticyclonic air movement is expected to bring colder-than-usual temperature conditions over southern Russia, Turkey and northern Africa. Average daily air temperatures over northern Africa are expected to drop to 2 – 4 °C below the long-term average. Even colder air temperature anomalies are expected over Turkey and southern Russia, with average daily temperatures down to 8 °C below the long-term-average. Sub-zero minimum daily air temperatures are expected over

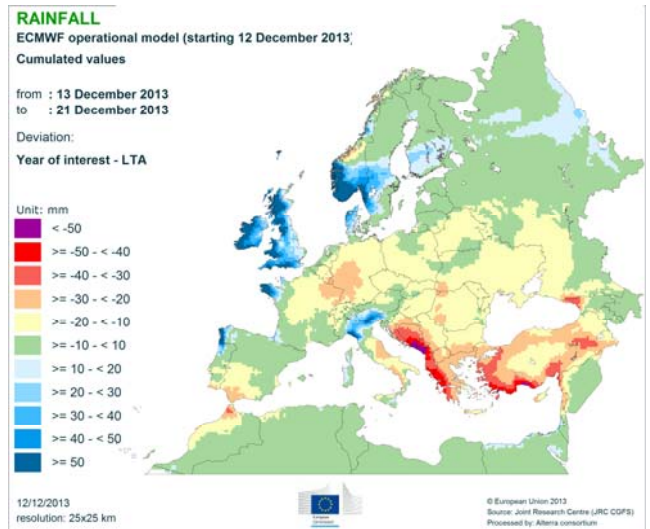
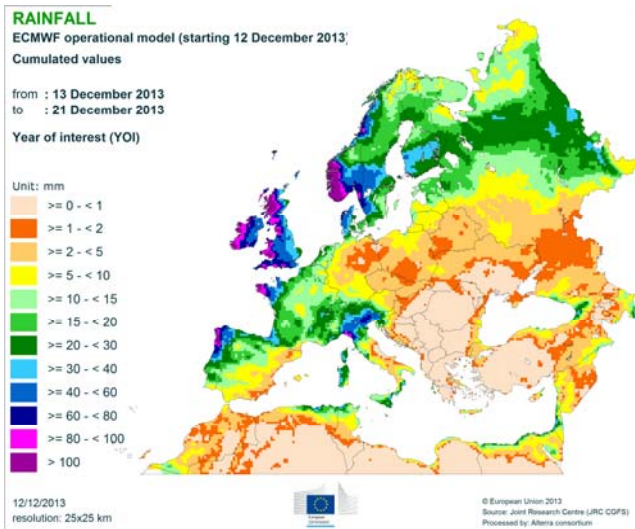
major parts of Europe, with values below -4 °C in south-eastern Europe and parts of central Europe, and even significantly lower values in eastern and northern Europe, and Turkey. On the other hand, warmer-than-usual conditions are expected in a wide belt extending from the British Isles to the central part of Russia. Average daily air temperatures over the Baltic countries and southern Scandinavia are expected to increase up to 6 °C above the long-term-average.



Precipitation forecast

A high-pressure system is expected to dominate European weather during the forecast period. This implies dry conditions over central Europe, most of eastern Europe, the Balkan Peninsula, southern Italy, the southern part of the Iberian Peninsula and Turkey. Northern Europe, however, is expected to be affected by a series of frontal systems moving over this region,

bringing relatively high variations in temperature and precipitation. Above-average precipitation is therefore forecast over a band crossing the British Isles, southern Scandinavia, southern Finland, Denmark and the north-western part of the Iberian Peninsula. Above-average precipitation is also expected over northern Italy.



MARS Bulletins 2013

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

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