



Seasonal Bulletin on the Climate in WMO Region VI

- Europe and Middle East -

Summer 2013

Deutscher Wetterdienst

Last Change: Mon Oct 7 13:45:46 UTC 2013



The following maps are first guess products based on meteorological bulletins which have been quality checked roughly. The text is based upon these maps as well as the monthly climate bulletins of the countries of RA VI as far as they are available on the web. More detailed information including updated analyses of more data which have undergone a better quality control and further aspects like clouds and water vapour may be found on the link of the Regional Climate Centre on Climate Monitoring in RAVI:

[RCC-CM RA VI/](#)

and at the Global Precipitation Climatology Center (GPCC):

[The GPCC](#)

The Seasonal Bulletin on the Climate in WMO Region VI will usually be delivered within 2 months after the end of a season.

Highlights:

- Extreme flooding in eastern and central Europe (continuing from end of May)
 - Record high temperature of 25.9 °C at Maniitsoq/Sukkertoppen (100 km north of Nuuk) on Greenland on 30 July 2013
 - Flooding in Georgia in July
 - Hailstone of 14,1 cm diameter and a weight of 360 g found on 6 August in Undingen, Germany
 - Extreme forest fire in Portugal
-

Overview:

Temperature

Summer 2013 was warmer than normal over the continent and only on the North Atlantic partly slightly colder than normal. Warmest overall was the Northeast. Between 2 to 3 K warmer than normal were parts of the Alps, parts of the Balkan Peninsula and parts of eastern Europe. It was the 7th warmest summer since 1864 in Switzerland and the 3rd warmest summer since 1813 in southeastern Austria. Also in Germany it was one of the 10 warmest summers since 1881. Especially in the Mediterranean region and in the Black Sea region there were much more tropical nights than normal. The warm spell duration index was clearly higher than normal for northern Italy, the eastern Alps and the Balkan Peninsula.

June 2013 was at least +1°C warmer than normal in the Arctic region and in eastern Europe. In eastern parts of the European Arctic region, anomalies exceeded +4°C. It was the warmest June since 1999 in Finland. Highest maximum in Finland this June was 32.4°C. The return time of such a warm June in Belarus is about 20 years. Northern Norway recorded its third warmest June with a highest daily maximum of 29.8°C. Akureyri in northeastern Iceland had its warmest June since 1953 with 11.4°C on monthly average, and maxima exceeded 20°C in places. Turkey had some new local June maxima records (35-40°C) around 5 June. Parts of the western half of Europe and the North Atlantic were slightly cooler than normal. This concerns especially the sea areas of the North Sea, eastern regions of the North Atlantic and the western Mediterranean, and the corresponding coastal regions. Anomalies were mostly between 0 and -1°C, only few exceptions below -1°C, e.g. locally in the Pyrenees region. Spain had its coldest June since 1997. In the Netherlands, all the months of the first half year were colder than normal. This happened for the first time since 1985. However, in the United Kingdom, the previous two Junes were even colder than this one. Central Europe was slightly warmer than normal due to an intense but short heat wave with maxima up to above 35°C, which also affected most of the other parts in Europe. Some local records occurred around 19 June in central Europe. The heat wave ended after arrival of a cold front causing an abrupt temperature decrease at the end of the month. **July 2013** was warmer than normal on the European continent except partly in Turkey and the Caucasus area. The mean monthly anomalies exceeded +2 K in central and western Europe and were in the range of +3 to +4 K in parts of France, Germany, eastern Austria and its neighbours and locally in UK and northwestern Spain. In France the heat wave of 13 days (15 to 27 July) was moderate but its length was on rank 6 since 1947. In Spain it was the 5th warmest July since 1961 and Norway reported the 5th warmest July since 1900. UK reported July 2013 as the 3rd warmest since 1919, France as well. Germany had the 6th warmest July since 1901. In Ireland it was the warmest July at several places for more than 60 years and at the Valentia Observatory it was the warmest since 1893. Hot days occurred in all central, southern, southwestern and southeastern Europe except in the high mountains and as well in southern UK. Summerdays occurred on the whole continent except on the higher mountains, northern Scandinavia and Russia. Days with maximum temperatures over 40°C occurred in southwestern Spain and Portugal as well as in parts of Italy, southeastern Europe and the Middle East, mainly Syria (see the table). The highest temperature in Spain was 41.8 °C in Jerez de la Frontera. Tropical nights occurred not only in southern Europe but also in eastern Germany, in Poland and in easternmost Austria and its neighbouring countries. **August 2013** was warmer than normal, especially on the Balkan Peninsula as well as in the eastern Arctic Sea. Tropical nights occurred rather often in the Mediterranean Sea region (compare also the map of sea surface temperatures) and in the northern Black Sea region but as well in northern Germany, Denmark and the Baltic States. Hot days occurred in central, western, southern and southeastern Europe, the Middle East and southern Russia and the Caucasus except in the higher mountains. On the southern Iberian Peninsula, in Greece and western and southern Turkey as well as in Syria, Lebanon, Israel and Jordan and in southern Russia more than 25 days of the month were hot days. Extremely hot days (above 40°C) occurred mainly in southern Spain and in Syria and Jordan but locally also in other countries. 17 of 58 countries reported that a maximum temperature of 40 °C or more was registered in August 2013. The highest value occurred in Jordan with 45 °C. In Spain 44.1 °C was the highest value. Only a few frost days occurred in the Alps at higher locations but more often in the mountains of southern Norway and Sweden. The high temperatures partly caused deformations of streets (i.e. Portugal, Germany, Austria). (Consider that temperatures close to the surface may exceed the air temperatures arbitrarily under sunshine conditions). Together with the dry conditions they lead to forest or bushfires especially in the southern regions (Portugal, Austria).

Precipitation

Precipitation in **summer 2013** was higher than normal in the Arctic region, on eastern Greenland and Norway, partly on the Italian Peninsula, in the Black Sea region, in the eastern Ukraine and in southern and northern Russia. It was drier than normal on the British Isles, the Iberian Peninsula, most of central Europe, the Balkan Peninsula and eastern Ukraine, the eastern Mediterranean and Middle East as well as central parts of European Russia. In eastern central Europe, which was effected by an extraordinary flooding at the beginning of the season, the seasonal total were slightly above the normal. The 1-month SPI (DWD adjusted SPI) was highest on the western Balkan Peninsula, the eastern Mediterranean and Middle East. The 3-month SPI index was remarkably below the mean on the whole Iberian Peninsula, southern UK and Netherland, and northern Germany, the Balkan Peninsula and parts of Italy and parts of the Alps.

Due to an extremely heavy precipitation situation with flooding especially in the Elbe and Danube River catchments at the beginning of June, monthly totals were very high in **June 2013** especially in eastern central Europe, and new local records were achieved in several places. 48-hour totals on 2-3 June reached at least up to 275mm in Germany, exceeding clearly the normal for the whole June. (The highest 1-day precipitation total of Germany in summer 2013 is nearly as high as the highest 5-day total of this month, see the table). Also some heavy rain after thunderstorms in the last third of the month contributed to a wet month there. Highest monthly totals fell in northern Austria with a local maximum of 475mm in Bregenz and new local June records. It was also very wet west of the Black Sea, in Scandinavia and over the eastern Atlantic and its coasts in southern Ireland, western France and northern Spain with monthly totals above 100 mm, locally above 150 mm or around twice the normal; in Bulgaria locally more than 300% of the normal, partly accompanied by large hail. Norway and the northern half of Austria received each 160% of its normal June total. It was the third wettest month on record in eastern Norway behind 2011 and 1987. In southwestern France, much of the rain was contributed by heavy thunderstorms on 17-20 June. In Moldova, more than 100 mm fell on 30 June within a few hours. On the other hand, there were some quite dry areas as well that month, such as Iceland, United Kingdom, the Azores islands, most of Iberia, the Mediterranean and also large parts of eastern Europe, although several thunderstorms with heavy precipitation and large hail occurred in Russia and other parts of eastern Europe. Southern Iberia and southern parts of the Mediterranean regions received less than 10 mm that month, which was locally less than 20% of the June normal. It was also very dry near to the southern slopes of the Alps. Villach in southern Austria had its driest June since beginning of measurements in 1888. Turkey had less than 80% of the normal rain; however, it was not so dry like in June 2012. **July 2013** was drier than normal in Central Europe, on the Balkan Peninsula, on most of the Iberian Peninsula and most of the Middle East. It was wetter than normal in the northern North Atlantic/Arctic Ocean and adjacent countries, partly in eastern Europe and partly in the Mediterranean countries. Highly convective situations with heavy to extremely heavy precipitation were often, not only in the wetter-than-normal areas. There are as well reports of extreme precipitation intensities of more than 50 mm within one or two hours (France). The convective events were partly accompanied with hail of up to 10 cm size especially in the last week of the month (Germany, France). July 2013 was mostly sunnier than normal on the European continent except partly in the Mediterranean countries and in northern Scandinavia and the Baltic countries. **August 2013** was mostly drier than normal except in the Arctic Sea region, the western Mediterranean Sea region, and parts of Russia. Drought contributed to the development of forest fires. As well drought-related damages to agriculture occurred as reported for instance by Austria. (See as well the map of the calculated soil moisture anomaly by CPC). Surplus of precipitation in the western Mediterranean, partly in the Alps and Germany, in Norway, northern and southern Russia in eastern central Europe and parts of the Middle East was often caused by heavy to extremely heavy precipitation.

