Seasonal Bulletin on the Climate in WMO Region VI

- Europe and Middle East -

Winter 2012

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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 Climatologogy Center (GPCC):

The GPCC

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

Highlights:

An intense cold-spell lasted from the last January decade to mid of February.

The Iberian Peninsula, the western Mediterranean and southern England suffered from drought conditions over the season.

Overview:

The anomaly fields for the temperature changed completely during winter 2012 (see the monthly Bulletins). In December 2011 there were positive anomalies over Russia, continental Europe, Scandinavia and the Arctic. In January 2012 there were mostly everywhere positive anomalies,

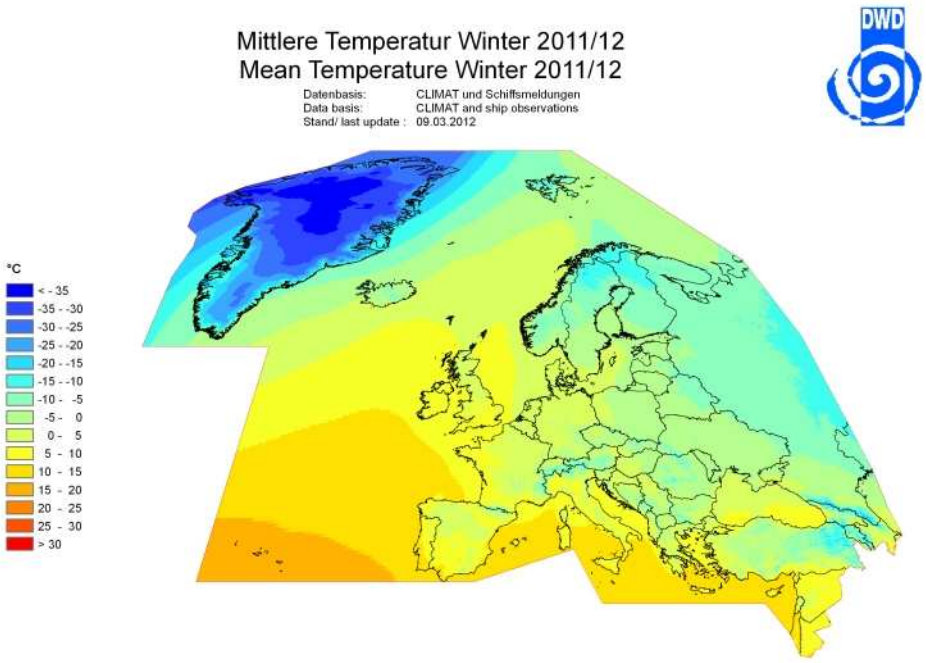
especially in the Arctic, except in the Mediterranean Sea area. And in February there was an extent area of negative anomalies covering Russia, continental Europe and the Mediterranean. Again it was very warm in the Arctic and warm over the North Atlantic. The winter mean shows negative anomalies in southern Europe and the Middle East and warm anomalies northward with values of >= 4 K in the Arctic region. From the last decade of January 2012 to mid of February lasted the cold spell which cost about 600 people their lives. The anomaly of the cold spell index for the complete winter shows impressively the surplus of cold spell days.

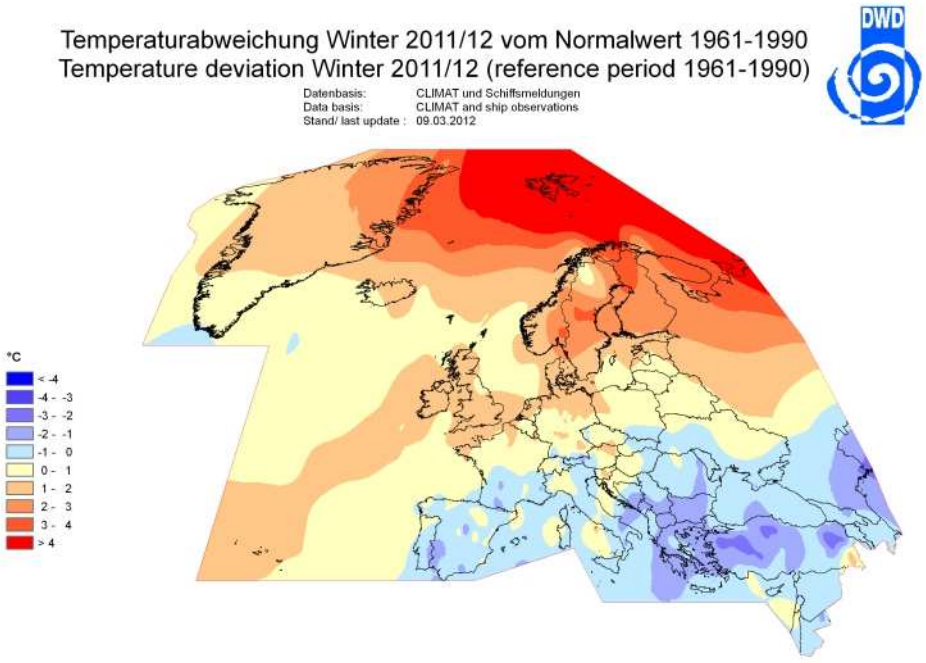
The winter season had drought conditions especially on the Iberian Peninsula, southern England and the western Mediterranean Sea region. For instance Portugal had precipitation totals for the period October 2011 to February 2012 mostly below 75 percent of the 1971-2000 reference (Boletim climatologico mensal - fevereiro 2012) and February 2012 was the driest February since 1931. Similarly Espania had well below 100 percent, mostly below 75 percent and partly below 50 percent of the normal for the period 01 September 2011 to 10 April 2012 (http://www.aemet.es/es/serviciosclimaticos/vigilancia_clima/balancehidrico). As well in southern and eastern UK the winter precipitation totals were below 70 % of the norm.(http://www.metoffice.gov.uk/climate/uk/2012/winter.html). This is weakly pronounced in the 1-month DWD-Standardized Precipitation Index but becomes more impressive in the anomalies of the 3-month Standardized Precipitation Index. Monthly maps of model analyses of the soil moisture are provided by the Climate Prediction Center (http://www.cpc.ncep.noaa.gov/cgi-bin/gl_Soil-Moisture-Monthly.sh). Under influence of the North Atlantic Ireland and Scotland as well as the westcoast of Scandinavia recieved much precipitation as well as the central and the eastern Mediterranean Sea. And also central Europe, eastern Europe and the Balkan Peninsula were wetter than normal. When comparing the anomaly maps for precipitation from GPCC and from ECA&D note, that the latter uses the 1961-1990 norm period, while the GPCC takes the longer 1951-2000 reference. And as an other factor the values of GPCC are expressed in mm/month.

