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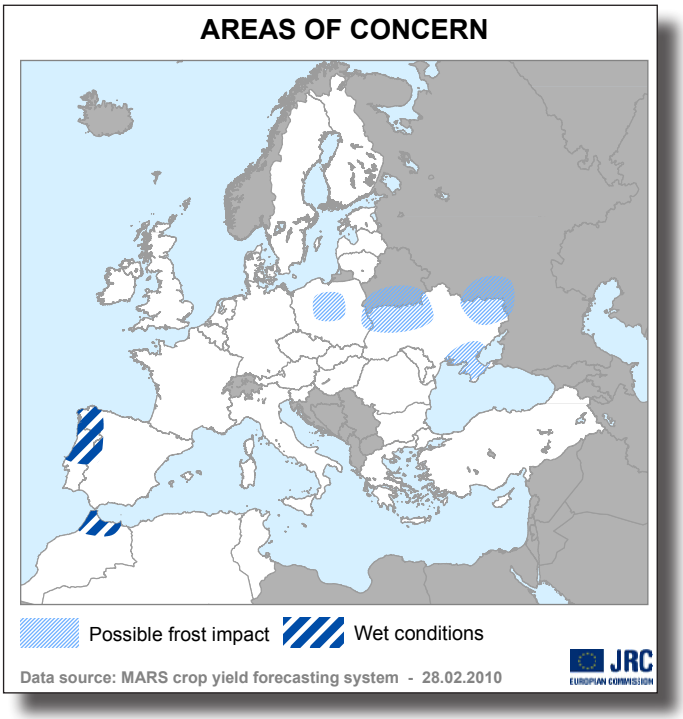
MARS AGROMETEOROLOGICAL Crop Monitoring in Europe

1st November 2009 to 28th February 2010 Vol. 18, No. 1

Mild autumn followed by a cold winter in central Europe; prospects generally positive



Contents

Highlights

In autumn, generally mild temperatures determined quite favourable conditions for winter crops. The autumn was also characterized by abundant rain in the Mediterranean basin, leading to a forecast of good potential productivity of durum wheat areas, especially in Greece and Italy, as well as in Morocco and Tunisia.

Close to the end of the year and again in January and in February, extremely low temperatures with likely frost impacts occurred in Russia, Ukraine, Belorussia, central Turkey and central Poland. However, the real effects of these phenomena on crop production of these areas is expected to be limited and within normal conditions.

For soft wheat, general good yields are forecasted at EU level. On the contrary, lower yield levels are expected for rape seed, compared to last year, as well as with respect to the past five - year average - mainly due to delays in development in main production districts.

It is important to note that planted area in the EU will likely diminish this year compared to the previous ones. This reduction may counter the observed favourable agrometeorological conditions and associated positive crop yield forecasts,, with yet uncertain impacts on final total cereal production.

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1. Agrometeorological overview

1.1. Temperatures

Almost all over the continent (except the British Isles and northern Spain) a very mild autumn (in particular in the eastern EU, Ukraine and Belarus) was followed by a seasonal winter, marked by extremely low temperatures.

A persistent shift in the seasonal conditions appears to be occurring across most of Europe in autumn. For the fourth consecutive year this season again brought milder than seasonal temperatures, even milder than last year.

These conditions were more marked in **November** than in **December** (in many areas November 2009 was the warmest on record in the MARS database; only in 1990 were similar conditions recorded). Almost up to mid-December the temperatures were above the seasonal average, before dropping drastically. However, by the end of the year, practically over the whole continent, a marked surplus of growing degree days (GDD) had accumulated (100 to 150 GDD, over 40 % more than the long-term average or LTA), in particular in Germany, eastern parts of the EU, Romania, Bulgaria and the Black Sea area, but also in central Italy, eastern Spain, Turkey and the Maghreb countries. By contrast, Ireland and Scotland were the only countries where a deficit was recorded: between 50 and 70 GDD (15 to 20 % below the LTA). The surpluses were mainly due to the above-seasonal daily minimums recorded during this period, especially in November. This created favourable conditions for rapid germination and tillering of the new winter cereals, but also exposed the new plants to a risk of frost damage. However, from the beginning of December on, the atmospheric circulation changed and a progressive and rapid drop in temperatures favoured hardening of winter cereals. During the last ten days of the year, the general circulation pattern changed and Arctic air was pushed all over the continent, triggering a rapid plunge in temperatures: the minimums fell to -17°C in Castilla y León, -19°C in eastern Germany, -20°C in the eastern part of the Po valley, -20°C in southern Sweden, -23°C in eastern Poland, Slovakia, Hungary and northern Romania and -25°C in western Ukraine. Luckily, this temperature drop was coupled with abundant snow which probably protected the winter crops. Some impact was possible locally in eastern Germany (Magdeburg), central Poland (Kujawsko), western Belarus, north-western Ukraine and eastern Russia. Turkey and Morocco were the only countries where the temperatures during this period were above the seasonal average.

In **January** and **February** large temperature fluctuations occurred and by the end of February the cumulated GDD values were down on the normal seasonal conditions in the western parts of the EU (Denmark, north-western Germany, France, the British Isles, the Benelux countries and northern Spain, where the deficits were estimated at 100 to 120 GDD or 30 to 40 %) but up in the Balkans, Greece, Bulgaria, Romania, Turkey and the whole of the southern side of the Mediterranean where, on the contrary, surpluses of between 80 and 140 GDD occurred. At the end of January another severe frost struck: again the minimum dropped below -15°C to -20°C in eastern parts of the EU, but also in eastern Germany and in the Black Sea basin and Russia. In these areas the snow cover was insufficient to protect the vegetation completely and injuries to crops (reduction in leaf area) were likely.

Abstract

The 1st 2010 printed MARS Bulletin (Vol. 18, No. 1) covers meteorological analysis and crop yield forecasts for the period 1 November 2009 to 28 February 2010.

Previous related analysis available:

—Climatic update, 27/01/2010 to 23/02/2010, (CU2010/1)

—Complete Bulletin, 11/09/2009 to 20/10/2009 (Vol. 17, No. 6)

Next printed issue

Vol. 18, No. 2: 1 March - 30 April 2010 analysis and forecasts.

Contributions

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MARS stands for Monitoring Agricultural Resources.

Technical note:

The long-term average used within this bulletin as a reference is based on an archive of data covering 1975–2008.

The CNDVI is an unmixed normalised vegetation index on the base of Corine land cover 2000 for arable land or grassland.

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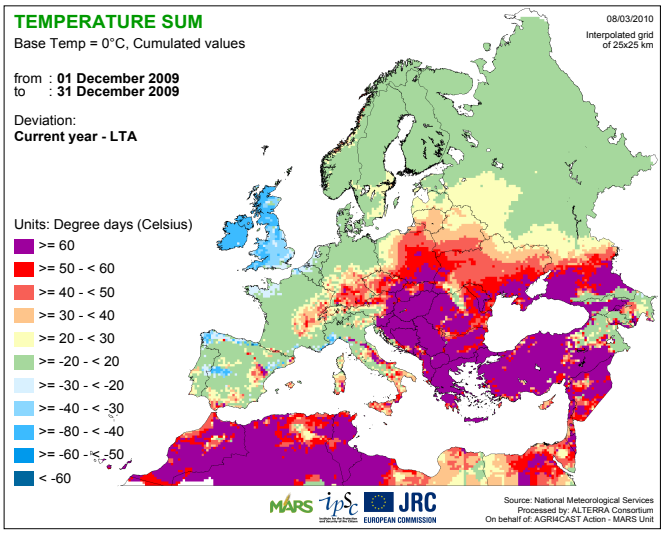
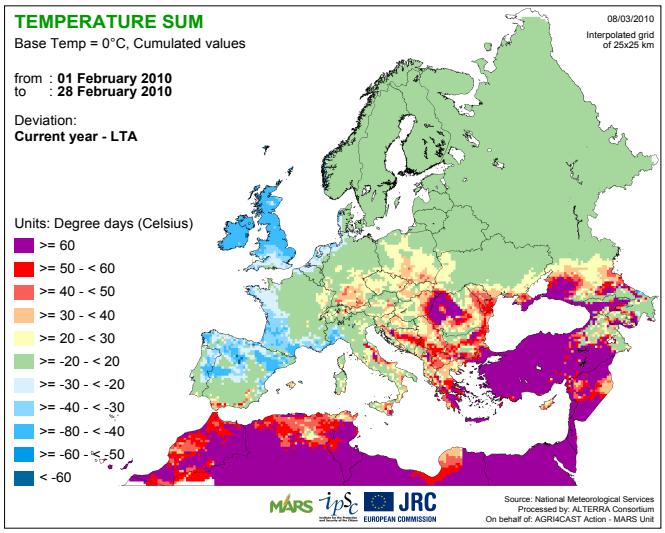




1.2. Rainfall and climatic water balance

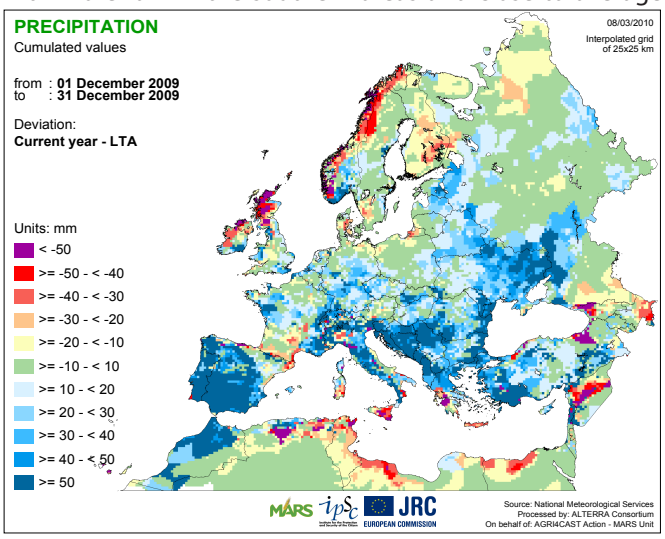
Abundant rain in autumn and winter similar to the previous season: quite wet and favourable in all the Mediterranean region, whilst relatively dry in the extreme northern latitudes.

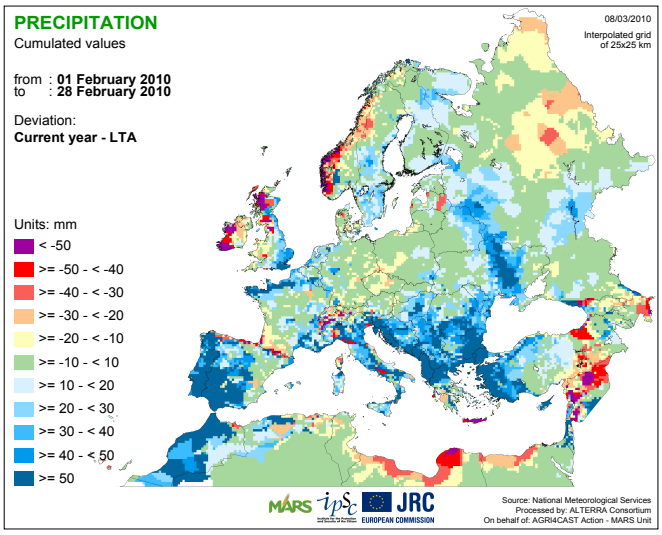
At first glance, the water supply during autumn and winter appeared adequate for favourable and prompt germination and to replenish the soil water content, in particular in the Mediterranean countries. There this is the season to build up the soil water reserves to be drawn on during the months ahead. Currently, the outlook for the 2010 yields in the Mediterranean region is promising, but in particular contexts (clay soils or soils with limited drainage) the rainfall probably hampered field preparation and timely sowing of winter cereals (southern Italy, Midi-Pyrénées and eastern Greece).

In the southern latitudes (southern Spain, southern Italy and the Maghreb countries) November is normally the busiest period for field activities (field preparation, sowing, protection of the new crops, etc.) and the relatively low rainfall was therefore favourable: in general 10-20 mm were recorded or no rainfall at all, as in southern Spain. By contrast, rain was quite abundant in the areas along the Atlantic coast (50 to 80 mm above the LTA). In December too the rain distribution was generally fairly favourable, with more rain in the southern areas and close to average for the rest. This provided adequate soil moisture for prompt germination and to replenish the soil reserves. In southern Spain and Portugal, Morocco, Slovenia, eastern Bulgaria and Romania the cumulated rain values were significantly (80 to 120 mm) above the LTA.

In January the water supplies were once again more abundant in the Mediterranean region (Morocco, southern Spain, except Castilla La Mancha, Portugal, central and southern Italy, the Balkans and Crete) and in the Black Sea basin (central and southern Ukraine, Romania, Bulgaria, Turkey and Georgia): 80-150 mm (60 to 80 % above the LTA). By contrast, again in the northern countries (central France, central Germany, Poland, the Baltic countries, Denmark, Sweden and Finland) only a few millimetres of rain were recorded: 20 to 40 mm, significantly below the LTA. Extreme spells of rain occurred in Sicily (205 mm on 15 January) and in northern Morocco (110 mm on 4 January), possibly with an impact at local level.

Similar conditions persisted during the first half of February, when rain was again more abundant in the Mediterranean region, in the Black Sea basin and in Ukraine. In the second part of the month the general atmospheric circulation changed, with a high pressure system influencing the Mediterranean basin and pushing the rainy fronts towards





higher latitudes. The rain was persistent and in some cases also extremely abundant in Portugal (120-150 mm), Galicia (above 250 mm) and southern Spain (70-90 mm), along the Atlantic side of France (100 mm) and in the southern UK (70-80 mm) accompanied by strong winds. Local floods occurred with an impact mainly on permanent crops and infrastructure.