Sunshine Duration

Summer 2013 was sunniest in Poland and the eastern Alps with more than 125 percent of the 1961 - 1990 normal. In Poland it was locally even above 150 percent. With respect to a 1971-2000 reference it exceeded there even 175 percent, with a seasonal total of 1064 hours at Warsaw. In Austria summer 2013 was on rank 1 together with 1887 and 1904 in the north, in the southeast and on the summits it was the 2nd sunniest summer. It was generally mostly sunnier than normal with patchy regional exceptions over the continent. It was dull in the eastern Mediterranean and Middle East.

June 2013 was very sunny in most of eastern Europe and the Arctic region, locally with more than 125% of the climate mean. On 6 June, sunshine duration in northern Lapland was nearly 24 hours. Also parts of central Europe, the western Mediterranean, Iberia and southern Ireland saw a relatively sunny month. Sunniest areas were in Russia and southern Iberia, both with more than 350 hours of sunshine duration. In contrast, it was mostly dull over northwestern and western Europe. Reykjavik (Iceland) had the duller June since 1995. Turkey and the Middle East, too, were much duller than normal. The Icelandic low was more intense than normal, and also the Azores high was a little bit stronger and extended to the European continent. This caused a more intense air flow from the Atlantic especially to Scandinavia with mostly wet and unstable weather there. The Azores high led to mostly dry and sunny weather over western and southwestern Europe. High pressure also dominated over northern parts of European Russia, where the highest positive temperature anomalies occurred. Low pressure was to be found over Turkey and the Middle East. Although this did not result in much rain, it caused much cloudiness and low sunshine durations. Less sunshine than normal occurred in **June 2013** partly in the eastern Mediterranean countries and the Middle East and in western European Russia. The sunshine surplus reached exceptional values in some countries, for instance in the northern parts of France (45 to 63 percent, based on the 1991-2010 reference). In Germany July 2013 was the 2nd sunniest July since 1951. **August 2013** was mostly sunnier than normal except on the British Isles, the eastern Mediterranean Sea and the Middle East and parts of Russia. The surplus of sunshine duration was most impressive for Poland where the absolute anomaly amounted up to 60 hours. Also rather high positive anomalies occurred in Scandinavia around the northern Baltic Sea as well as in the northernmost regions of Russia.

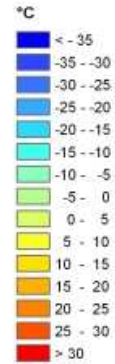
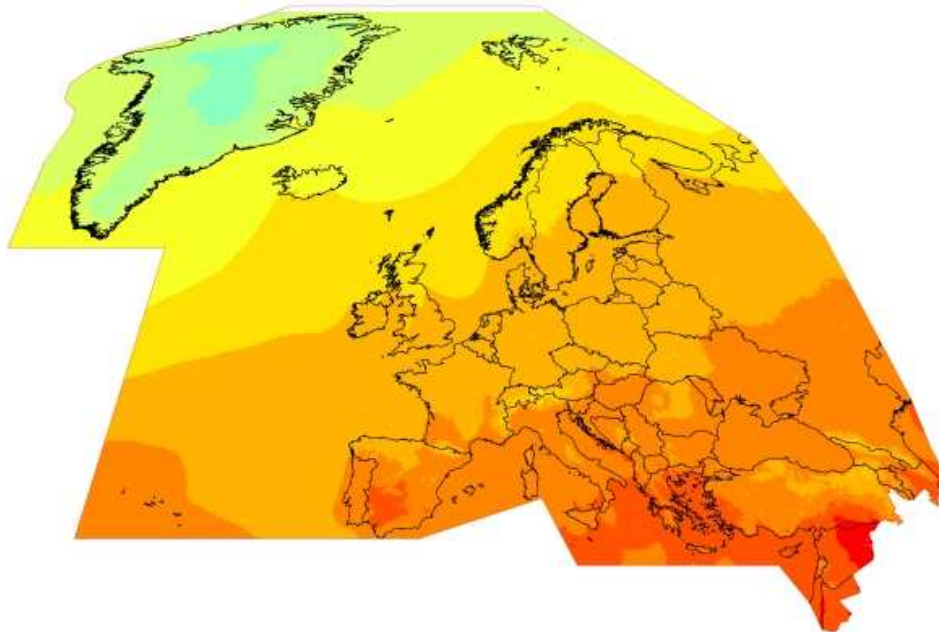
Sea surface pressure/Circulation

The Azores high was as a mean of the season well developed. the Icelandic low was part of low pressure extending from the American East coasts to east of Iceland. Rather low pressure was over the Middle East. The negative anomalies in the range of 0 to -4 hPa extended over Greenland and the Northern North Atlantic, including Iceland as well as in the southeast, including the eastern Mediterranean, the Middle East and southern Russia. The western, northern and northeastern continent, the western Mediterranean and the Balkan Peninsula had slightly positive anomalies up to +4 hPa. The seasonal means of the NAO- and AO-indices were 0.65 and 0.226.

In **June 2013** the NAO index was positive most of the month, resulting in a slightly positive monthly mean of 0.52, similar like in April and May 2013. This reflects both the more intense Icelandic low and Azores high. The AO index, too, was mostly slightly positive, indicating relatively small air mass exchange between polar and central latitudes most of the month. In **July 2013** the Azores high was extended northeastwards over the northwestern, central and southwestern European continent. The anomalies were positive from Scandinavia and northern Russia over the northwestern, central, southern and southeastern continent and the central Mediterranean region and negative on the Atlantic, including the Iberian Peninsula, in the eastern Mediterranean, the Middle East, the Caucasus region and Russia except the north. In **August 2013** the Icelandic low and the Azores high were well pronounced. The Azores high was extended northeastwards over the European continent to western Russia. The positive anomalies were in the range of 0 to +4 hPa. Over the northern (including the northern British Isles) and western Atlantic Ocean, the southern North Atlantic, the eastern Mediterranean Sea, the Middle East and southern Russia the anomalies were negative, mostly in the range of 0 to -4 hPa. The negative anomalies over Iceland ranged -4 to -8 hPa. The NAO_index was positive with 0.97.

Temperature:

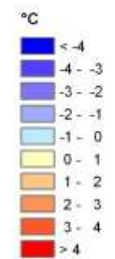
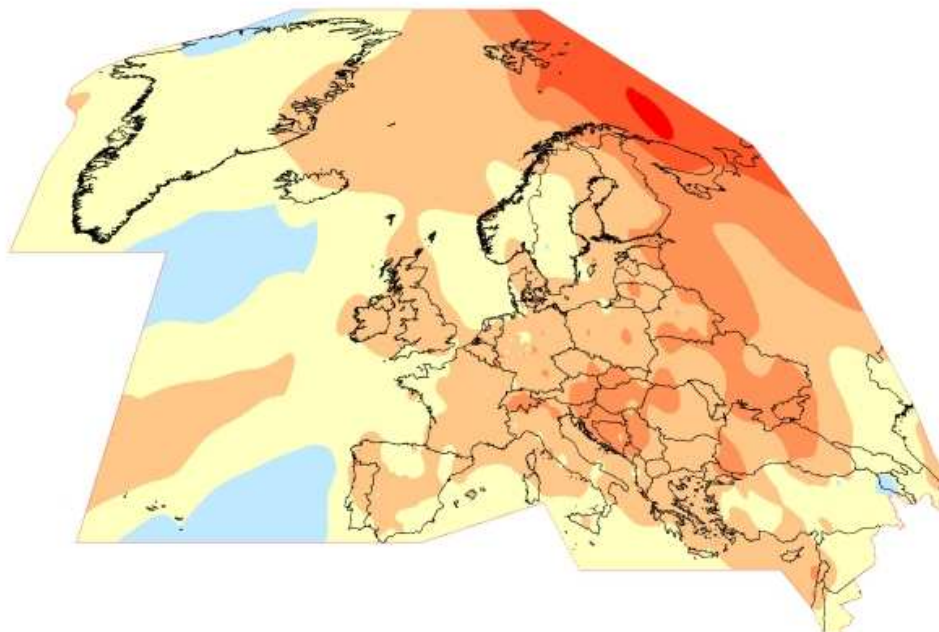
Mittlere Temperatur Sommer 2013
Mean Temperature Summer 2013