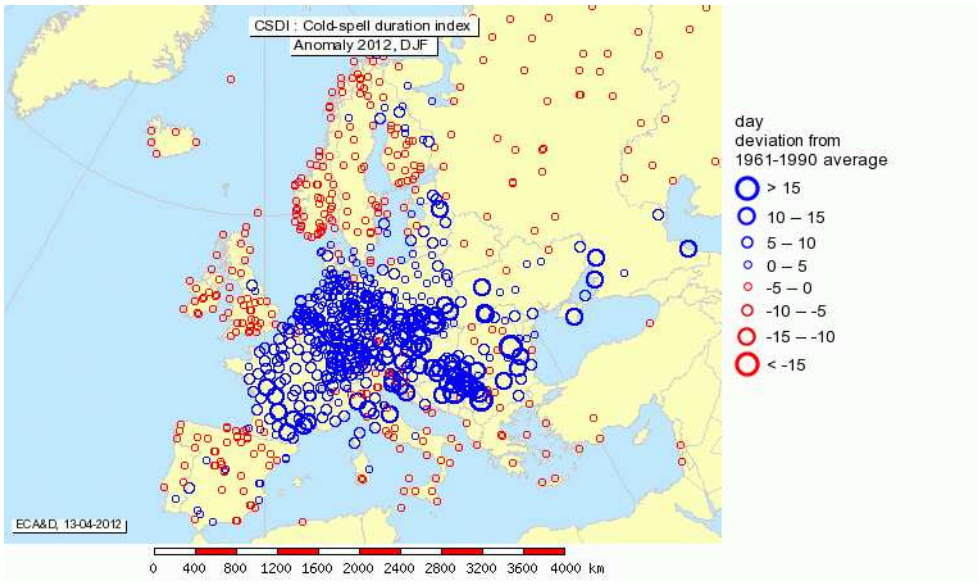
For the sunshine duration the comparison between the mean sunshine duration and the anomaly makes clear that the anomaly map is probably too optimistic for northern Europe. These areas do not have much sunshine in wintertime generally so that a small absolute surplus makes a high positive anomaly expressed in percentages. The maps of fair or dull days (Data source: The CM SAF climate monitoring http://www.cmsaf.eu) give some additional information about the cloud cover.

The mean sea level surface pressure developed during December 2011 to February 2012 from a rather zonal distribution with low pressure in the north and high pressure in the south to an intense blocking situation with very high pressure over western and southwestern Europe and very high pressure over Russia and a high pressure bridge between both. While in December 2011 the NAO index was clearly positive with 2.25 it was nearly neutral with 0.03 in February 2012. The mean distribution over the winter months is very similar to the January distribution. This extreme blocking came somewhat surprisingly. A gif-animation of the Tibaldi-Molteni blocking index of part of the episode which startet during the last January decade is provided by KNMI (http://www.knmi.nl/~vries/Research/research_blocking.html.). An interesting aspect in this context may be the ’Arctic amplification’ which was recently discussed in a paper by Francis and Vavrus. Arctic amplification will lead to a weakened zonal wind regime and increased Rossby wave amplitudes. Indeed in 2011 the Arctic sea ice has been very low again and the Arctic Sea region is relatively warm for many months. The authors say that the effect of Arctic amplification is highest in autumn and winter but also apparent in summer. They argue that it may be related to cold-spells, heat-waves, droughts or prolonged precipitation. See the reference below.