2. Country-by-country review of the season

E U - 27

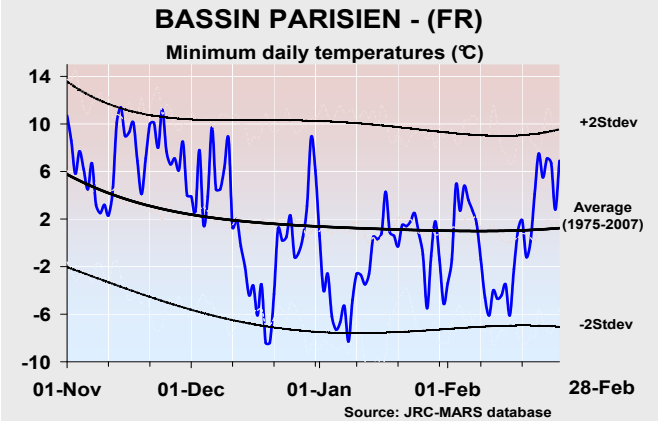
France: significant cold period during January and February. Seasonal water balance

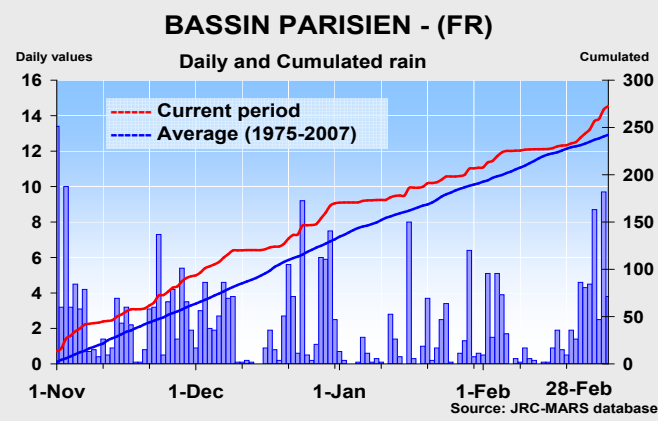
The yield forecast for soft wheat is 7.3 t/ha, lower than last year (down by 4.6 %). Durum wheat production is expected to be about 4.9 t/ha, 2.9 % down on last year's yield. The winter barley yield is expected to be around 6.5 t/ha, 5.0 % less than last year. Rapeseed is forecast at 3.4 t/ha.

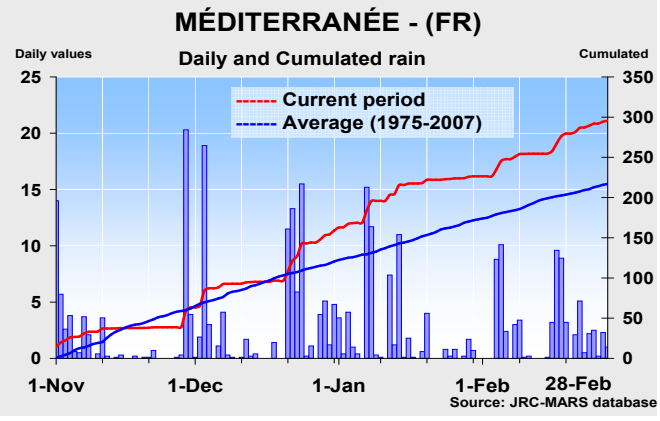
Until 15 December the temperature values recorded were higher than normal. Between mid-December and 20 February a cold period followed, with very low temperatures (the third coldest year for the last 35 years) and minimum temperatures 8°C below the seasonal values. The same conditions also prevailed in southern France.

Moreover, between 19 and 21 December, temperatures dropped to -14°C to -16°C on the eastern side of the Bassin parisien. These temperatures did not harm crops because of the dormancy period and the sufficient hardening, but they had a direct impact on crop development. Normal crop development was observed until mid-December, but then the low temperatures in January and February stopped the development of wheat and rapeseed. However, warmer temperatures in the last ten days of February allowed crops to catch up on the delay and by the end of the month crop development was comparable to the previous year.

Rainfall accumulated over the period from November to February, with favourable increases in every region, especially in the south. However, over this period the rainfall distribution was very variable. Every region received abundant rainfall combined with warmer conditions in November and December. January and February were dry in the northern and eastern regions and wet in Mediterranean regions (particularly in Provence-Alpes-Côtes d'Azur). In the south-western regions average values were registered. This water supply in southern France was particularly favourable for durum wheat. However, dry conditions were observed in the Marne and Hérault departments which could affect soft and durum wheat growth during the development stages.







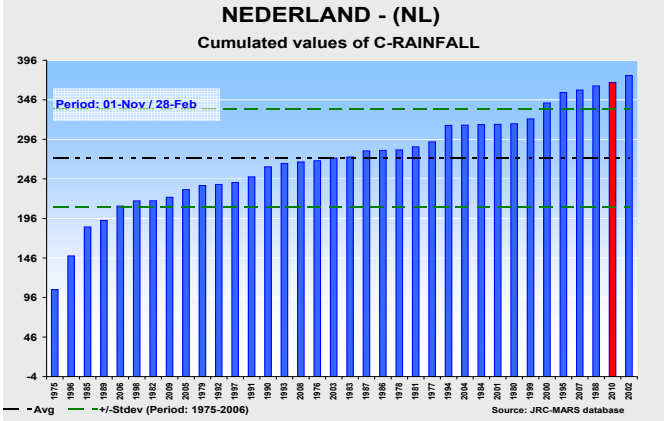
Belgium, the Netherlands and Luxembourg: rainfall significantly above average but very cold temperatures

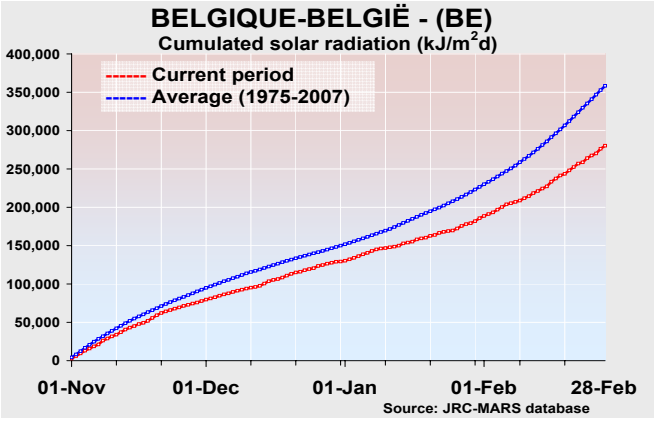
Delays in development due to very cold conditions, but still comparable to the corresponding period last year. Reasonable crop yields are expected for winter cereals: lower than last season, but still higher than the long-term average.

The cumulative rain values observed from November to the end of February in all three Benelux countries were much higher than the long-term average. In the Netherlands 2010 could be considered an exceptional year. Analysis shows a deficit of solar radiation and three ten-day periods with very cold temperatures. The temperatures observed in all three countries during the third ten-day period of December and the first and third ten-day periods of January were very low in comparison with the average.

These general conditions led to a delay in the development of winter cereals and rapeseed. Nevertheless, this delay had been reduced in all three Benelux countries by the end of February and crops had even caught up well in Luxembourg, mainly due to an increase in temperatures at the end of February and good soil moisture conditions.

Winter soft wheat yields are forecast at 8.8 t/ha in Belgium, 8.7 t/ha in the Netherlands and 6.4 t/ha in Luxembourg. This is lower than the previous year in all three countries: by 9.8 % in the Netherlands, 4.0 % in Belgium and 2.1 % in Luxembourg. However, the forecast yields are still slightly higher than the long-term average: by 4.0 %, 4.3 % and 1.7 % for Belgium, Luxembourg and the Netherlands respectively. The same trend can be seen for winter barley in Belgium, where yield is forecast at 8.5 t/ha (1.4 % down on 2009 but 4.4 % above the long-term average). Rapeseed is forecast at 4.1 t/ha for Belgium compared with 4.4 t/ha in 2009 (down by 6.7 %) and the long-term average of 4.0 t/ha (3.9 % above the LTA).





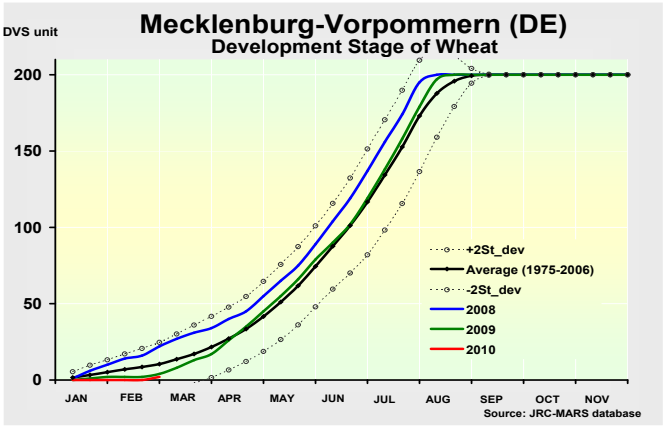
Germany: slight delay in the restart of development of winter crops despite the advance observed at the end of 2009

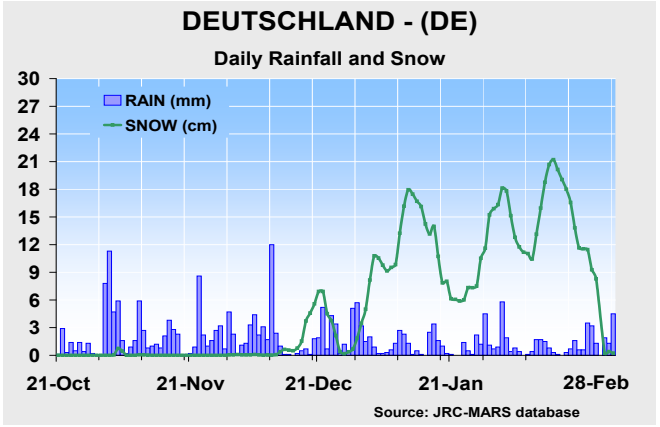
The deep snow cover limited the impact of the frost in January, but caused a long delay in the restart of the vegetative phase of winter crops. The thaw will take the soil water content to average values.

In terms of average temperatures, Germany had a seasonal winter. Temperatures were 35 % higher than normal, but this is purely due to the high values recorded at the end of last year. In fact January and February showed a deficit in thermal accumulation (70 % below the LTA) which was even more marked in northern (e.g. Niedersachsen) and western regions (e.g. Rheinland-Pfalz). Some big drops in temperatures were recorded in January across the whole country (e.g. -15.7°C in Sachsen-Anhalt on 6 January and even -19.8°C in Brandenburg on 26 January), but as the temperature had stayed below 0°C since the end of 2009, assuming sufficient hardening of the plants and significant snow cover, the impact of frost kill on the crop biomass is considered limited. The drop which occurred in December after a prolonged period with temperatures consistently above the long-term average could have caused more damage.

November and December were wetter than average (with a south-north gradient), whereas January and February were drier (30 % below average in eastern Germany). However, the deep snow will replenish soil moisture as the thaw begins. Problems because of excessive rain during sowing of winter crops might have arisen in north-eastern regions (e.g. Brandenburg). Both winter wheat and rapeseed have just entered the emergence phase and are showing a long delay in development compared with the long-term average, due to the fact that crop growth simulations start counting thermal accumulation from January on.

As the delay seems to be similar to last year, winter crop yields are nevertheless forecast to be close to average. Despite the delay and the deep snow cover, no major agro-meteorological problems occurred through the winter. Therefore winter crop yields are forecast to be close to average, with soft wheat at 7.7 t/ha (2.4 % above average), winter barley at 6.6 t/ha (2.4 % above) and rapeseed at 3.8 t/ha (1.2 % below).





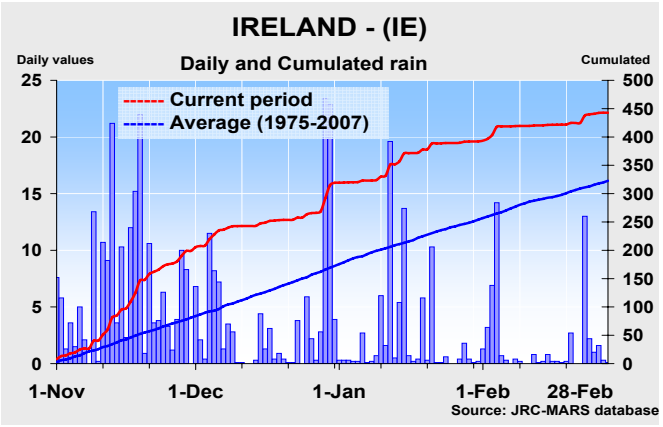
UK and Republic of Ireland: good start to the season, mild but wet autumn and cooler than seasonal winter

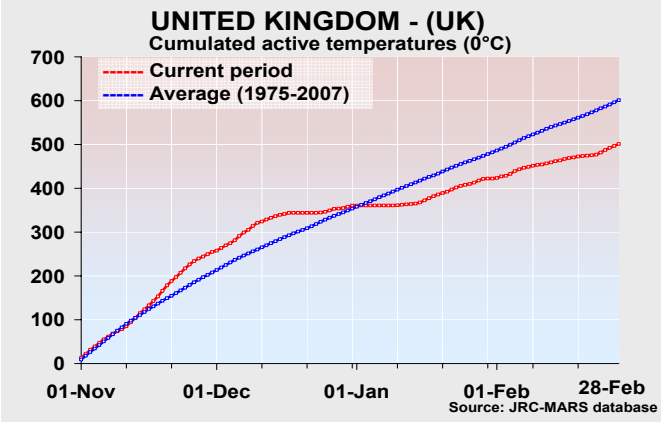
In the UK, soft wheat yields are estimated at 8.0 t/ha (1.2 % above the five-year average), winter barley at 6.5 t/ha (1.0 % above the LTA) and rapeseed at 3.4 t/ha (2.3 % below the LTA).