Datenbasis / Data basis:
CLIMAT und Schiffsmeldungen
CLIMAT and ship observations

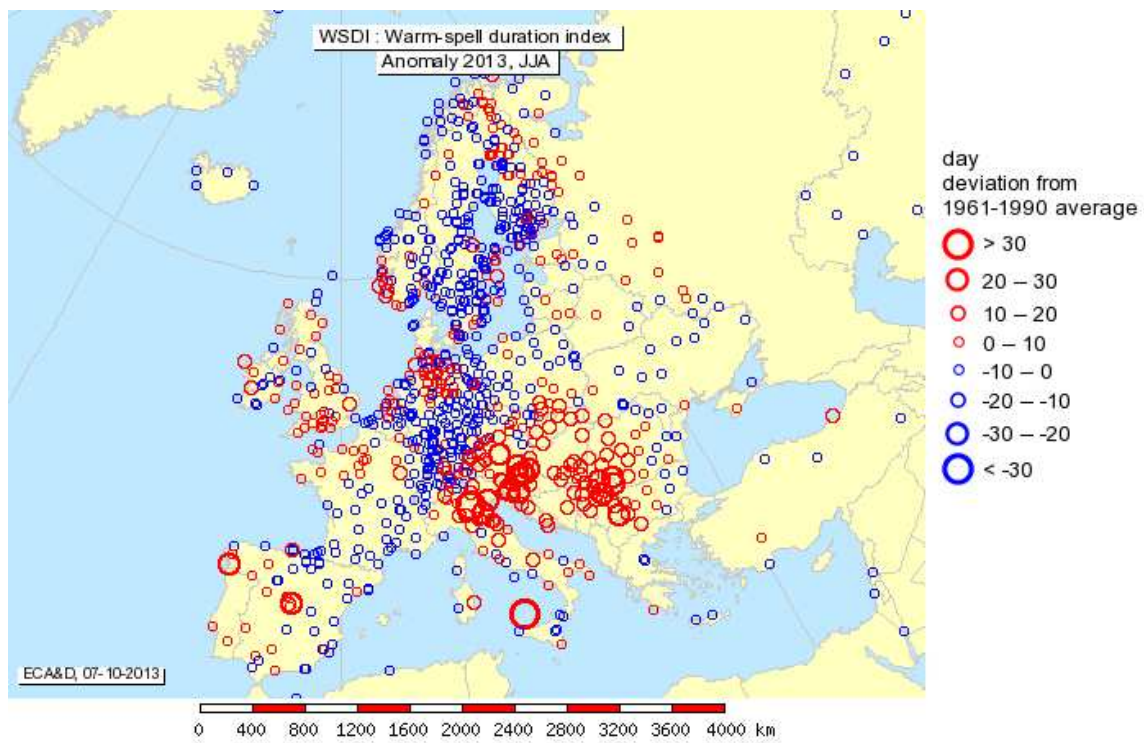
Stand / last update :
04.10.2013

Temperaturabweichung Sommer 2013 vom Normalwert 1961-1990
Temperature deviation Summer 2013 (reference period 1961-1990)

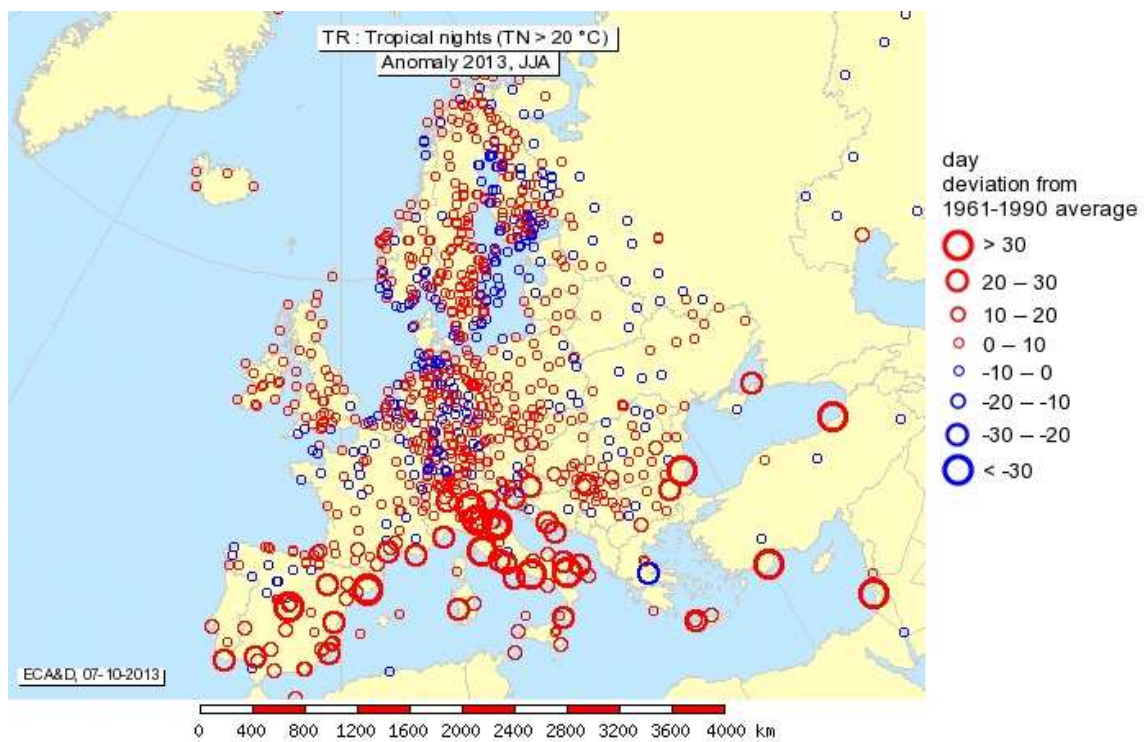


Datenbasis / Data basis:
CLIMAT und Schiffsmeldungen
CLIMAT and ship observations

Stand / last update :
04.10.2013



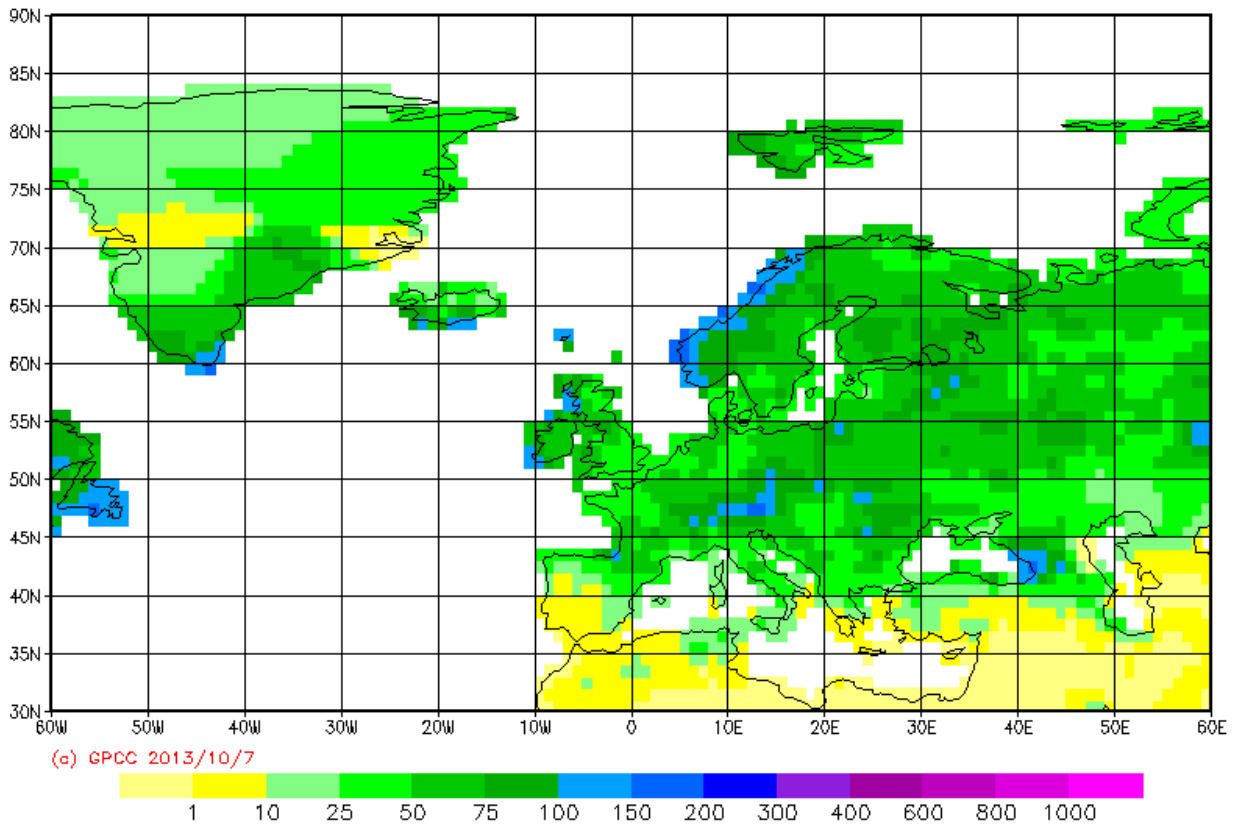
Anomaly of the Warm Spell Duration Index in summer 2013