Temperature:

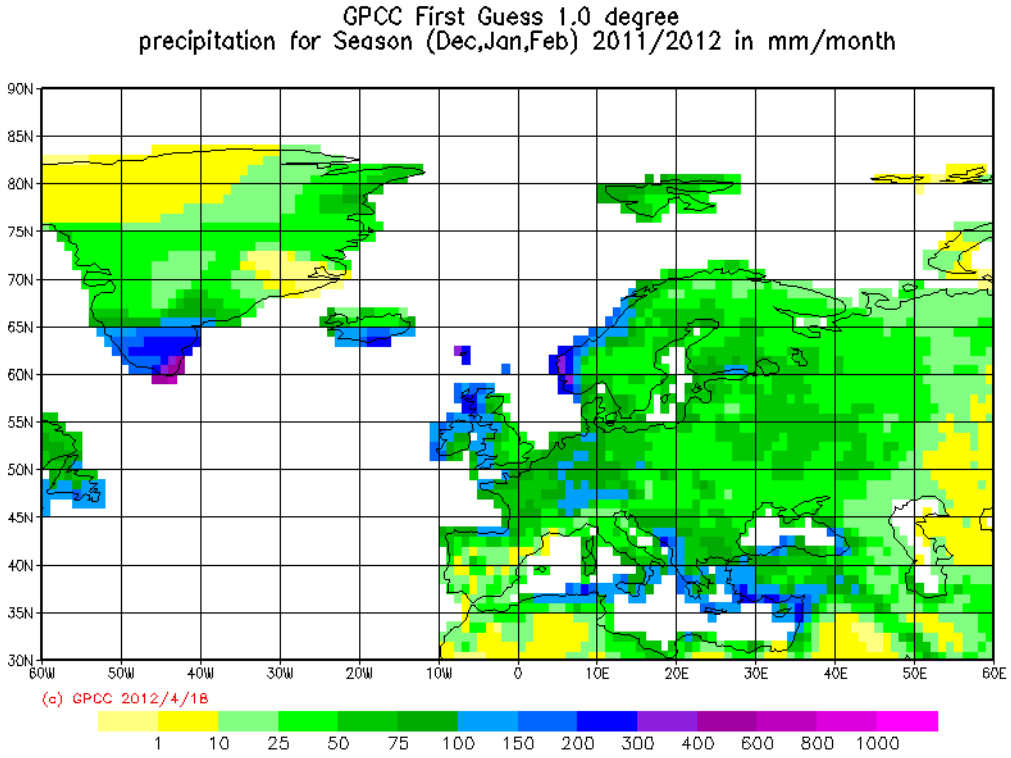




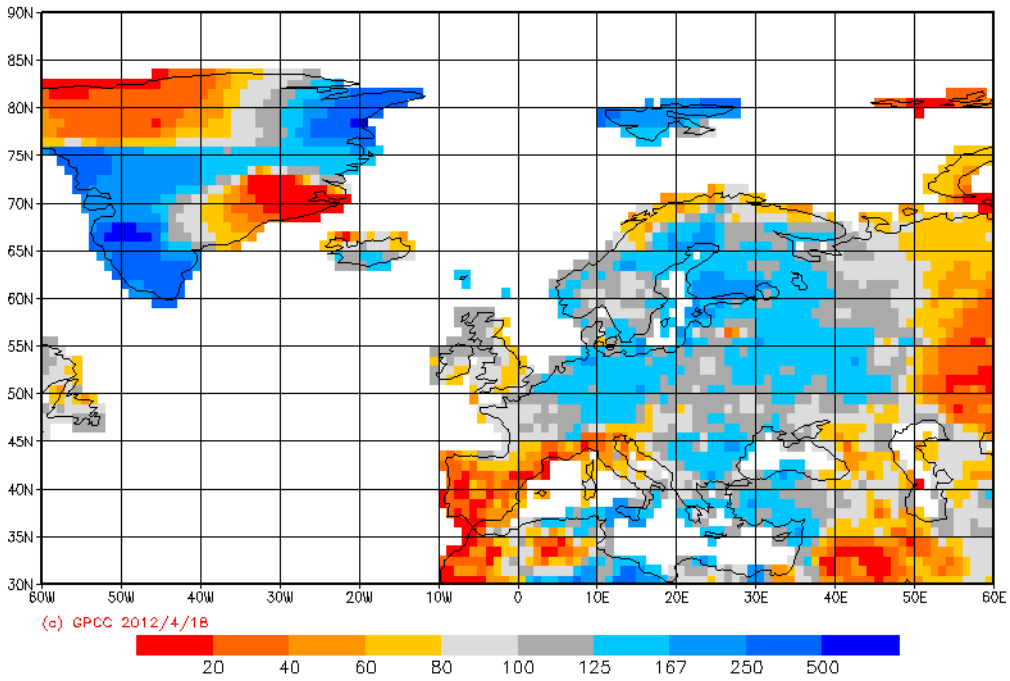


Anomalies of the Cold Spell Duration Index Winter 2012

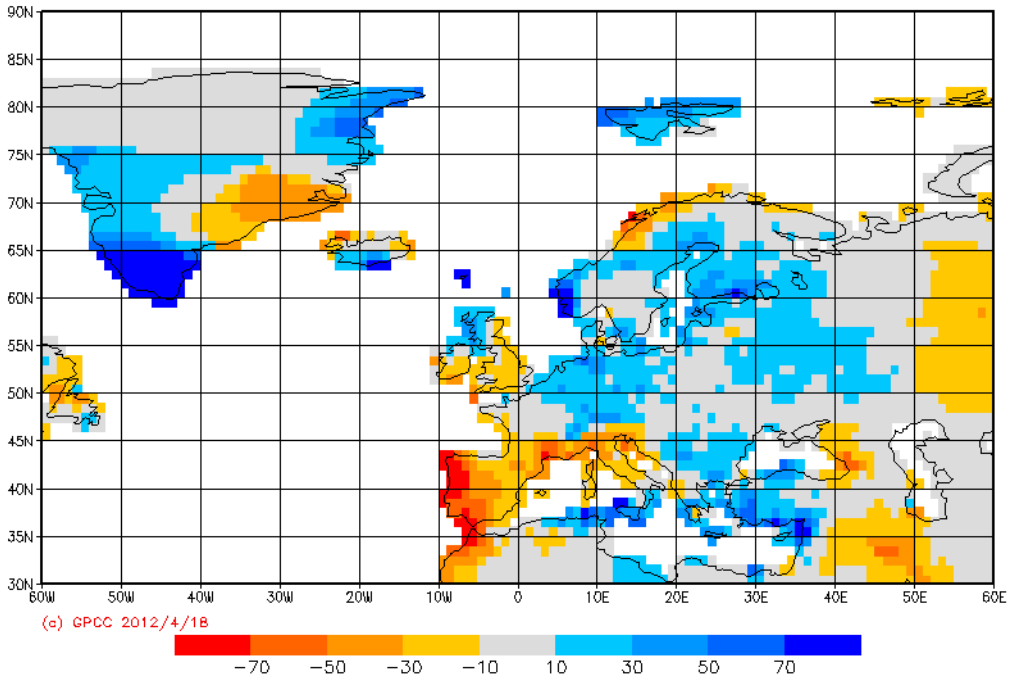