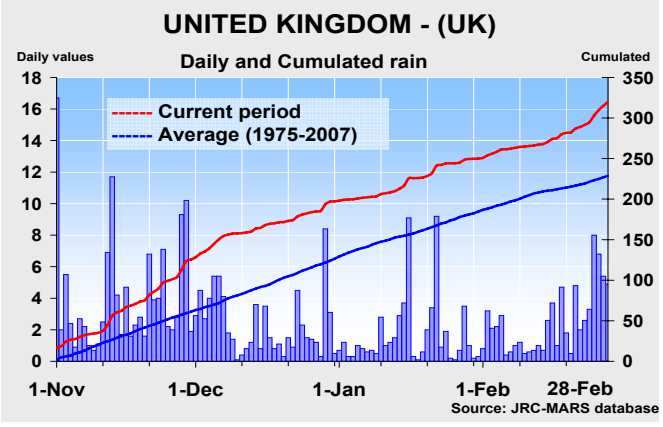
Similarly to the previous year, the season started with relatively good agrometeorological conditions although dominated by quite frequent and abundant rain in the second part of the autumn. Nevertheless, the sowing period for winter cereals was sufficiently dry. In autumn, up to mid-November the temperatures were generally very close to the normal range of variation and therefore gave all the winter crops a good start. Between the second half of November and mid-December conditions were milder. However, in this period the rain was quite persistent, creating temporary soil water saturation.

In the second half of December the conditions changed significantly with a sharp drop in temperatures, even below the normal range of variation. Therefore, by the end of the year, the cumulated GDD were back to very close to the seasonal values. The cold period (-11.8°C in Berkshire on 7 January, similar to the temperatures recorded in 1979, 1985 and 1997) persisted up to mid-January, when the temperatures returned to normal. February brought seasonal temperatures. However, the GDD deficit built up in January was not counter-balanced in February and influenced crop development which was still behind the LTA in March.

As mentioned above, the rain was abundant and persistent in the second half of autumn (the second wettest since 1975, behind only 2002), creating potentially asphyxiating conditions in heavier soils. In January snow covered most of the United Kingdom and Ireland, protecting the plants from frost. In the second ten-day period of January, as temperatures rose the snow melted and rain returned. At the end of February, frequent and relatively abundant rain led, once again, to an excess of soil water.







Italy: despite low solar radiation conditions good, particularly in central and southern regions

Despite constant snow cover in the north and wet conditions in the south, almost no problems were reported during the sowing period for winter crops. After the delay in the restart of the vegetative phase observed in the northern part of the country, crops seem to be catching up.

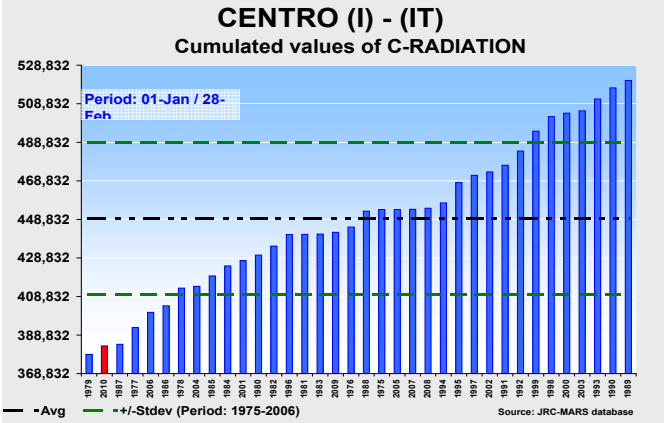
The second part of the autumn together with the winter were marked, with the exception of the main islands, by wetter than average conditions, but without placing any major constraints on field preparation and sowing.

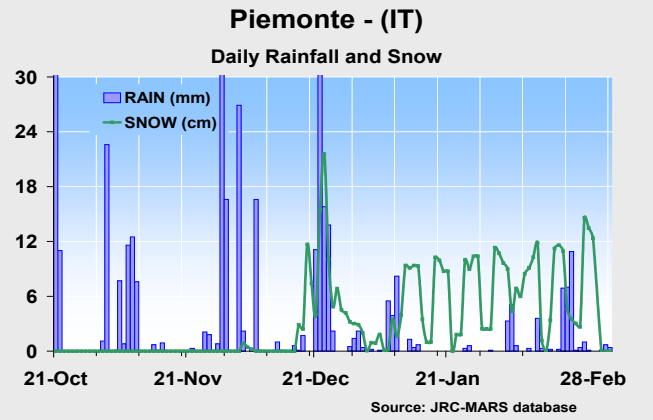
In Lombardia and Piemonte in particular, a further increase in soil moisture values can be expected in the weeks ahead as a direct consequence of the thaw. In fact, snow covered the fields almost permanently up to the end of February leading to a significant delay in the restart of the vegetative phase.

Minimum and maximum temperatures were above average from December 2009 until the beginning of February when the daily maximums fell. The decrease of the thermal sum below the LTA in the last ten-day periods was more marked in the northern part of Italy. Nevertheless it also led to snow in the south. The cumulated solar radiation turned out lower than average during the whole period observed over almost the entire country. Low irradiance values were observed along the Adriatic coast. If these conditions persist, they could place some constraints on winter crop development.

Winter crop phenology, driven by the temperature sum, showed a delay of more than ten days in the north, as temperature accumulation took place mainly in December before the start of the crop growth simulations. In central and southern regions the initial advance in development observed in autumn has been recovered, creating good yield expectations. In central and southern regions, at the end of February the winter wheat was at the end of the tillering stage, while in Sicily and Sardinia it was already entering the heading stage. Similar conditions were forecast for winter rapeseed.

Winter crop yields are expected to be close to average, as the very good crop development in the south should counter-balance the less favourable conditions in the north. Durum wheat yields are estimated at 3.1 t/ha (4.0 % above the LTA) and soft wheat at 5.3 t/ha (0.6 t/ha above). The yield forecast for barley (3.6 t/ha) is slightly (2.0 %) lower than average.





Spain: temperatures close to seasonal conditions but the highest rainfall accumulation on record in the first two months of the year

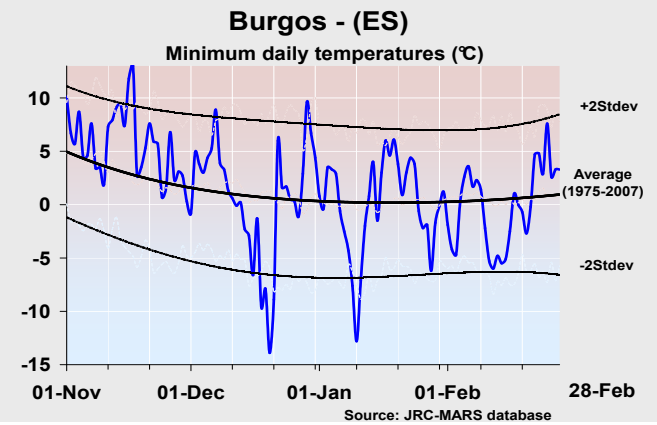
Temperatures from November to February were near seasonal values. On the whole, the rainfall cumulated during the last four months was exceptionally high.

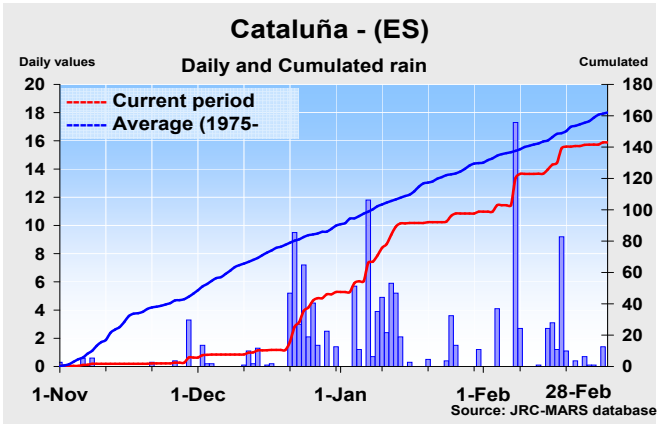
Temperatures from November to February were near seasonal values: slightly colder in the north (north of Castilla y León, Galicia, Asturias, País Vasco, Navarra, Aragon and Cataluña), Madrid and northern Extremadura. Crop development was only slightly delayed (by 5 to 10 days) in these regions due to colder temperatures and lower radiation over this period. All the other regions (Castilla La Mancha and Andalucia) recorded higher than seasonal temperatures and crop development similar to the long-term average. Two sharp cold waves were observed on 20 December (when temperatures around 17°C were recorded in Burgos, Palencia, Cantabria and León) and on 10 January (-15°C in Burgos). However, these events did not affect development of the crops, since they were in the dormancy phase at that time. Currently, the end of wheat vernalisation seems to have been reached in the southern half of Spain.

On the whole, the rainfall cumulated during the last four months was exceptionally high (it was the third wettest year in the last 35 years), whereas before 15 December the cumulated rainfall was below seasonal values in every region. In Castilla La Mancha this dry period hampered sowing of wheat and barley. Simulations show that soil water content will not be replenished until the end of February.

Dry conditions were also observed in some areas of Aragon (Zaragoza) and along the Mediterranean coast (Cataluña) which could affect the future development of wheat.

The yield forecast for soft wheat is 3.1 t/ha, 10.5 % higher than last year. Durum wheat yields are put at 2.3 t/ha, 8.8 % down on last year. The winter barley yield is forecast at 2.6 t/ha (24.6 % higher than last year).



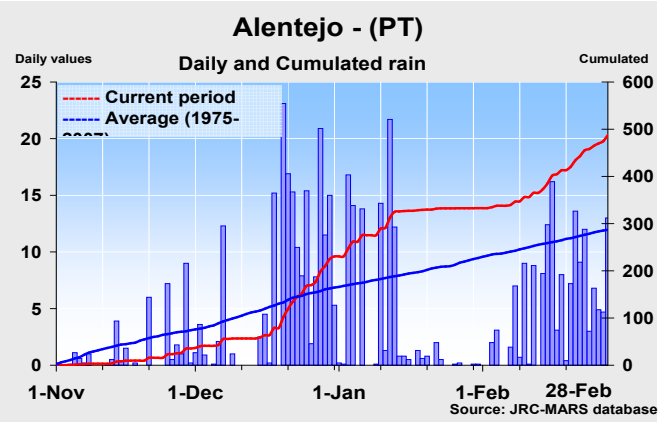


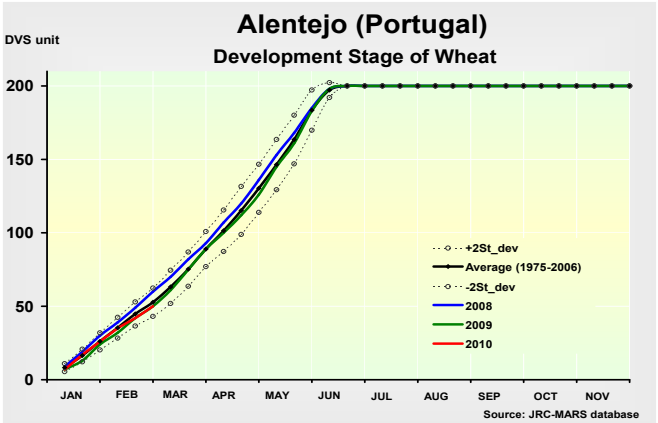
Portugal: seasonal temperatures and abundant rainfall from November to February

The period from November to February was marked by seasonal temperatures. Rainfall distribution was quite variable over the period.

The period from November to February was marked by seasonal temperatures. In some areas of central and northern Portugal, two colder spells occurred (from 15 to 20 December and on 10 January), due to cold waves from northern Europe, with temperatures between -5°C and -8°C. Rainfall distribution was quite variable over the period. Until 15 December, cumulated values were lower than the seasonal values but scattered rain allowed a normal sowing season. After that, abundant rain led to high soil water values (the period between 15 December and the end of February was the second wettest in the last 35 years). Until mid-February the thermal conditions permitted normal crop development, but low temperatures and low radiation during the last two ten-day periods of February slowed down biomass accumulation (similarly to 2009).

The expected soft wheat yield is put at 1.7 t/ha, 11.0 % down on 2009 and 5.0 % lower than the five-year average. For winter barley, the yield expected at the moment is 1.8 t/ha, 1.0 % down on 2009 and 2.6 % below the average.

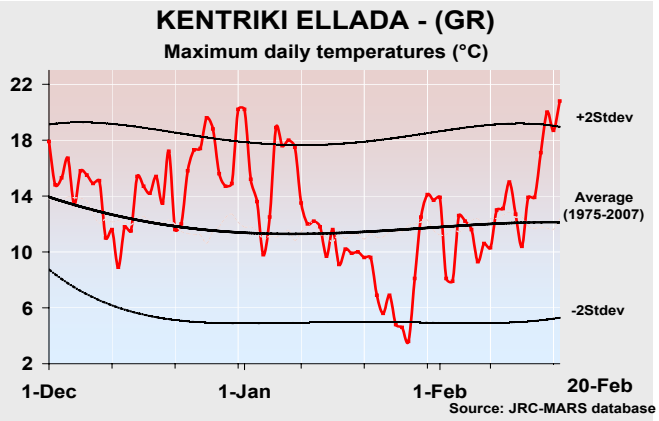


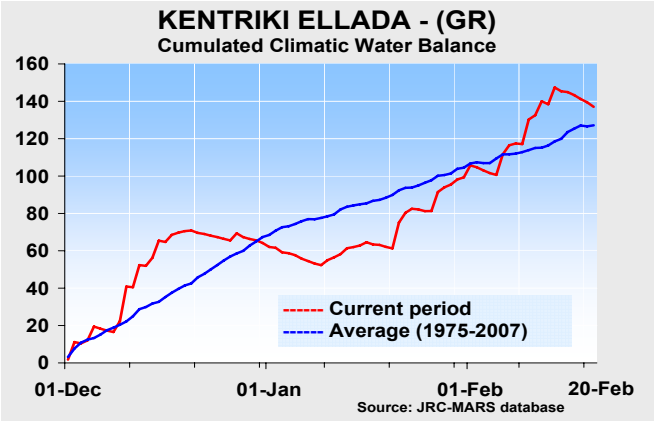


Greece: a positive start to the season affected by abundant precipitation and above-average temperatures

The climatic conditions at this stage of development of winter cereals result in a yield forecast of 2.6 t/ha for durum wheat, slightly up on the 2009 level of 2.5 t/ha. Winter barley is forecast at 2.4 t/ha, also higher than in 2009 (2.3 t/ha). Soft wheat, which is more sensitive to temperature increases, is forecast at 2.8 t/ha, down by 1.4 % on 2009.