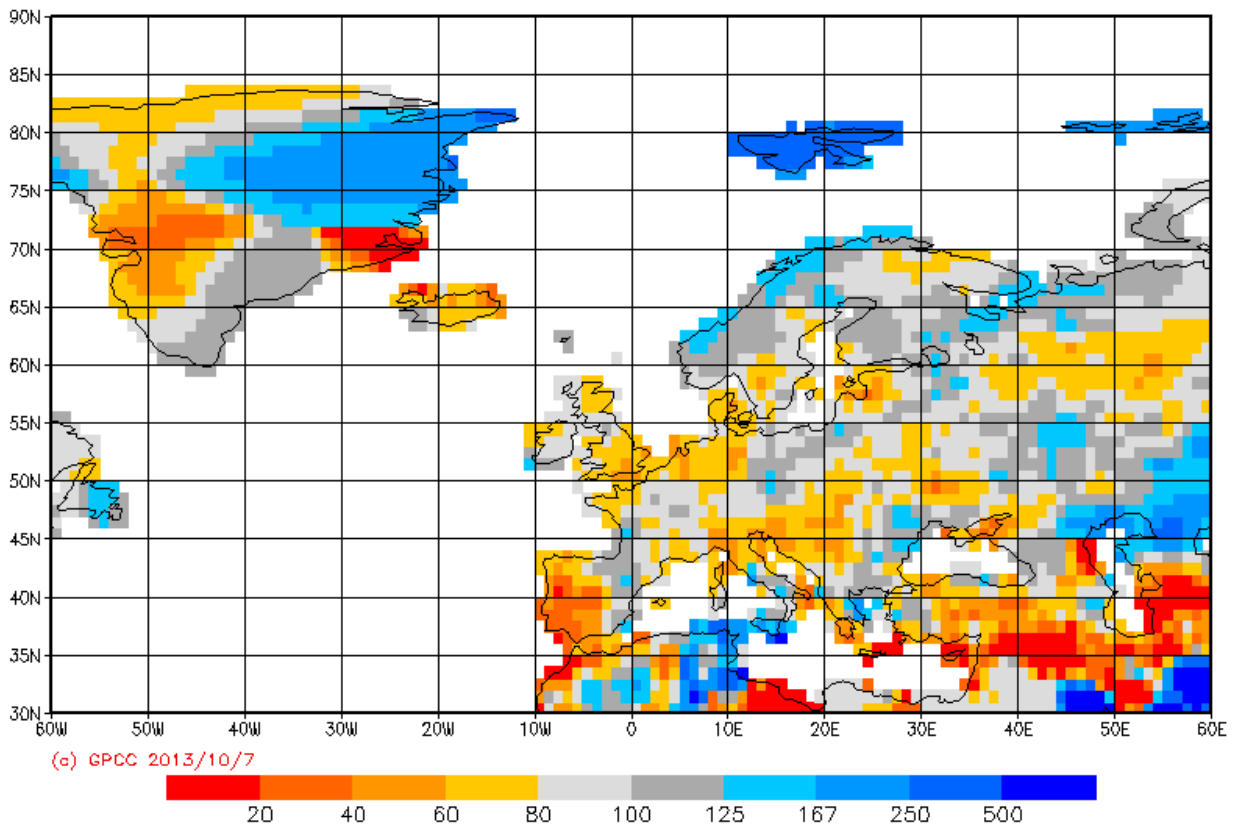
Anomaly of the number of tropical nights in summer 2013

Precipitation:

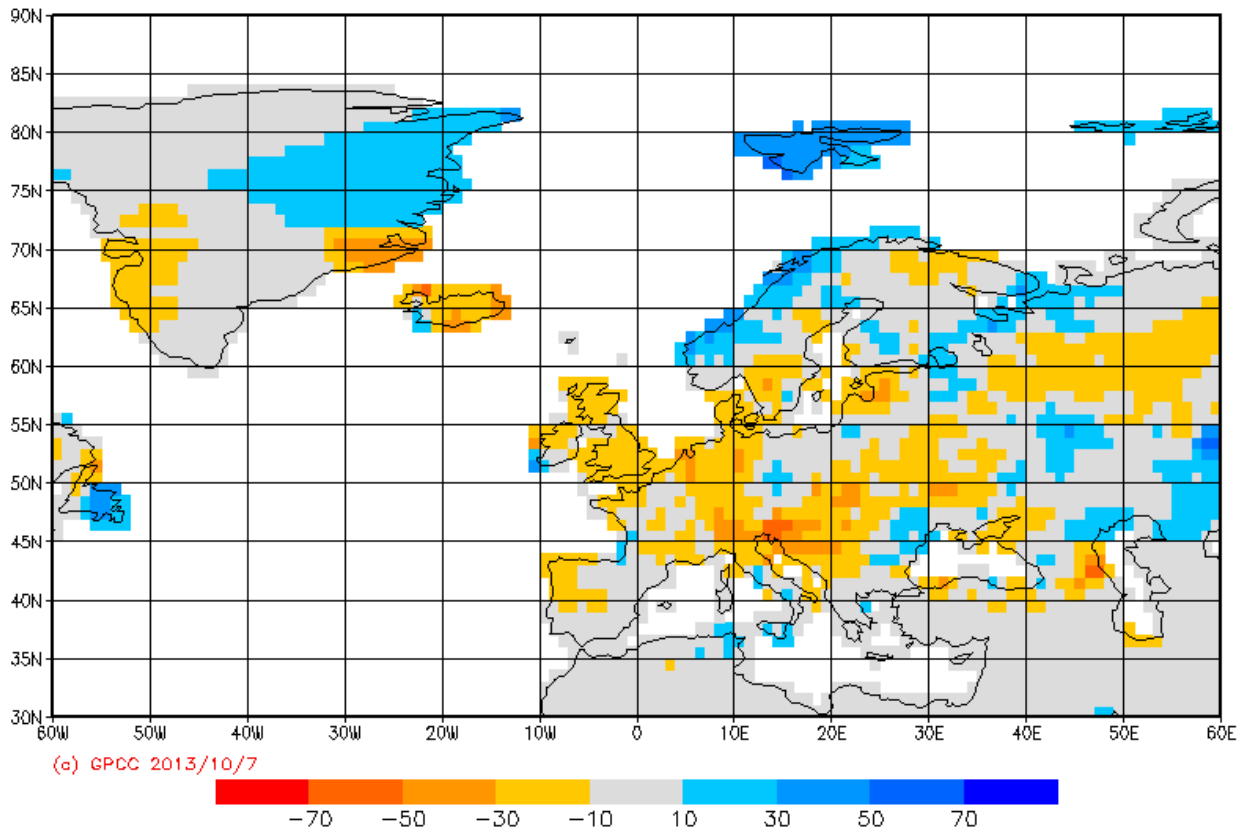
GPCC First Guess 1.0 degree
precipitation for Season (Jun,Jul,Aug) 2013 in mm/month