Precipitation:

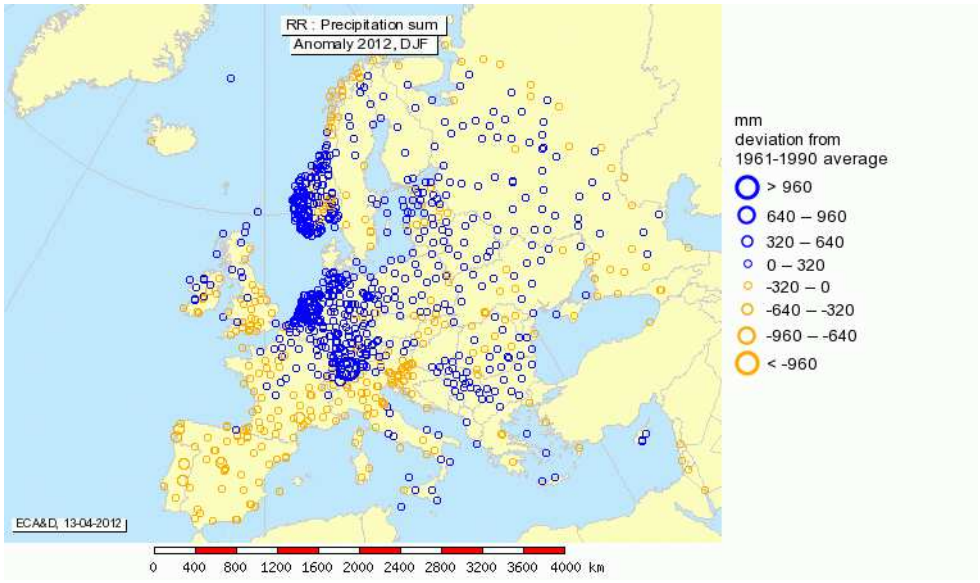


GPCC First Guess 1.0 degree
precipitation percentage of normals 1951/2000 for Season (Dec,Jan,Feb) 2011/2012
(grid based)