In Kentriki Makedonia, the major cereal-growing region of Greece, cumulated precipitation remained significantly higher than average despite a dry spell during the third ten-day period of January which was followed by abundant rainfall in February. Temperatures remained within the norm during the initial development phases of winter cereals in October and November. The whole country saw a rise in maximum temperatures during the second half of December with levels exceeding the seasonal averages by over five degrees. This specific increase was as high as 60 % in the south but nearly double the seasonal average in the north (Anatoliki Makedonia). In the south of the country this moderate heat wave was coupled with almost normal precipitation which resulted in a lower than normal climatic water balance. In the centre and north, high temperatures were coupled with above-average precipitation generating a positive climatic water balance. Germination, emergence and tillering occurred rather early as a result, but the dry spell during January should not have affected cereals in their vernalisation period. On the contrary, the increase in precipitation in February should create a positive environment for the spring tillering.

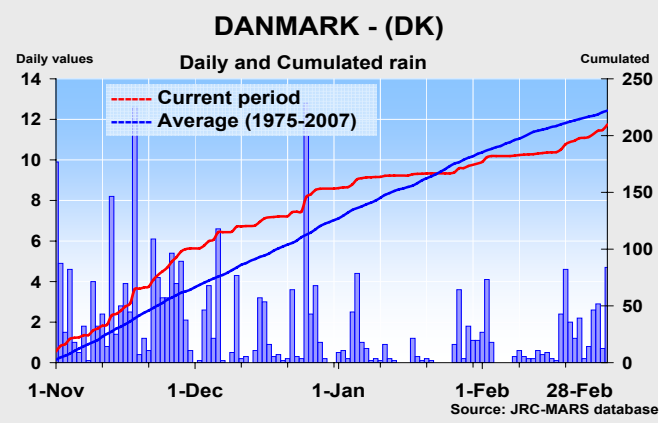


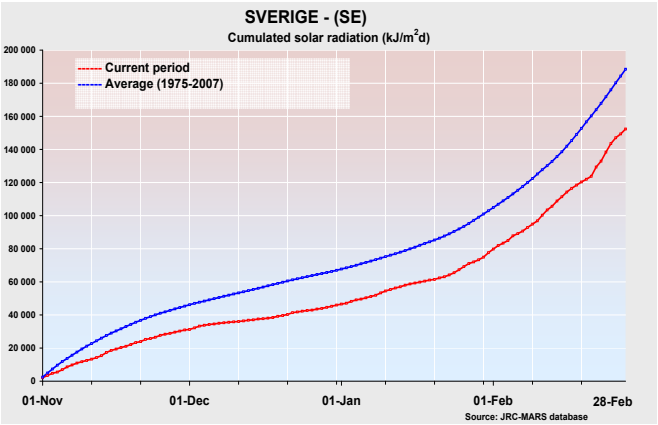


Denmark and Sweden: two opposite seasons, mild wet autumn followed by a cold dry winter

In Denmark, soft wheat yields are estimated at 7.5 t/ha (1.4 % above the five-year average), winter barley at 5.8 t/ha (0.3 % above) and rapeseed at 3.5 t/ha (0.3 % below). In Sweden, soft wheat yields are estimated at 6.0 t/ha (1.7 % below the five-year average), winter barley at 5.9 t/ha (8.4 % above) and rapeseed at 2.9 t/ha (9.0 % above).

Autumn and winter followed an unusual course. Autumn brought temperatures significantly above the seasonal average (on 20 November 13°C was recorded in Denmark, compared with the LTA of 6°C). These thermal conditions persisted up to the beginning of December, when more seasonal temperatures followed. The favourable temperatures permitted faster growth of the winter crops, although limited by the low incoming solar radiation due to the persistent cloudiness. The cloudiness brought frequent and abundant rain, in particular in November (60 % above the LTA in Denmark and 80 % above in Sweden). However, the excess water recorded in autumn was counterbalanced by the relative shortage in the following months: 40 % below average in Denmark at the end of February and 48 % below in southern Sweden at the end of January. These conditions were mainly due to a change of general atmospheric circulation, with Arctic air blowing towards the continent from mid-December on. The change also led to a drastic drop in temperatures which fell below the seasonal average: in mid-January and early February, the minimum and maximum daily values were also below the normal range of variation. Harsh frosts occurred in Denmark (17°C on 3 January, -18°C at the end of January and -16°C at the end of February) and in southern Sweden (-23°C at the end of January and -21°C at the end of February). In general, the snow cover was probably thick enough to protect the crops from the frost. The winter dormancy and prolonged cold period also permitted appropriate hardening of the winter cereals.





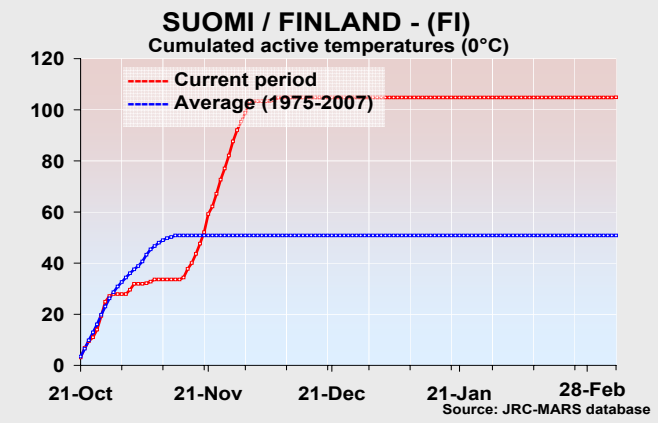
Finland: warm autumn and unusually cold winter

Favourable autumn with high cumulated active temperatures followed by an extremely cold winter. Limited risk of winter kill.

The beginning of autumn was mild, getting the winter crops off to a good start. In the middle of November temperatures increased to above the long-term average and at the beginning of December the cumulated active temperature (base = 0°C) exceeded the average value by 100 %. In the second ten-day period of December a sudden drop in temperature followed, with both the minimum and maximum values below the level-2 standard deviation. At the end of the second ten-day period in December the minimum temperatures fell to below -20°C. This, in conjunction with the thin snow cover (< 4 cm), could have posed a risk of injury to plants, particularly in the southern areas of the country. The period from 11 December onwards

was one of the three coldest spells since 1975 (behind 1985 and 1987). The next extremely cold spells occurred in the first and third ten-day periods of January and at the beginning of February. Nevertheless, the thick snow cover (> 25 cm) which persisted since the end of December should have protected plants against frost kill.

The distribution and amount of precipitation were generally close to the norm in autumn, with lower accumulation during the winter. At the moment crops are still in winter dormancy. The early forecast for soft wheat is at the average level (3.8 t/ha) with rapeseed at 1.5 t/ha.



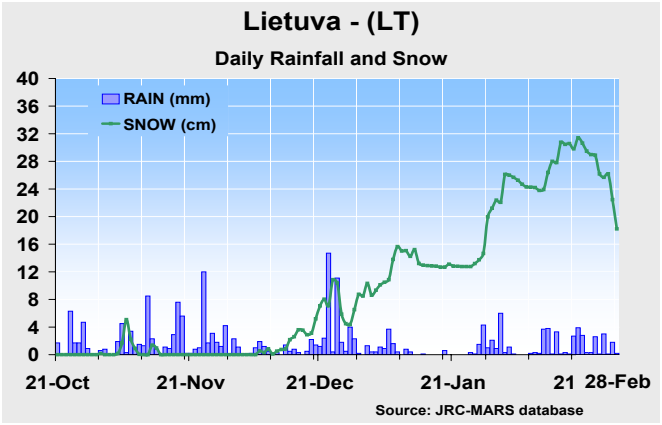
Estonia, Latvia and Lithuania: extremely cold snowy winter

A warm autumn followed by an extremely cold winter; slight frost impact on plants possible in eastern and north-eastern Latvia and Lithuania.

In all three countries the beginning of the period under analysis, especially the spell between mid-November and the first ten days of December, was warmer than normal. The cumulative active temperatures (base = 0°C) were almost twice as high as the long-term average and rainfall was on the LTA line. These weather conditions allowed winter crops to develop well before the winter dormancy. In the second ten-day period of December the temperature dropped rapidly, even below the level-2 standard deviation value. In some areas of eastern and north-eastern Latvia (Latgale) and Lithuania (Utenos apskritis) the minimum temperatures were below -18°C with very thin snow cover (< 4 cm). In southern Estonia on 19 December the minimum temperature was below -23°C. This frost could have had a negative impact on any plants which were not well-hardened. This period was followed by a short spell with positive temperatures and a long one with snowfalls. Finally, in January and February all three countries were covered with a thick (> 15 cm) blanket of snow, which should have protected plants against the next severe frost spells in January (on 24 January the minimum temperature was below -27°C). In the Baltic countries the period from 11 December onwards was at least 4°C colder than usual and was one of the coldest periods since 1975.

Cumulated precipitation in the period examined was slightly below the average in Latvia and Lithuania, but slightly above in Estonia, especially in the southern areas, where at the end of February precipitation was 20 % above the LTA.

At the moment, winter crops are still in the dormancy stage. Considering the anomalous meteorological conditions during the winter, the early yield forecast for winter crops is expected to be lower than in the previous year and close to the five-year average. For Estonia the soft wheat yield is estimated at 2.9 t/ha and rapeseed at 1.5 t/ha. For Latvia the soft wheat forecast is 3.5 t/ha with rapeseed at 1.9 t/ha (lower than the five-year average due to the high yield amplitude). For Lithuania soft wheat is forecast at 3.7 t/ha, rapeseed at 1.8 t/ha and winter barley at 3.2 t/ha (lower than the five-year average as it is the crop most sensitive to frost impact).



Poland: warm autumn followed by unusually cold winter with thick snow cover

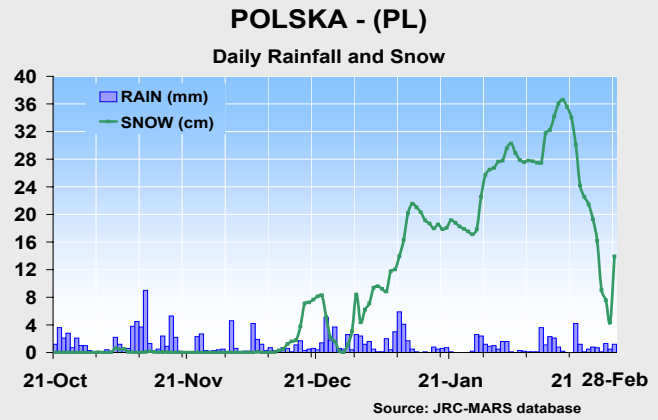
Poland reported a warmer than usual November with average rainfall followed by an unusually cold winter with thick snow cover; light frost impact possible in small areas.

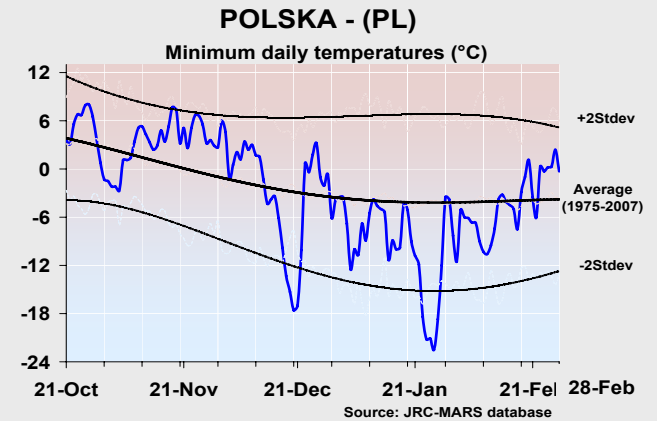
In Poland air temperatures until the end of the first ten days of December were significantly higher than normal, especially in November when the cumulated active temperatures (base = 0°C) were more than 80 % higher than usual. Cumulated rainfall was also slightly above the long-term average. These weather conditions were favourable for plant development before the winter dormancy. In the second ten days of December, temperatures dropped rapidly below 0°C (on 21 December in the whole country minimum temperatures were below -17.0°C). This sudden frost in some areas was accompanied by scarce snowfalls Then a short spell with temperatures above 0°C followed: on 25 December the average maximum temperature for the country was about 9°C. Especially in the areas with little or no snow cover (Kujawsko-Pomorskie), such a sudden fluctuation of temperatures could have affected crops (especially winter barley which is more sensitive to injury by frost and sudden dehardening). This weather was followed by an unusually long cold period with heavy snowfalls. From the beginning of January until the second ten-day period of February the

average temperature was 4°C lower than the LTA. A second influx of extremely cold air was recorded in the last ten days of January (when the minimum temperature was lower than -22°C), but the whole country was covered by a thick layer of snow (> 15 cm).

Cumulated rainfall values were slightly above the long-term average. The persistent thick snow cover in the whole country and prolonged low temperatures could have caused a delay in plant development. Even though, according to the model calculations, soil moisture is at the average level, water reserves cumulated in the snow cover are above normal.