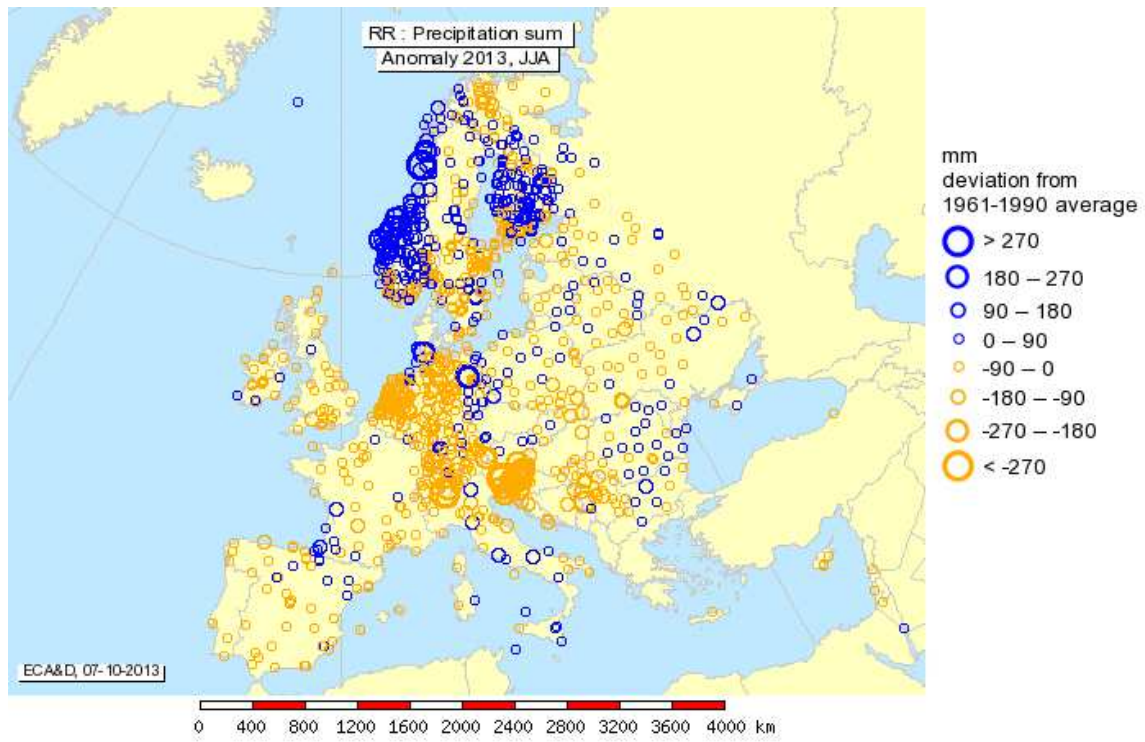


GPCP First Guess 1.0 degree
precipitation percentage of normals 1951/2000 for Season (Jun,Jul,Aug) 2013
(grid based)

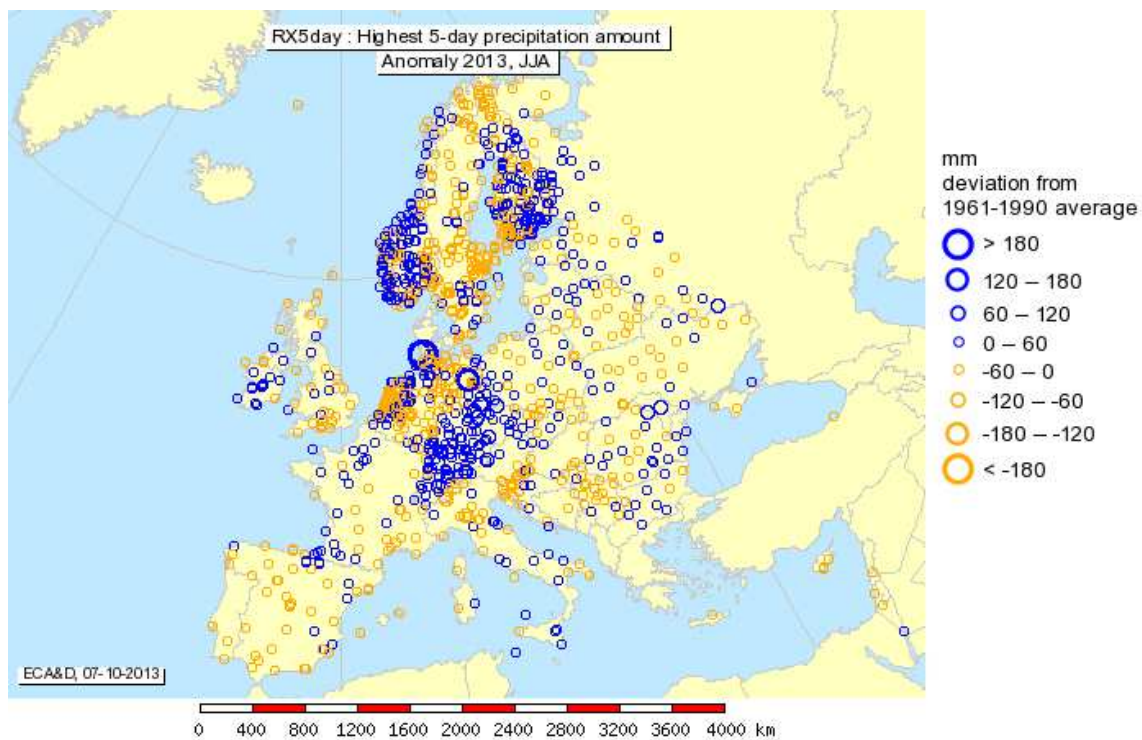


GPCC First Guess 1.0 degree
precipitation anomaly for Season (Jun,Jul,Aug) 2013 in mm/month
(deviation from normals 1951/2000) (grid based)

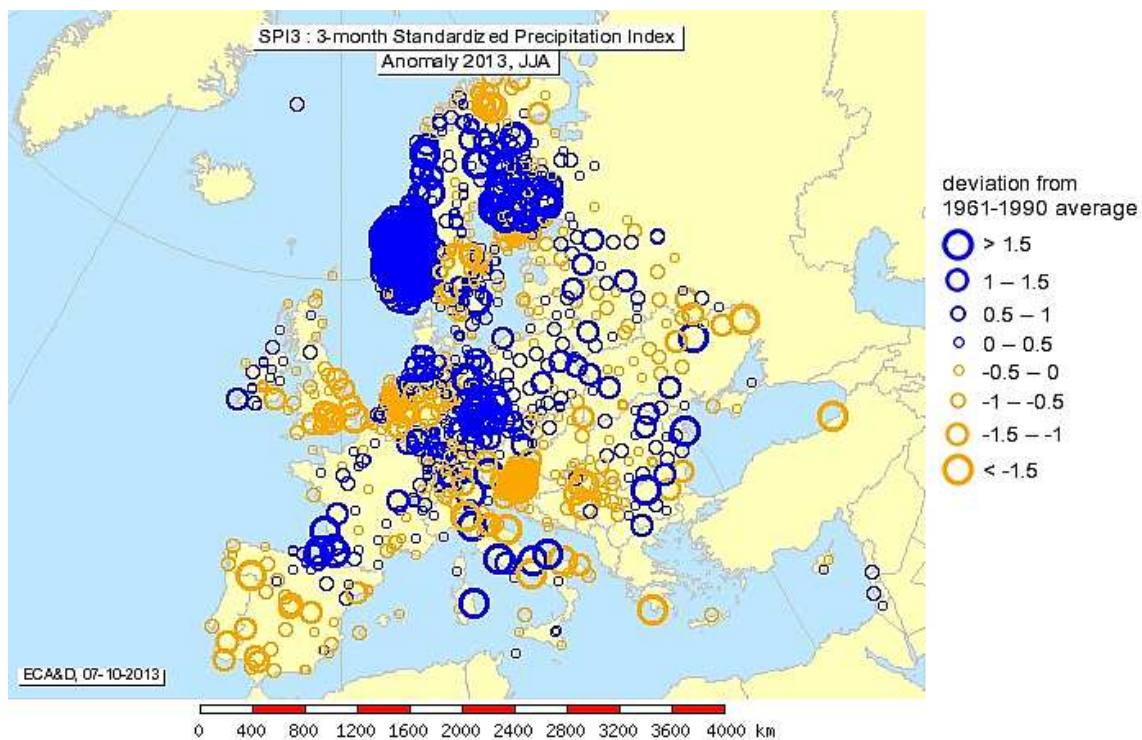




Anomaly of the precipitation total in summer 2013

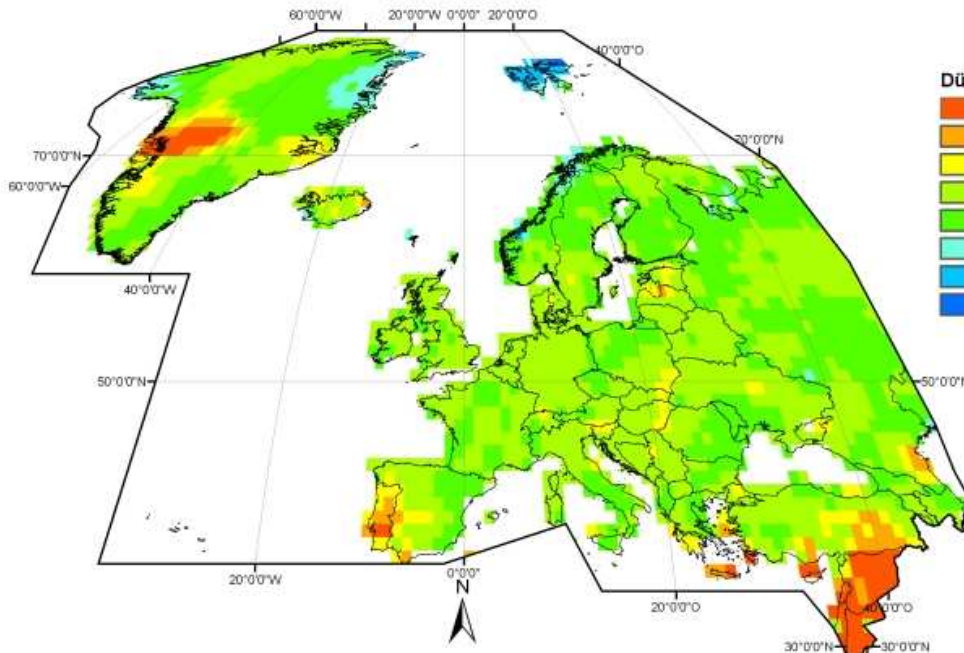


Anomaly of the highest 5-day precipitation totals in summer 2013



Anomaly of the 3-month standardized precipitation index in summer 2013

DWD-Standardisierter Niederschlags-Index Sommer 2013
DWD Standardized Precipitation Index Summer 2013