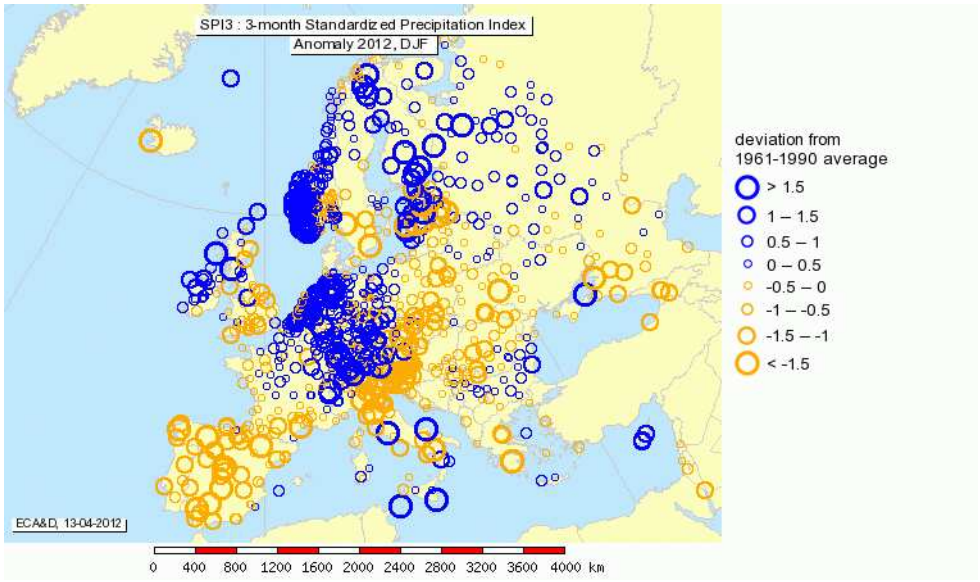


GPCC First Guess 1.0 degree
precipitation anomaly for Season (Dec,Jan,Feb) 2011/2012 in mm/month
(deviation from normals 1951/2000) (grid based)

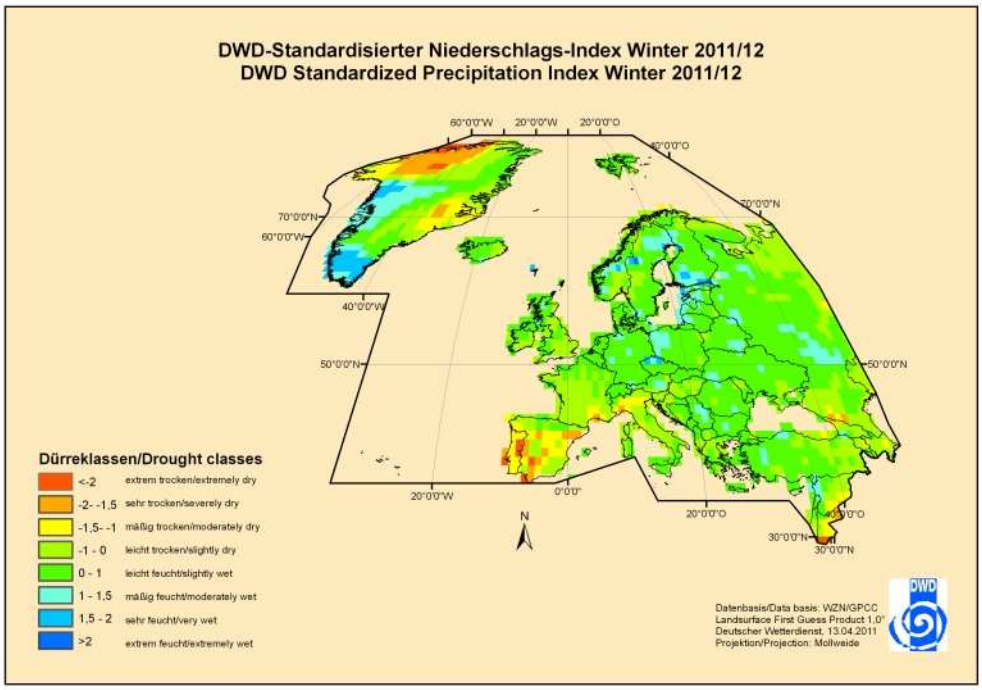




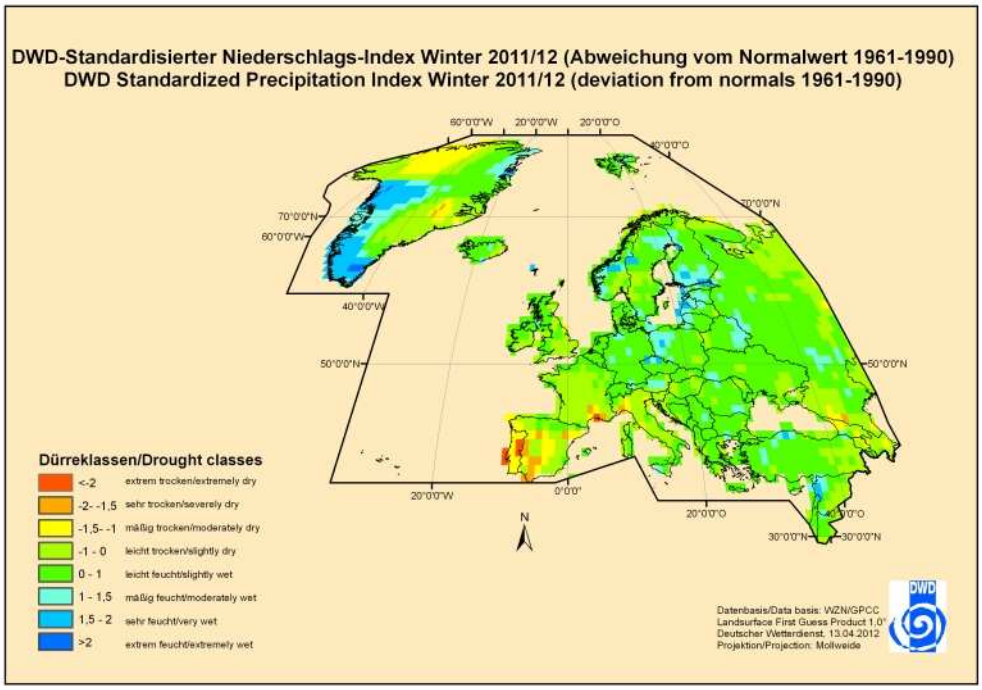
Anomalies (with repect to 1961-1990) of the Precipitation Total Winter 2012