At the moment, the snow is slowly melting across the whole country and all winter crops are at the end of the dormancy stage. Considering the anomalous meteorological conditions during the winter, the very early yield expectations are lower than last year: winter soft wheat is estimated at 3.9 t/ha, winter barley at 3.7 t/ha and rapeseed at 2.7 t/ha (9.4 % down on 2009).





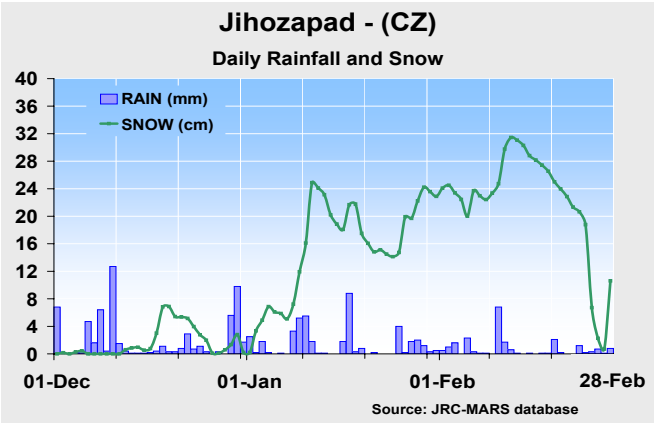
Czech Republic and Slovakia: reduced expectations with respect to last year

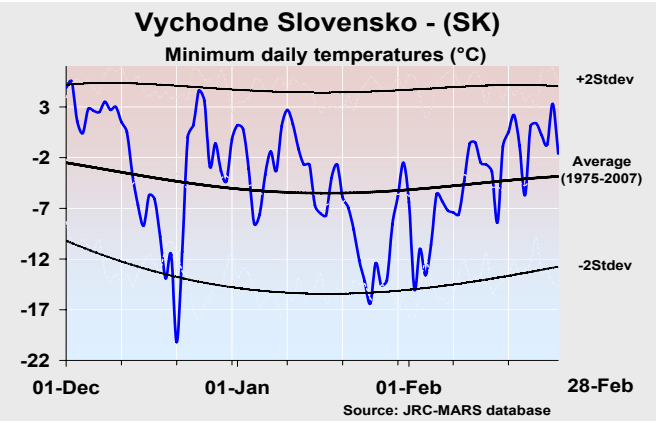
Mild winter conditions were recorded in Slovakia where daily temperatures stayed mainly above the average value. Sparse rainfall characterised the weather in the Czech Republic, especially in the north-west.

Cumulated active temperatures (T base=0 °C) are higher than average, especially because of the warm conditions in the last months of 2008 and in the last dekad of January. These favourable thermal conditions have been coupled in Slovakia with suitable irradiance levels, leading to a satisfactory development of winter crops even if lower than last year. On the other hand, in the Czech Republic, crops show a strong delay in restarting the vegetative phase. This is probably due to the snow depth (average values between 5 and 20 cm have been recorded since the beginning of 2009) which is covering most of the country. A cold air irruption (– 16.2 °C was reached in Slovakia and – 14.4 °C in the Czech Republic) which occurred on 9 January could have affected the crops which had already entered into the emergence phase. Precipitation presented a spatial gradient distribution from north-west to south-east and although cumulated values have been partly below the long-term average (in Severozapad cumulated rain values were more than 30 % lower than the LTA) relatively good soil moisture values are depicted.

In the Czech Republic, both winter crops, wheat and rapeseed, have entered into the emergence phase with respectively more than two and three dekads' delay compared with the LTA. For rapeseed, the depicted situation is similar in both countries, whilst winter wheat in Slovakia (especially in the north-eastern regions) is ending the emergence phase with a slight advance in development compared with the LTA.

With respect to last year, a reduction in yields is depicted for Slovakia. Forecasts for winter crops are: 3.44 t/ha (– 14.8 % on last year) for winter barley, 4.30 t/ha for soft wheat (– 11.9 %) and 2.43 t/ha (– 10.2 %) for rapeseed. Forecasted yields for the Czech Republic are: 5.25 t/ha for soft wheat (– 10.3 % on 2008), 3.01 t/ha for rapeseed (1.7 %) and 4.65 t/ha for winter barley (– 2.0 %).



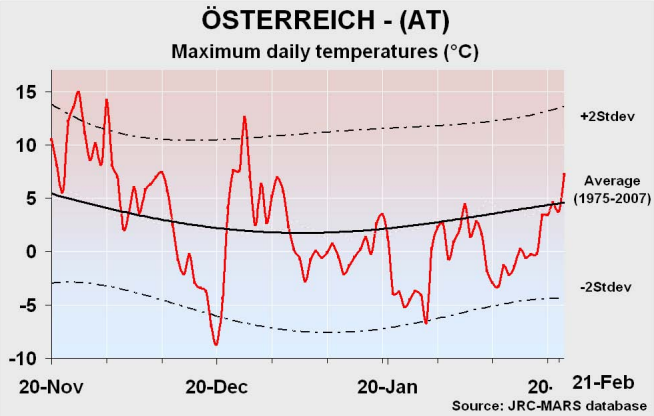


Austria and Slovenia: despite the favourable thermal conditions the snow cover is delaying the restart of the vegetative phase

The winter crop yield forecasts are lower than last year. However, average potential is shown. Soft wheat yield is forecast to be 4.2 t/ha in Slovenia and 5.3 t/ha in Austria, 2.9 % below and 3.1 % above the five-year average respectively.

With the exception of the abrupt drop in temperature in the second ten-day period of December (on 21 December the minimum temperature fell to almost -15.6°C in Austria and -18°C in Slovenia), in the last few months of 2009 temperatures were consistently higher than the long-term average. These prolonged warm conditions drove the thermal sum 20 to 30 % above the average conditions bringing development forward at the end of December. In both countries the period reviewed was marked by abundant rain in the autumn and since the beginning of the year soils have been covered by snow. This, in conjunction with low irradiance levels, probably reduced the risk of frost but stopped the restart of the vegetative phase. Frost could have caused damage in southern regions of Austria (Steiermark and Kärnten) at the beginning of January when the snow cover was insufficient and crops might not have hardened. The prolonged presence of snow could significantly delay the thaw and, consequently, field preparation for spring crops. Both winter wheat and rapeseed have just entered the emergence phase, putting development more than ten days behind the long-term average. Soil moisture levels are only slightly higher than the average at the moment but could rise significantly when the snow melts, although this will make it difficult for machinery to gain access to the fields.

Similar conditions are forecast for durum wheat in Austria where the expected yield is also close to the average with 4.3 t/ha. Winter barley is also forecast at around average level with 5.5 t/ha in Austria and slightly higher in Slovenia (3.8 t/ha, 2 % above average). Rapeseed, by contrast, is forecast at slightly (0.8 %) below the average, showing yield potential of 3.0 t/ha.



Hungary: temperate snowy winter promises a good start to this season

Cumulated GDD values over the period under consideration show a significant surplus with respect to the long-term average. The abrupt temperature drop which occurred at the beginning of January, in conjunction with an absence of snow, might have caused frost damage in some areas.

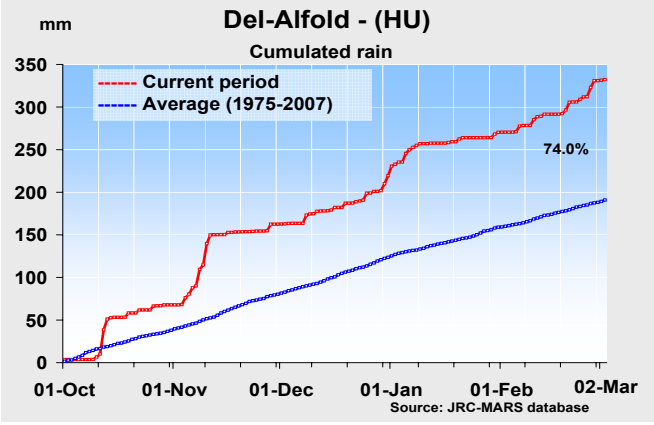
Cumulated GDD values exceeded the long-term average over the period under consideration. The precipitation surplus might have caused waterlogging damage in some areas.

Autumn was the third warmest in the last 35 years. The warmer-than-usual weather and rain continued in November and lasted until the end of the first ten days of December. This period was marked by moderate frosts and maximum temperatures higher than 10°C on several days. The crops strengthened before winter.

From mid-December onwards the weather turned into a cold winter. The ground was generally covered with thick snow until the last ten days of February. The temperature on 21 December fell to -20°C. The last ten days of December and the first ten days of January were more temperate than usual. The minimum temperature was below -10°C from 25 January to 5 February. During the cold spells the ground was covered with thick snow. Cumulated winter precipitation was 60 % above the LTA in the eastern part of the country. The climatological water balance shows a significant surplus except in the Nyugat-Dunantul region.

Winter crops were in good condition at the end of the winter. Just slight frost damage is presumed in limited territories in northern Hungary where shallower snow provided less protection. Winter wheat is showing delays in development, particularly in Transdanubia. Soil moisture exceeds the long-term average and might reduce access to arable land. The quick melting of the thick snow cover caused widespread waterlogging problems on the plains in Hungary. As much as 10 % of the total acreage under winter crops could be affected.

Simulations put soft wheat yields at 4.3 t/ha (2.4 % up on the five-year average and 11.7 % higher than last year) and winter barley at 4.0 t/ha, similar to the average. Rapeseed is put at 2.4 t/ha (4.1 % up in comparison with the LTA).



Romania: uncertain season with alternating weather and advanced crop development susceptible to late frost

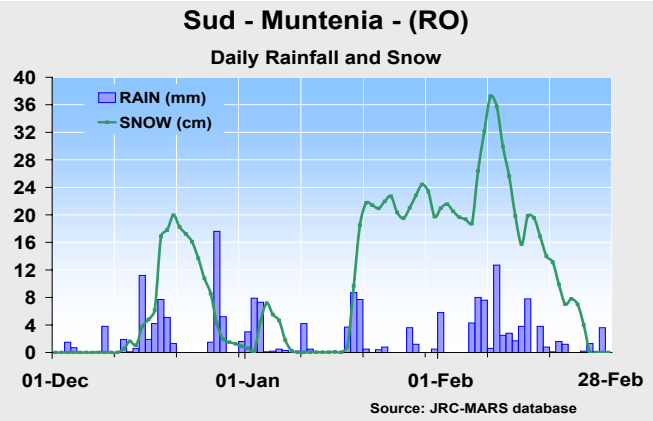
A positive start to the season was characterised by warm weather and sufficient precipitation. The trend continued until January, which saw the occurrence of a frost event, though mitigated by significant snow cover. The evolution of the season remains uncertain with warm weather and alternating precipitation. Considering the current trend, a higher-than-average yield is expected, though reduced with respect to 2008.

In Romania the season started favourably following a diffuse trend in the region, that is, with sufficient moisture supply for germination and mild temperatures. A warmer-than-usual after-sowing period allowed an anticipated germination but increased the risk of aphid attack. Cumulated active temperatures (T base=0 °C) were a boost to crop growth from October to December.

The beginning of January saw the occurrence of a frost event which was, however, associated to a sufficient snow cover which mitigated the possible damage to crops. Rainfall was reduced until the third dekad of January after which there were alternate periods of dry and wet weather, in a trend that continues up to the present in combination with unseasonably high temperatures.

Crop development was quite advanced with respect to the average of the period until the third dekad of February, but at present appears to be converging to average levels. The current evolution of the season combined with a possible early break of the dormancy result are cause for great uncertainty on future developments and there is a high risk for the possible effects of late frosts on the crops.

Yield for soft wheat is simulated at 3.2 t/ha (+ 13.3 % on the five-year average and – 7.9 % lower than last year). The estimate for barley is 3.3 t/ha and rapeseed is estimated at 1.8 t/ha.



Bulgaria: favourable conditions at the start of the season were followed by dry weather and frost events of limited impact

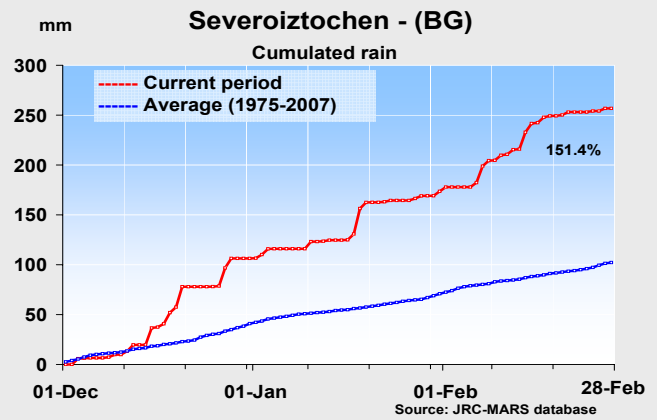
Germination and early development of winter cereals found near to optimal conditions during autumn with a sufficient soil moisture supply and warm weather. From November onward, a progressive cooling of temperatures combined to dry weather allowed hardening of the crops. This condition resulted in an enhanced resistance to the frost that occurred in early January. These events should not have affected significantly the outcome of the season with reduced winter kill, and the forecasted potential yields are expected to be higher than average although reduced with respect to 2008.

In Bulgaria, as in most of the Black Sea basin, sowing conditions for winter cereals have been favourable thanks to abundant precipitation during September which improved the soil moisture level. In October, precipitation dropped but temperatures remained mild, ranging between 5 °C and 10 °C until early November. Regardless of the scarce precipitation, conditions remained favourable for germination and tilling.

From November onward, the weather continued to be characterised by scarce precipitation with a deficit in cumulated rainfall of – 20 % to – 50 % on the LTA. Temperatures, however, dropped significantly starting from the third dekad of November but the decrease was not too abrupt and should have guaranteed a sufficient hardening of crops.