Dürreklassen/Drought classes

<-2	extrem trocken/extremely dry
-2 - -1,5	sehr trocken/severely dry
-1,5 - -1	mäßig trocken/moderately dry
-1 - 0	leicht trocken/slightly dry
0 - 1	leicht feucht/slightly wet
1 - 1,5	mäßig feucht/moderately wet
1,5 - 2	sehr feucht/very wet
>2	extrem feucht/extremely wet

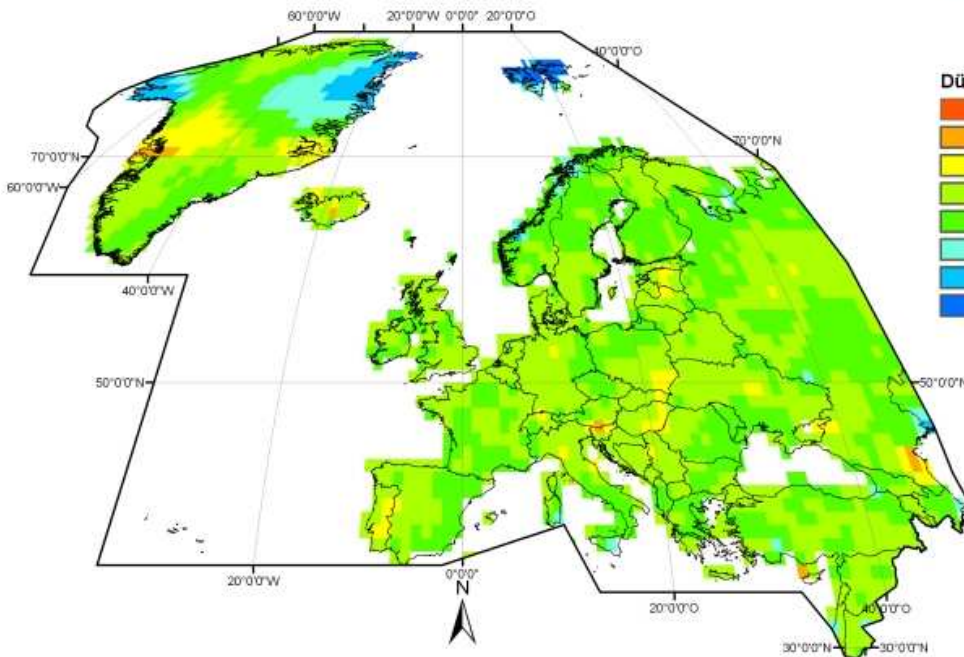
Datenbasis / Data basis:
WZN/GPCC
Landsurface First Guess
Product 1.0*

Projektion / Projection:
Mollweide

Stand / last update :
04.10.2013

DWD-Standardisierter Niederschlags-Index Sommer 2013
(Abweichung vom Normalwert 1961-1990)

DWD Standardized Precipitation Index Summer 2013
(deviation from normals 1961-1990)



Dürreklassen/Drought classes

<-2	extrem trocken/extremely dry
-2 - -1,5	sehr trocken/severely dry
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-1 - 0	leicht trocken/slightly dry
0 - 1	leicht feucht/slightly wet
1 - 1,5	mäßig feucht/moderately wet
1,5 - 2	sehr feucht/very wet
>2	extrem feucht/extremely wet

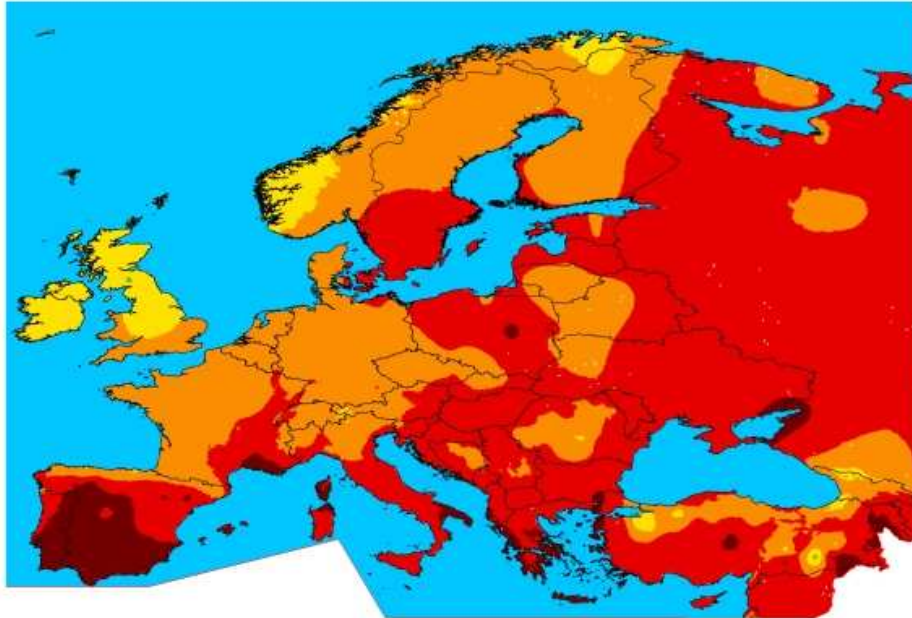
Datenbasis / Data basis:
WZN/GPCC
Landsurface First Guess
Product 1.0*

Projektion / Projection:
Mollweide

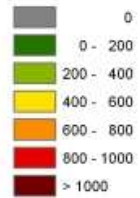
Stand / last update :
04.10.2013

Sunshine Duration and Cloud Cover:

Sonnenscheindauer Sommer 2013
Sunshine duration Summer 2013



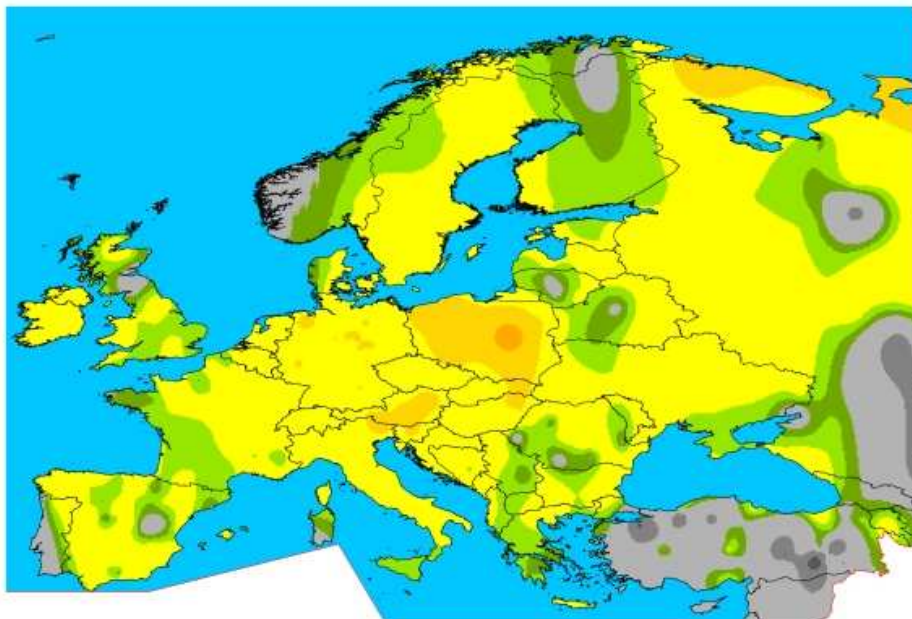
Std. / h



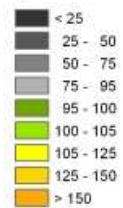
Datenbasis/Data basis:
CLIMAT

Stand / last update :
07.10.2013

Sonnenscheindauer Sommer 2013 in % vom Normalwert 1961-1990
Sunshine duration Summer 2013 in % of the 1961-1990 normal