Anomalies of the 3-month Standardized Precipitation Index Winter 2012

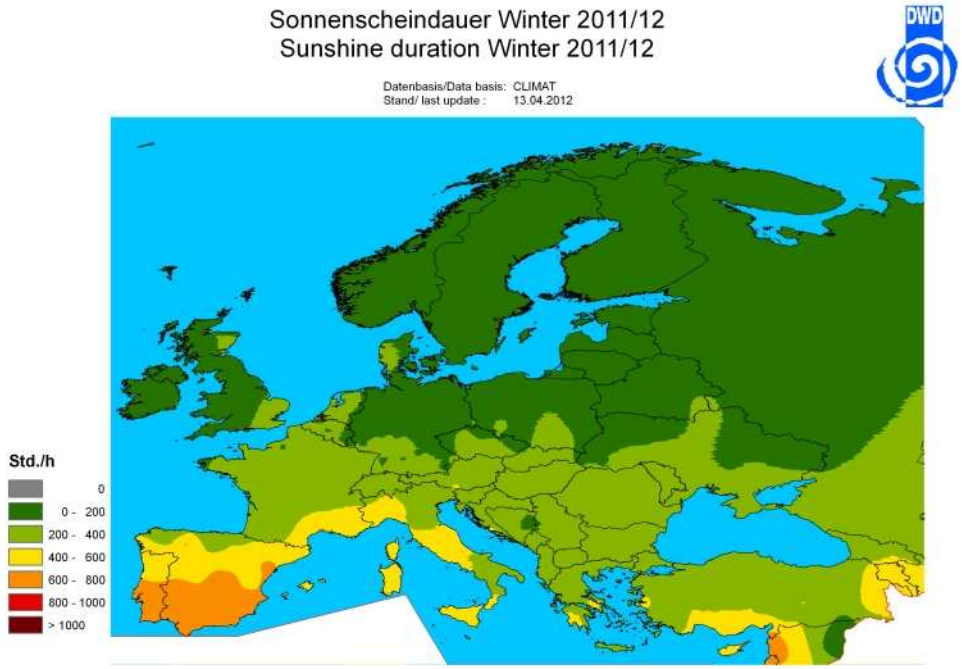


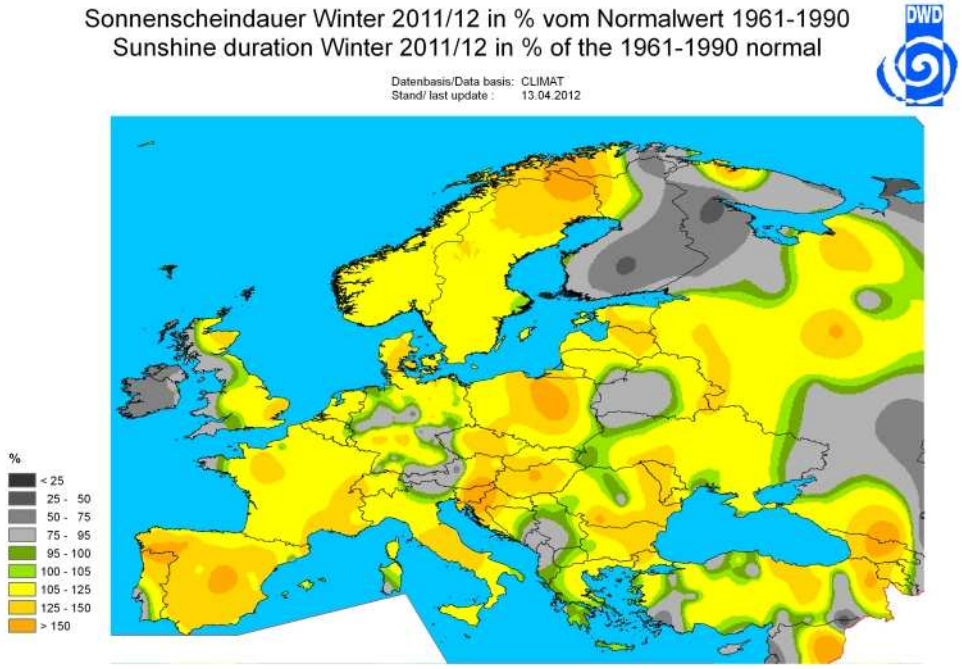
Map of mean seasonal drought index (SPI, modified by DWD) Europe