Around 15 January, the minimum daily temperature dropped below – 15 °C, but the negative impact on crops should have been reduced by the achieved hardening and by the presence of snow cover (~ 10 cm). The frost was followed again by rather mild weather until mid-February conducive to an early breaking of dormancy. After that and up to the present, temperatures again started to decrease but stabilising on average levels. This trend was combined with the return of precipitation in February, especially in the south-east regions of Yugoiztochen making up for the cumulated deficit. Overall, these conditions are setting a positive environment for the spring development of cereals.

Yield for soft wheat is simulated at 3.7 t/ha (+ 13.0 % on the five-year average and – 10 % lower than last year). The estimate for barley is 3.6 t/ha, +18.4 % on the average. The yield for rapeseed has been estimated at 2.1 t/ha.

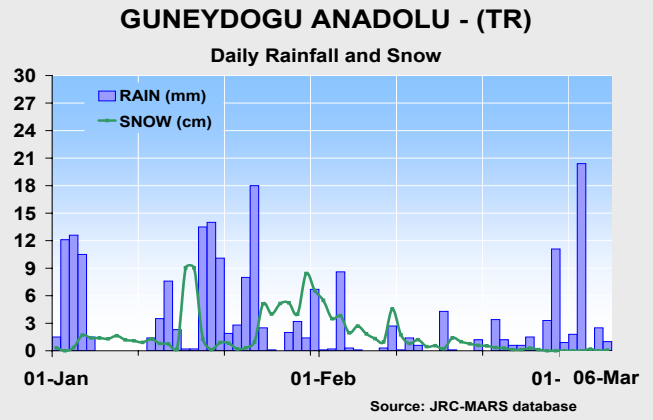


BLACK SEA AREA

Turkey: The beginning of the season was marked by mild temperatures and above-average precipitation leading to a positive outlook for the productivity level of winter cereals

The positive trend points to an estimated yield for wheat of 2.2 t/ha, on the same level as in 2009 but still 2.2 % down on the five-year average. Winter barley is at present set for 2.3 t/ha, the same level as the long-term average.

The beginning of the 2010 agricultural season in the major cereal-producing areas of the country, namely the provinces of Orta Anadolu, Bati Anadolu and Guney Dogu Anadolu, was marked by wet weather and moderate temperatures. Precipitation was considerable and well distributed from October to December 2009 and the accumulation remained steadily above the norm. These conditions were favourable for sowing and the emergence of winter cereals, which probably occurred earlier than usual. In the east of the country (Guney Dogu Anadolu) the cumulated precipitation exceeded 300 mm, with a steady increase from October onwards. Average temperatures over the period from January to February 2010 remained between 0°C and 5°C, with local highs of over 15°C, while the minimum never fell below -5°C. Minimum temperatures dropped at the end of January due to snow, but thermal levels quickly bounced back to above average. The climatic water balance remained positive. In some central and western regions like Konya conditions were relatively drier in autumn but still above the norm. In the cereal-growing areas in the far east of the country (Guney Dogu Andolu) the season started with good precipitation levels but this was followed by a rather long dry period lasting throughout November and December. Precipitation recovered, maintaining above-average levels during January and February. In Turkey winter cereals are sowed between September and October. This year the climatic conditions should have resulted in rapid germination and early development and tillering. These conditions at the beginning of winter could expose the new plants to a higher risk of frost damage, but so far no such events have been reported and yield expectations for winter cereals are still fairly positive.



Ukraine: Favourable conditions for winter crops in November, followed by possible frost damage

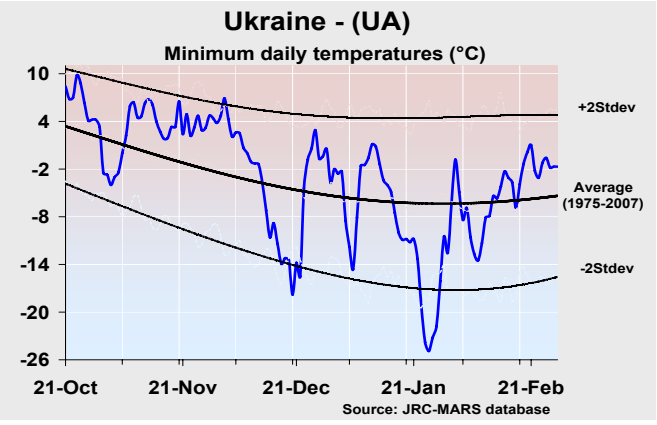
The 2009-2010 agricultural season started with mild conditions. Temperatures were higher than usual, reaching 8°C above the long-term average at the end of November, with cumulated rainfall close to the average.

Those favourable conditions were followed by sharp drops in temperatures. The first occurred in the second ten-day period of December with temperatures lower than -15°C (5°C below the average) in the northern part of Ukraine in the regions of Chernihivs'ka and Sums'ka. The second drop, at the end of January, was sharper and covered the whole country, with temperatures 10°C below the average.

As the snow cover was deeper than 10 centimetres during the first drop, it was probably enough to protect the winter crops in Chernihivs'ka and Sums'ka. During the second countrywide drop in temperatures, snow cover in the eastern part of Ukraine was insufficient, which could have resulted in frost damage.

The cumulated rainfall in the period reviewed was close to normal values except in the eastern regions, where it was slightly higher than usual.

Due to a warm and wet November, quick development of winter crops was expected. Until the end of the period reviewed, all arable land was covered by snow. It is therefore hard to assess the frost damage and a delay in the restart of development is possible.



EASTERN COUNTRIES

Belarus: possible frost impact in the south and west

High cumulated active temperatures in the autumn followed by extremely cold conditions with higher than usual winter precipitation.

Winter crops started their autumn growth after sowing in good weather conditions (higher than normal temperature and rainfall). Between 11 November and 10 December the cumulated active temperatures (base > 0°C) exceeded the long-term average value by more than 100 %. This allowed proper development of plants, possibly even to reach a more advanced stage of development than normal. However, from the middle of December temperatures decreased suddenly, even below the threshold of the level-2 standard deviation. On 16 December minimum temperatures in the Gomel region dropped to -21.2°C, whereas the snow cover was less than 4 cm. Such low temperatures persisted for several days with some snowfalls. Then a short spell with positive temperatures followed (maximum temperature below 6°C). This was followed by a long extremely cold period lasting all January and the first half of February. On 22 January the maximum temperature was below -17°C. The average temperature from 11 December onwards was 3.5°C lower than the long-term average. According to model simulations, the frosts in December could damage plants, especially in the south and west of the country. Extreme frosts in January could have had a negative effect on crops in the centre of southern Belarus, because of the thin snow blanket. Most of the country was covered with a thick (> 15 cm) snow blanket, which protected plants against extreme frost.

Precipitation during the period reviewed was significantly above the long-term average. In the Gomel region the cumulated precipitation even exceeded the LTA value by 40 %. Now the snow has started to melt and the thaw is progressing slowly. Very early yield forecasts put wheat at 2.9 t/ha and rapeseed at 1.0 t/ha.

Russia: High probability of damage by frost due to insufficient snow depth and a sudden drop in temperature

Air temperature slightly higher than average, except for two radical drops.

From November 2009 to February 2010 the air temperature was slightly higher than average, except for two radical drops, the first in the second ten-day period of December and the second at the end of January. In both cases, the temperature was at least 10 degrees lower than the long-term average. Only regions in the south of the European part of Russia were not affected and showed temperatures close to average.

Due to the shallow snow cover in December, during the period when temperatures were below -15°C, winter crops in Bryanskaya, Kaluzhskaya, Orlovskaya, Lipetskaya, Voronezhskaya, Tamborskaya, Penzenskaya and Saratonskaya will probably have been affected by frost. The second drop in temperature should have had no significant impact on winter crops, as the snow cover was not less than 10 centimetres. Analysis of satellite images showed that, from the beginning of January until the end of February, arable land was continuously covered by snow.

In the southern part of European Russia — below the 53° latitude,– the cumulated rainfall from November 2009 until February 2010 was slightly higher than the long-term average. This is important for crop production.

MAGHREB

Maghreb: A fairly positive season to date, except in Tunisia

In most of the Maghreb countries, the winter was quite mild until the end of February, with temperatures above the average and good precipitation. These conditions favoured sowing and germination. Early emergence and tillering of winter cereals were observed in Morocco and in eastern Algeria. Lower precipitation was reported in Tunisia from the end of November to February.

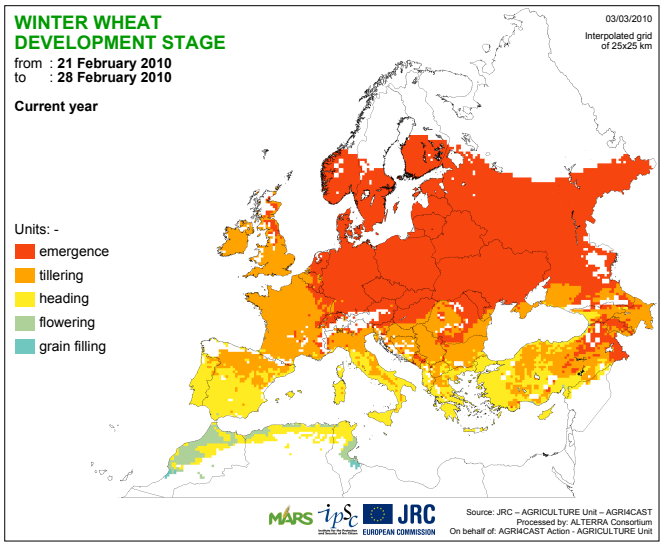
During the sowing period at the beginning of November, rain and temperature conditions in the three Maghreb countries favoured sowing and germination. From November to the end of February temperatures were above average with values as high as 27°C to 29°C recorded in November and above 20°C in January in all three countries.

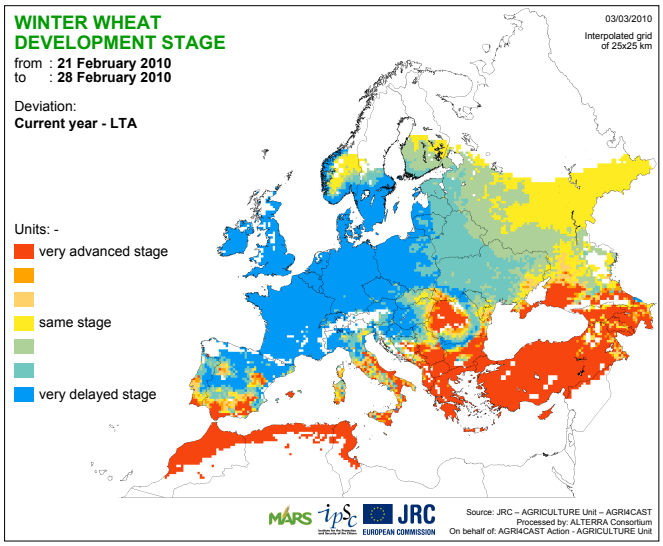
The cumulated climatic water balance was best in Morocco where it was above the long-term average. In Algeria the balance was average, whereas it remained below average in Tunisia for a long period, from the end of November to the end of February. Water could be a factor limiting cereal growth in Tunisia during the next few weeks. By contrast, in Algeria, and even more so in Morocco, the development stage of winter soft wheat has started earlier than in 2009.

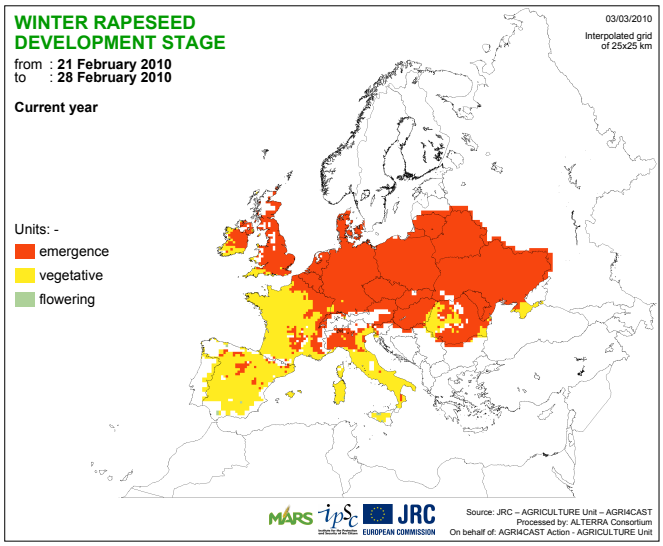
Wheat yield is forecast at 1.8 t/ha in Morocco, down on the exceptional level of the previous harvest (2.1 t/ha) but still 24.1 % higher than the long-term average calculated for 2003–2007. Barley yield is forecast at 1.4 t/ha, lower than the previous year but still 62.1 % higher than the long-term average. In Algeria wheat yield is forecast at 1.3 t/ha and barley at 1.2 t/ha. In Tunisia, the expected yields are 1.8 t/ha and 0.9 t/ha for wheat and barley respectively.