%

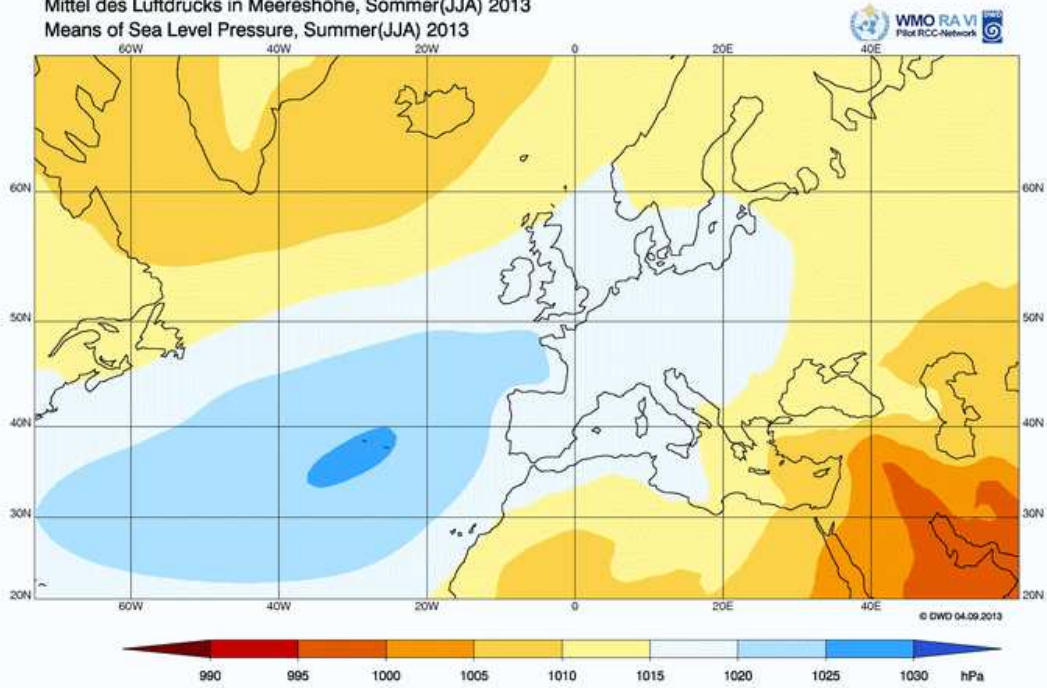


Datenbasis/Data basis:
CLIMAT

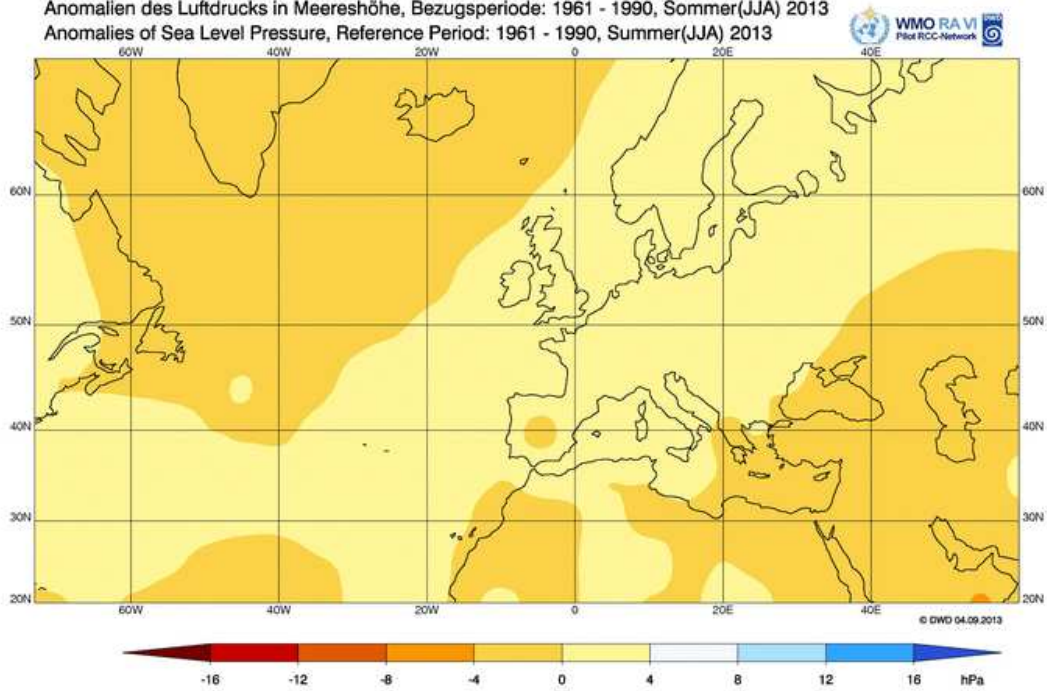
Stand / last update :
07.10.2013

Air Pressure (surface):

Mittel des Luftdrucks in Meereshöhe, Sommer(JJA) 2013
Means of Sea Level Pressure, Summer(JJA) 2013



Anomalien des Luftdrucks in Meereshöhe, Bezugsperiode: 1961 - 1990, Sommer(JJA) 2013
Anomalies of Sea Level Pressure, Reference Period: 1961 - 1990, Summer(JJA) 2013



Extremes Values:

Data source: The RCC-CD-node: <http://www.ecad.eu>

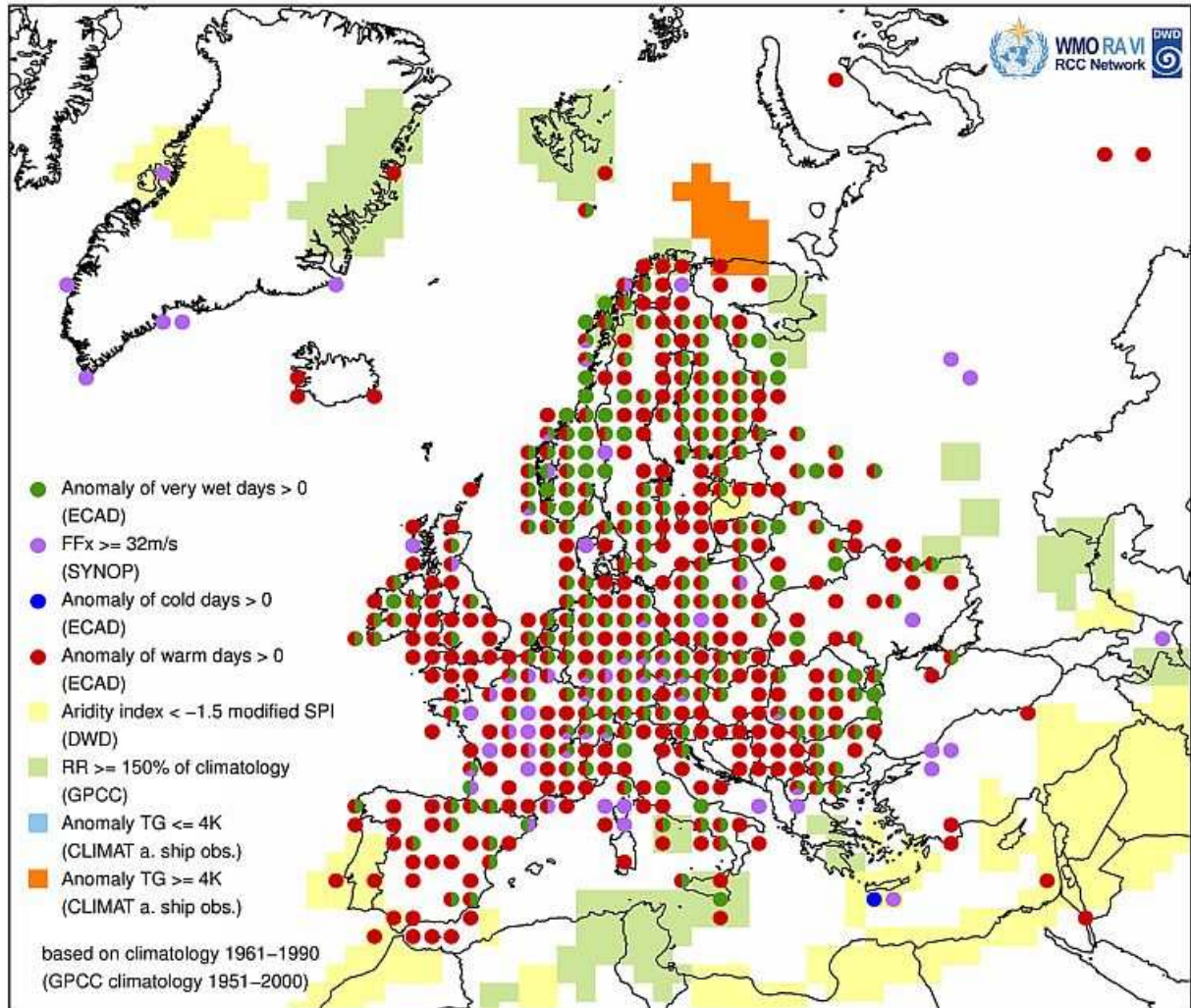
RX1d: highest 24 hours total (in mm), RX5d: highest 120 hours total (in mm), RR10: highest number of days with heavy precipitation (>10 mm/d), RR20: highest number of days with very heavy precipitation (>20 mm/d), TN: lowest mean minimum temperature (° C), TNN: lowest absolute minimum temperature (° C), TX: highest mean maximum temperature (° C), TXX: highest absolute maximum temperature (° C)