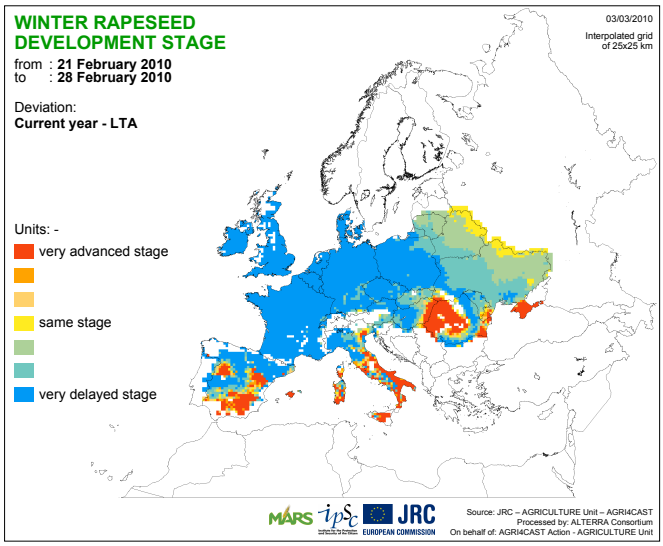
3. Map analysis

3.1. Crop development stage

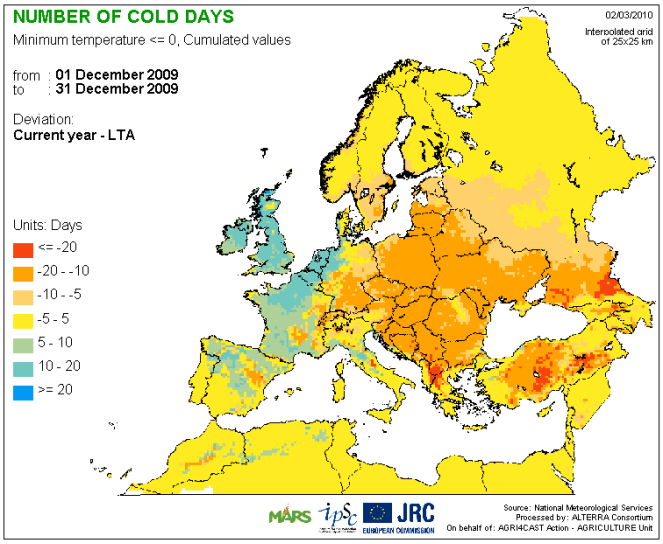


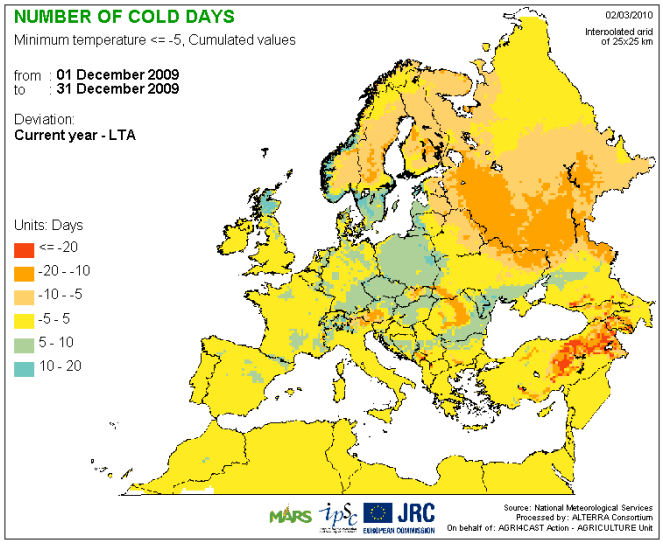


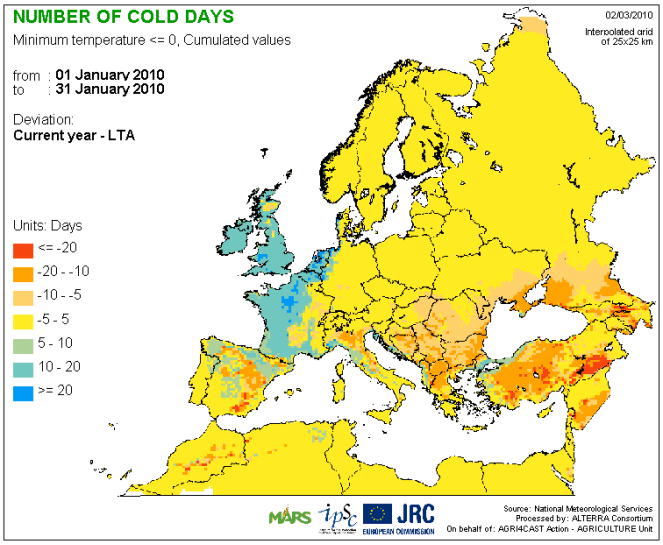


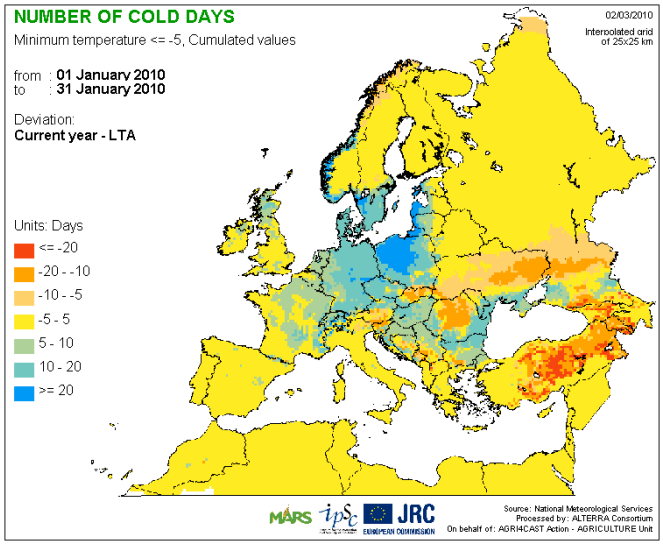


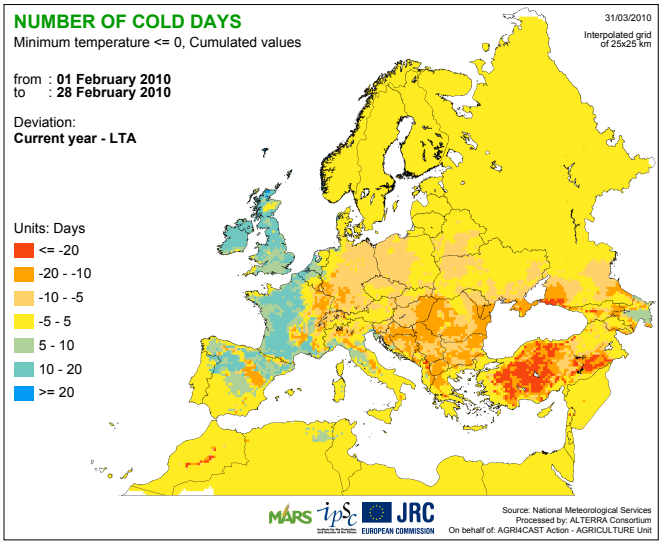
3.2. Number of cold days

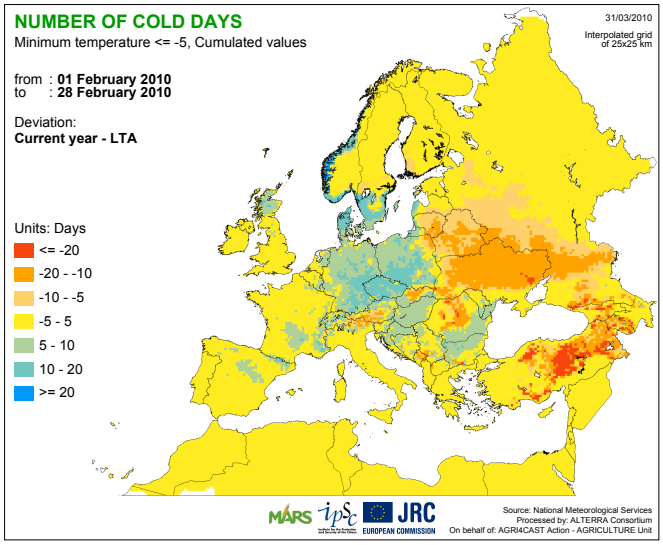




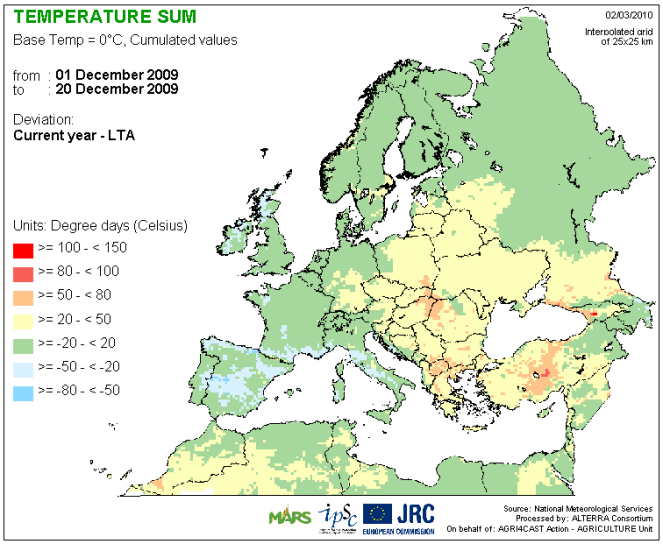


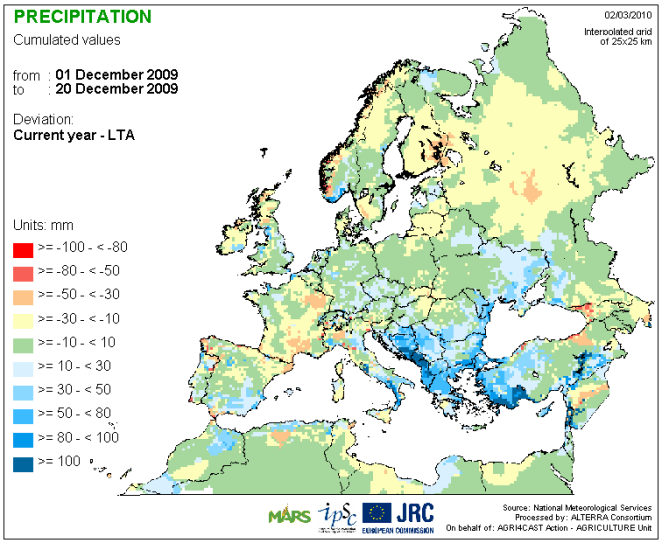


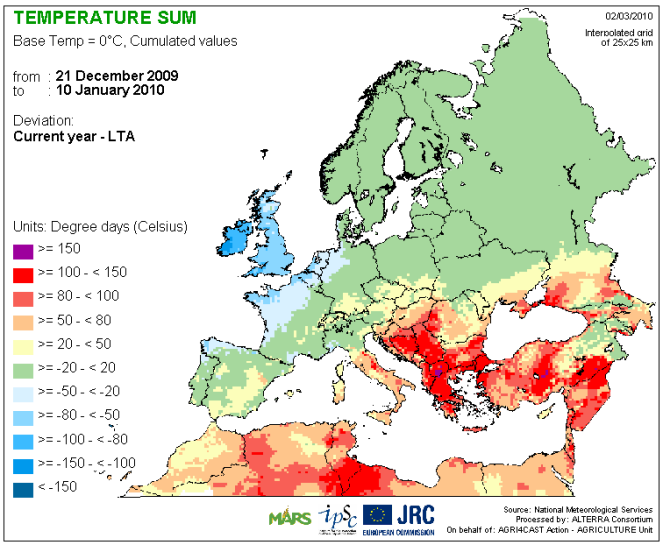


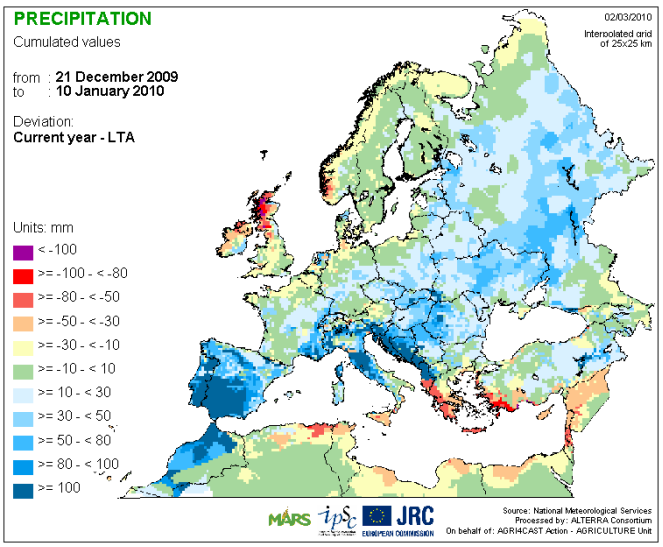


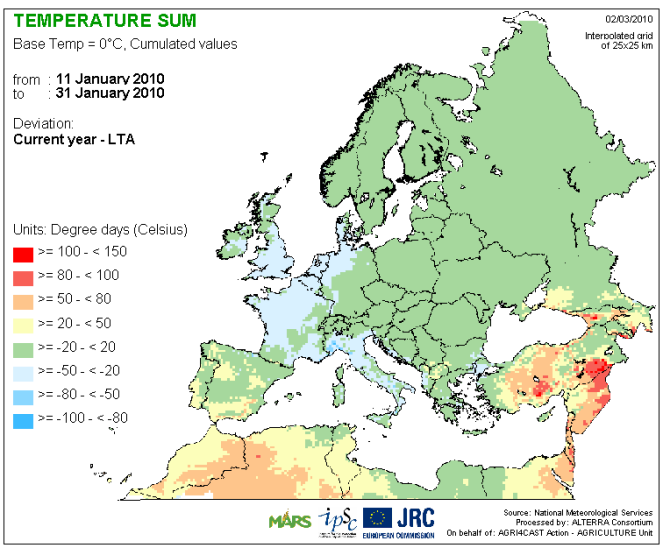
3.3. Temperature and Precipitation 2010 - compared with Long Term Average - (20 days)