Country	RX1d [mm]	RX5d [mm]	RR10 [days]	RR20 [days]	TN [°C]	TNN [°C]	TX [°C]	TXX [°C]
Austria	69.3	156.7	12	6	0.6	-7.5	26.9	38.6
Bosnia and Herzegovina	27.0	28.0	4	1	-	8.4	27.6	37.7
Belgium	50.0	63.0	11	4	-	3.4	24.2	36.6
Bulgaria	61.0	92.0	10	5	-	3.6	32.8	39.2
Belarus	65.3	95.3	11	4	-	6.9	25.0	34.6
Switzerland	77.0	235.0	17	13	4.0	-12.1	27.4	37.4
Cyprus	0.2	0.4	0	0	-	-	-	-
Czech Republic	86.7	167.6	14	8	-	2.2	-	38.7
Germany	270.1	283.9	16	8	0.8	-7.3	26.1	38.5
Denmark	-	-	-	-	-	6.9	21.9	30.6
Algeria	-	-	-	-	-	9.1	40.6	46.9
Estonia	39.0	64.4	7	3	-	4.6	24.3	32.1
Canar. Island	-	-	-	-	-	-	28.0	46.6
Spain	106.0	139.8	9	4	-	-0.9	36.1	42.9
Finland	59.1	99.7	14	5	7.5	-2.5	23.0	31.8
France	106.0	136.2	9	4	9.7	0.1	30.2	39.5
United Kingdom	52.0	73.2	12	3	9.5	0.6	23.9	34.1
Greenland	-	-	-	-	0.7	-5.5	6.8	13.1
Greece	-	0.0	0	0	-	9.1	34.1	39.6
Croatia	52.0	116.0	11	4	-	0.1	30.4	39.2
Hungary	56.0	75.9	5	2	-	6.6	29.0	39.7
Ireland	49.0	84.6	12	6	-	3.9	20.3	29.6
Israel	-	0.0	0	0	-	-	39.9	46.5
Iceland	-	-	-	-	8.5	3.6	14.6	23.7
Italy	57.0	79.4	8	3	7.5	-1.5	33.0	40.1
Kyrgyzstan	-	-	-	-	-	7.1	31.2	39.2
Kazakhstan	-	-	-	-	-	2.1	35.2	44.5
Liechtenstein	-	-	-	-	14.1	5.5	24.3	35.1
Lithuania	40.0	63.5	9	4	-	6.5	23.9	33.6
Luxembourg	63.7	77.8	6	2	-	6.4	23.2	32.7
Latvia	49.0	68.0	11	3	-	5.1	23.4	31.6
Moldova	118.0	172.0	5	3	-	-	27.1	33.4
Netherlands	89.5	105.6	9	3	-	2.6	24.0	36.9
Norway	85.8	212.4	33	16	2.9	-2.8	22.0	30.4
Poland	72.0	91.1	13	7	-	4.0	25.1	38.1
Portugal	5.0	7.1	0	0	-	4.5	32.5	41.2
Romania	118.0	159.1	16	5	4.3	-4.4	30.9	39.5
Serbia	49.0	55.1	9	4	9.2	1.4	30.2	39.7
Russian Federation	99.3	115.3	11	5	3.0	-11.0	27.1	34.1
Sweden	54.0	99.1	10	5	5.4	-3.4	22.9	31.1
Slovenia	50.7	95.7	11	5	4.6	-3.9	28.5	40.2
Slovakia	81.0	86.2	7	3	-	3.0	28.3	39.4
Tajikistan	-	-	-	-	-	-	36.0	42.2
Turkmenistan	-	-	-	-	-	-	38.0	45.0
Turkey	24.0	30.0	1	1	-	5.5	32.8	38.2
Ukraine	81.0	101.5	11	5	-	6.9	29.7	37.7
Uzbekistan	-	-	-	-	-	-	38.7	44.4

Climate Extremes and Severe Weather Events:

Map of Climate Extremes and Events of the Season:

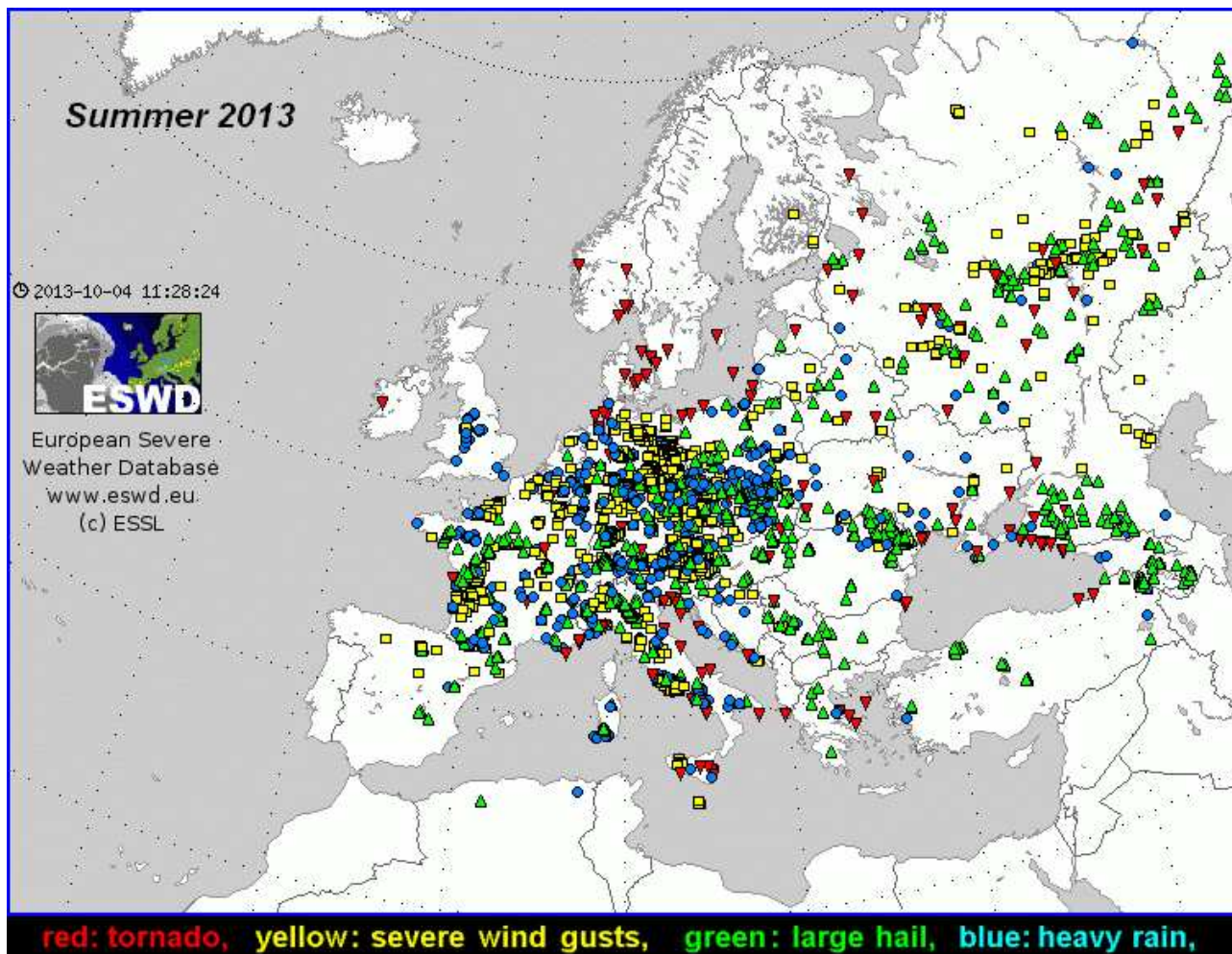
Event map summer 2013



© DWD 04/10/2013



Map of selected Severe Weather Events of the Season (voluntary reports):



Map of reported Severe Weather Events of the Season, Source: <http://essl.org/cgi-bin/eswd/eswd.cgi>

Web-available seasonal summaries in RA VI:

[Meteo Schweiz 2013: Klimabulletin Sommer 2013](#)

[DMI: Vejret i Danmark - sommeren 2013](#)

[EMHI Estonia: Suveilmad 2013](#)

[FMI Finland: Kesätilastot - Ilmatieteen laitos](#)

[Meteo France: Bilan de l'été 2013 \(02/09/2013\)](#)

[Met eirenn Ireland: THE WEATHER OF SUMMER 2013 \(JUNE, JULY AND AUGUST SUMMARY\)](#)

[Norway met.no: Lufttemperatur og nedbør for sommersesongen 2013](#)

[UK MetOffice: Summer 2013 \(provisional of 2 August 2013\)](#)

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