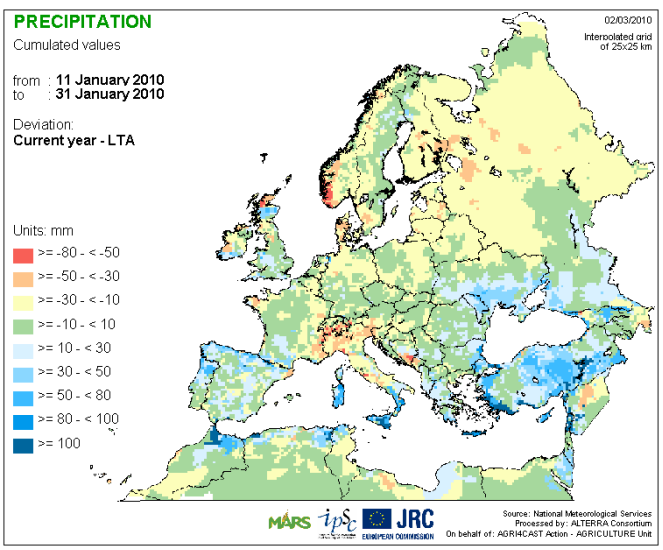




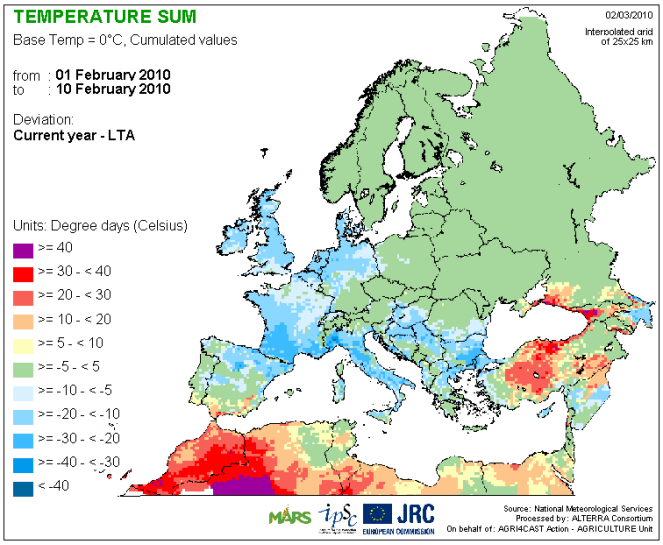


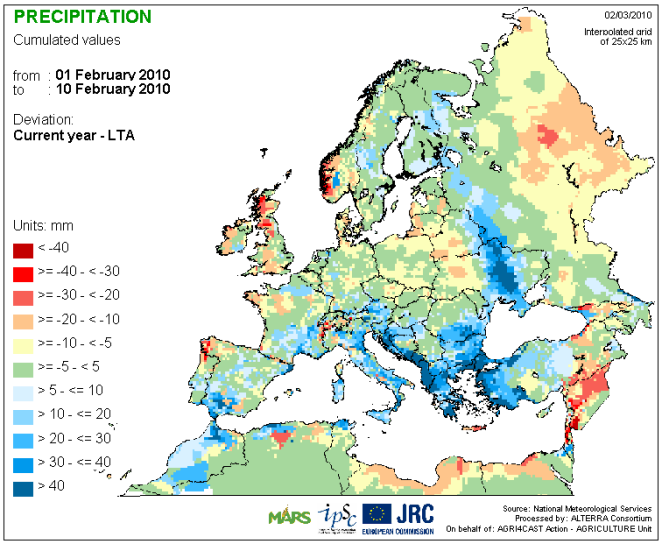


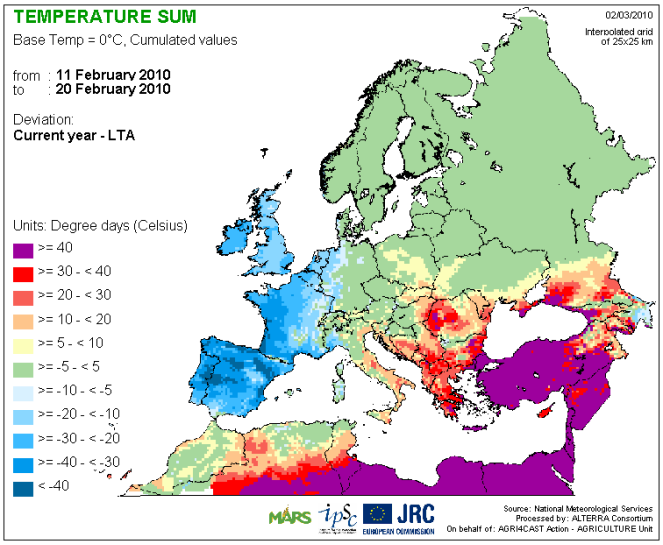


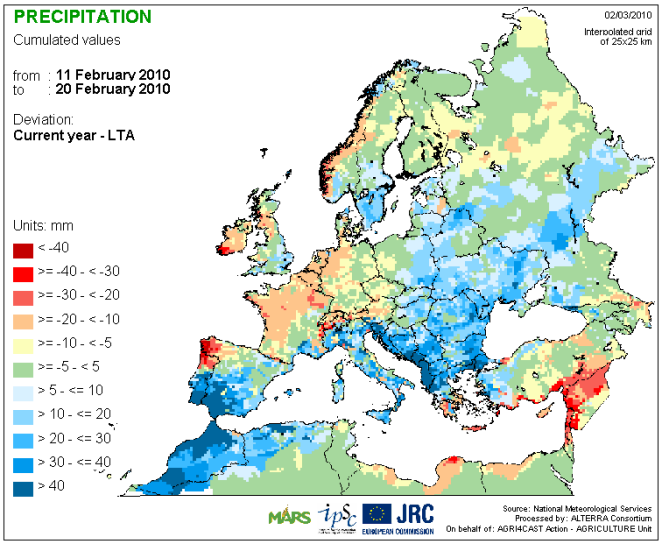


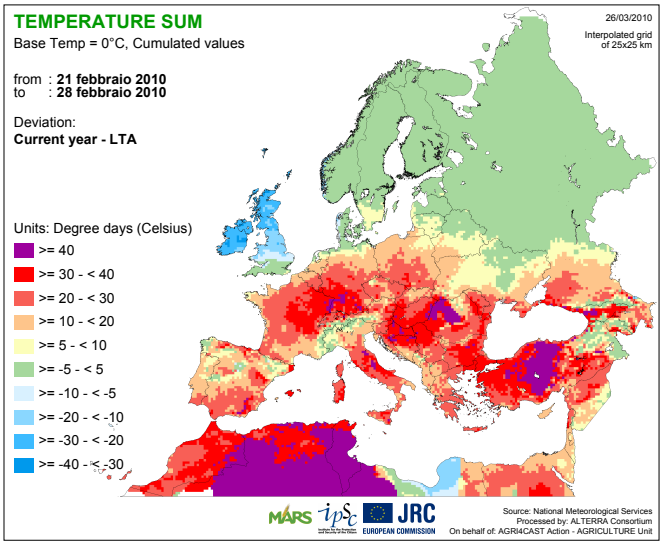
3.3. Temperature and Precipitation 2010 compared with Long Term Average - (10 days)

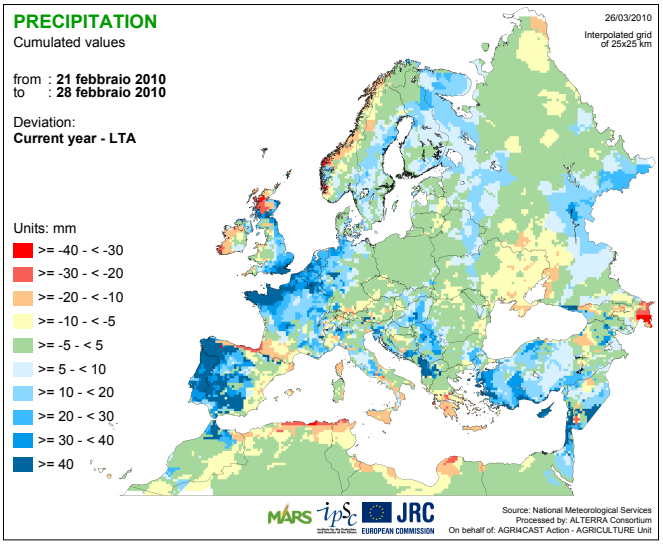






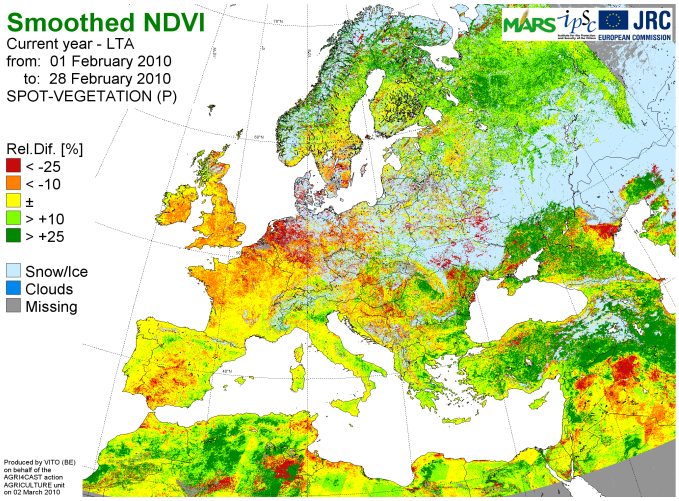






4. Satellite analysis: SPOT Vegetation

Good development in southern Europe and the Maghreb region

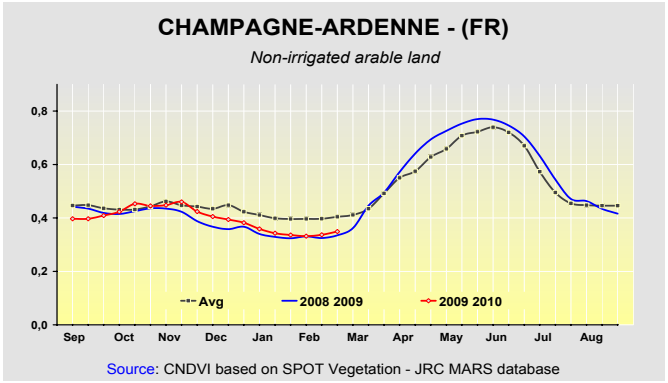


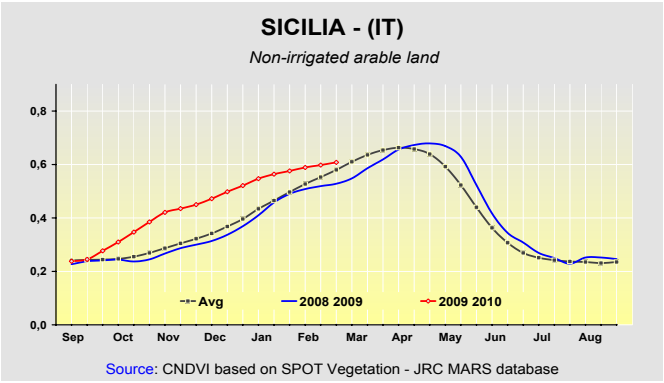
The NDVI map shows differences between the February 2010 NDVI and the long-term average (1998–2008) over the same period. In western Europe precipitation and cloud cover lowered the NDVI response. This activity is stronger in the Benelux region but is also visible in the United Kingdom and northern France. A similar situation can be seen in central and northern Europe, where the above-average snowfall still covers wide areas or strongly reduces the NDVI signal. The situation is more favourable for the countries bordering the Black Sea (e.g. Romania and Bulgaria) due to warmer than usual temperatures during germination of the winter cereals and to snow cover that protected crops from January frost kills. In the Mediterranean basin normal to good conditions are observed (e.g. Italy and Greece). An exception is visible in southern Spain and northern Morocco where the NDVI values dropped to the average. Once again, abundant rainfall is the main reason for this.

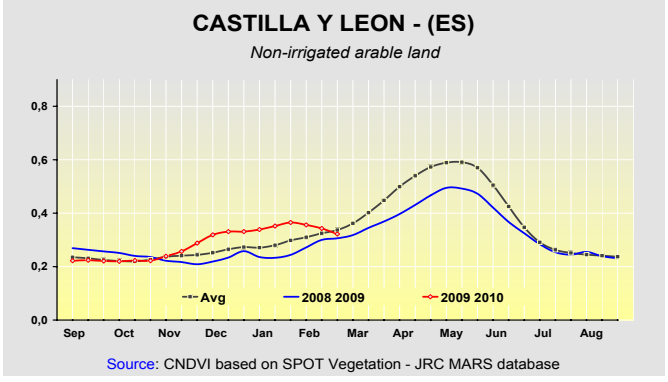
The situation is confirmed at regional level by the NDVI profiles of non-irrigated arable land. NDVI profiles for Spain (see Castilla y León and Extremadura) show trends around the average, slightly affected by wet conditions. A less favourable situation is visible in the profile for Champagne-Ardenne (France), where vegetation development could be delayed by the low winter temperature.

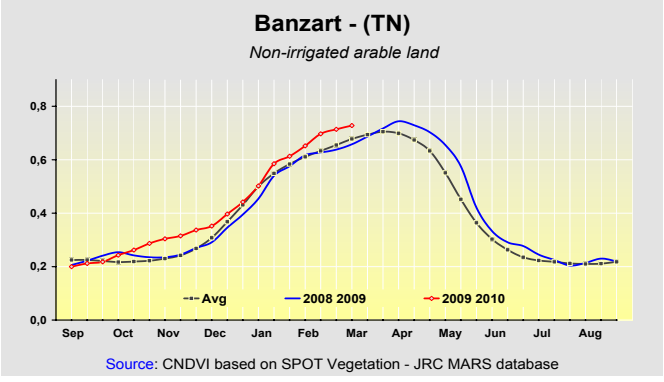
By contrast, in southern Italy (see Sicilia) and in Greece NDVI profiles display values that are higher than average due to the mild winter conditions. Good starting conditions are observed in the countries along the west coast of the Black Sea.

The Maghreb region exhibits good vegetation development. In Tunisia (see Banzart profile) the NDVI values for the current year are slightly above the average. In Morocco the wet conditions lowered the NDVI signal in recent months, whereas in February drier conditions raised the curve for the current year above the average.









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