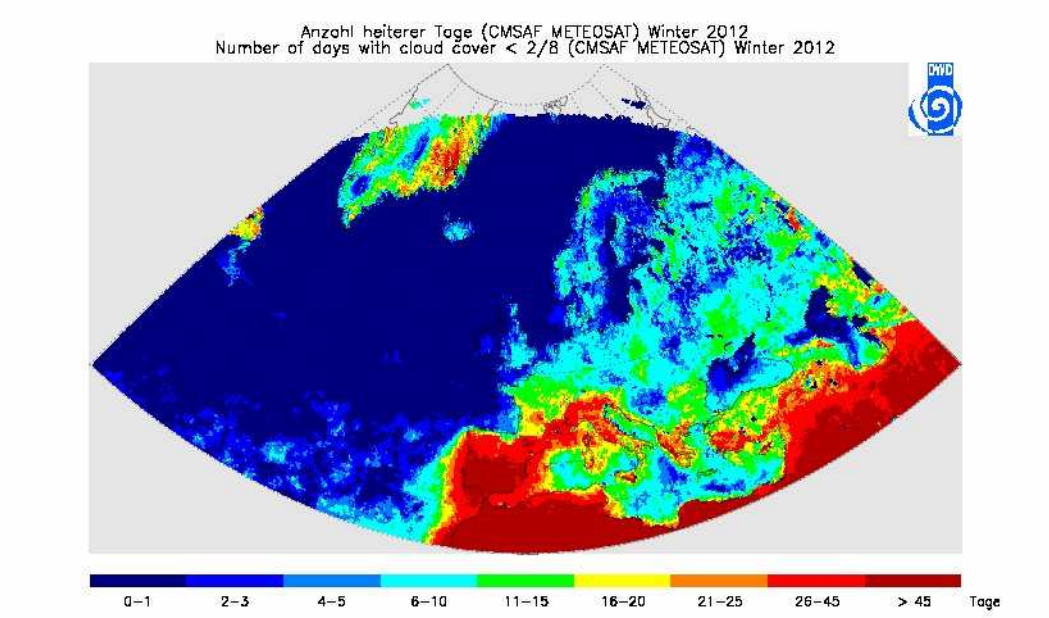


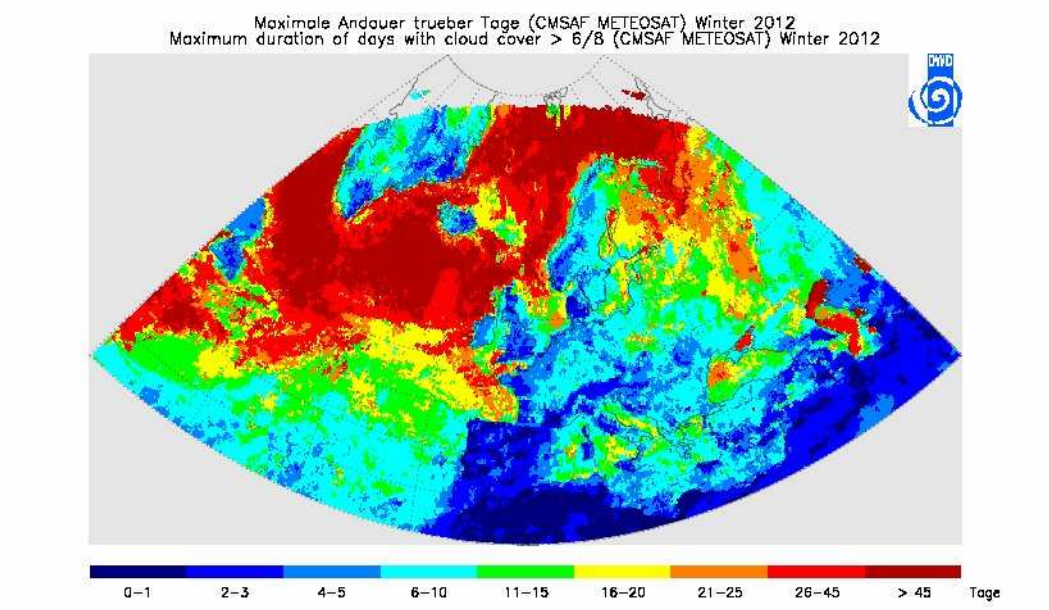
Map of anomaly of mean seasonal drought index (SPI, modified by DWD) Europe

Sunshine Duration and Cloud Cover:

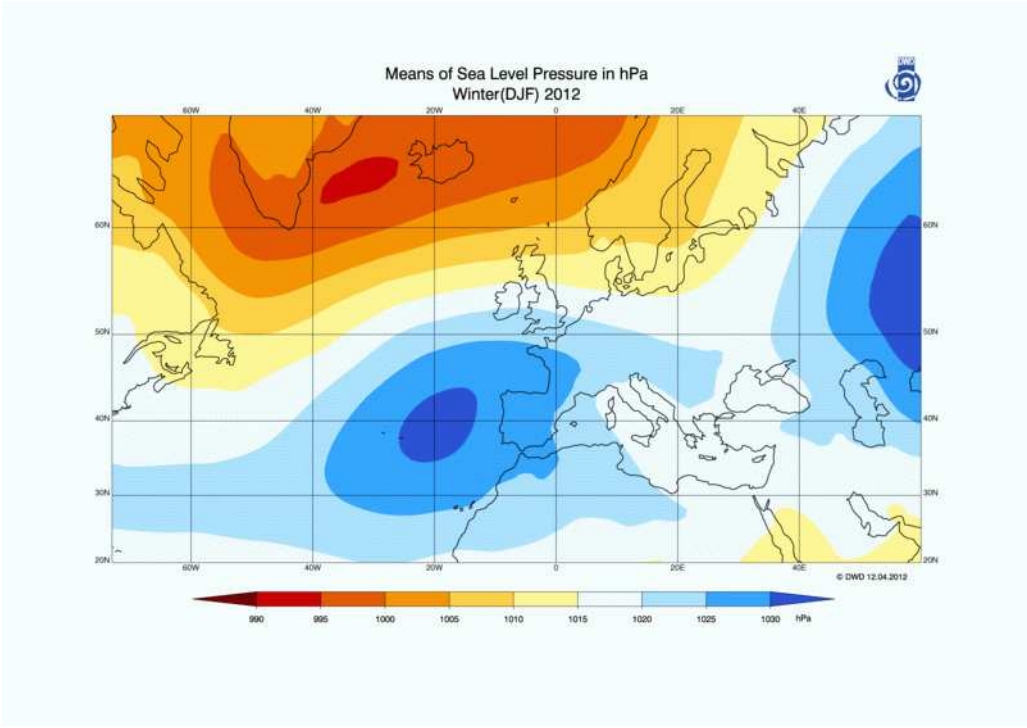


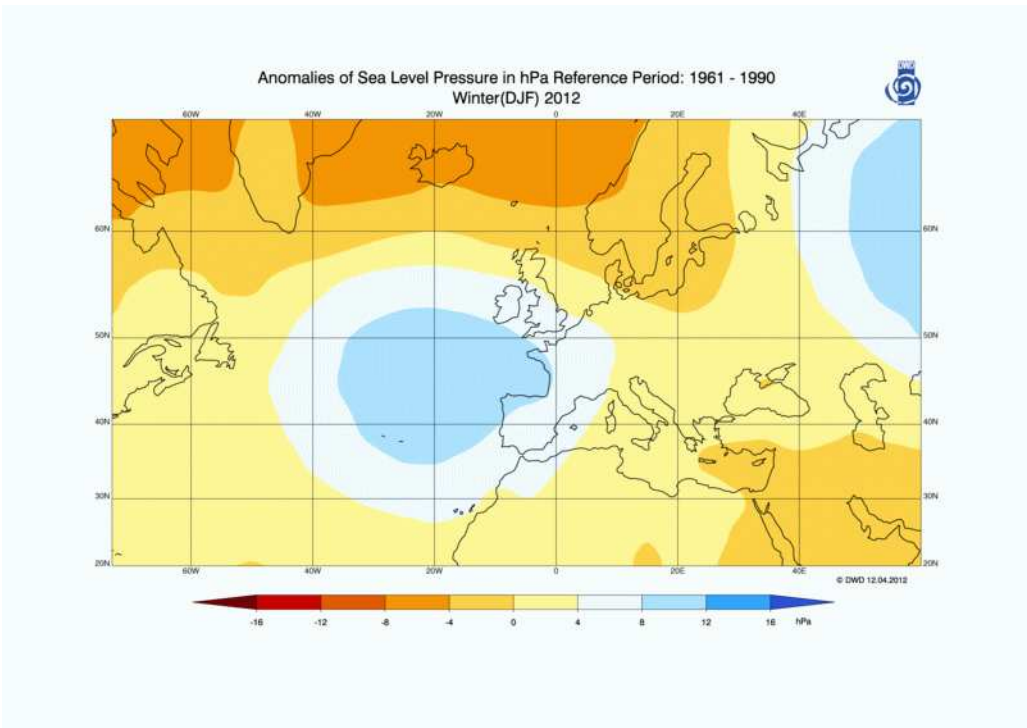






Air Pressure (surface):





Circulation indices are a means to analyse the atmospheric large scale influences upon climate. One of the best known indices is the North Atlantic Oscillation (NAO).Another well known one is ENSO which is especially connected to the El Niño phenomenon.

Monthly values of different circulation indices relevant for Europe: North Atlantic Oscillation (NAO), East Atlantic Pattern (EA), East Atlantic/West Russia Pattern (EA/WR), European Zonal Index (ZI_EU)

(see www.cpc.noaa.gov/data/teledoc/telecontents.shtml and www.dwd.de/GWL for more information)

Index	Monthly Value	Mean Value	Reference Period	Producer
NAO	1.07			cpc/noaa
EA	-1.11			cpc/noaa
EA/WR	-0.53			cpc/noaa
ZI_EU	na	na	1961-1990	dwd

Seasonal extreme values:

Data source: http://www.knmi.ecad.nl

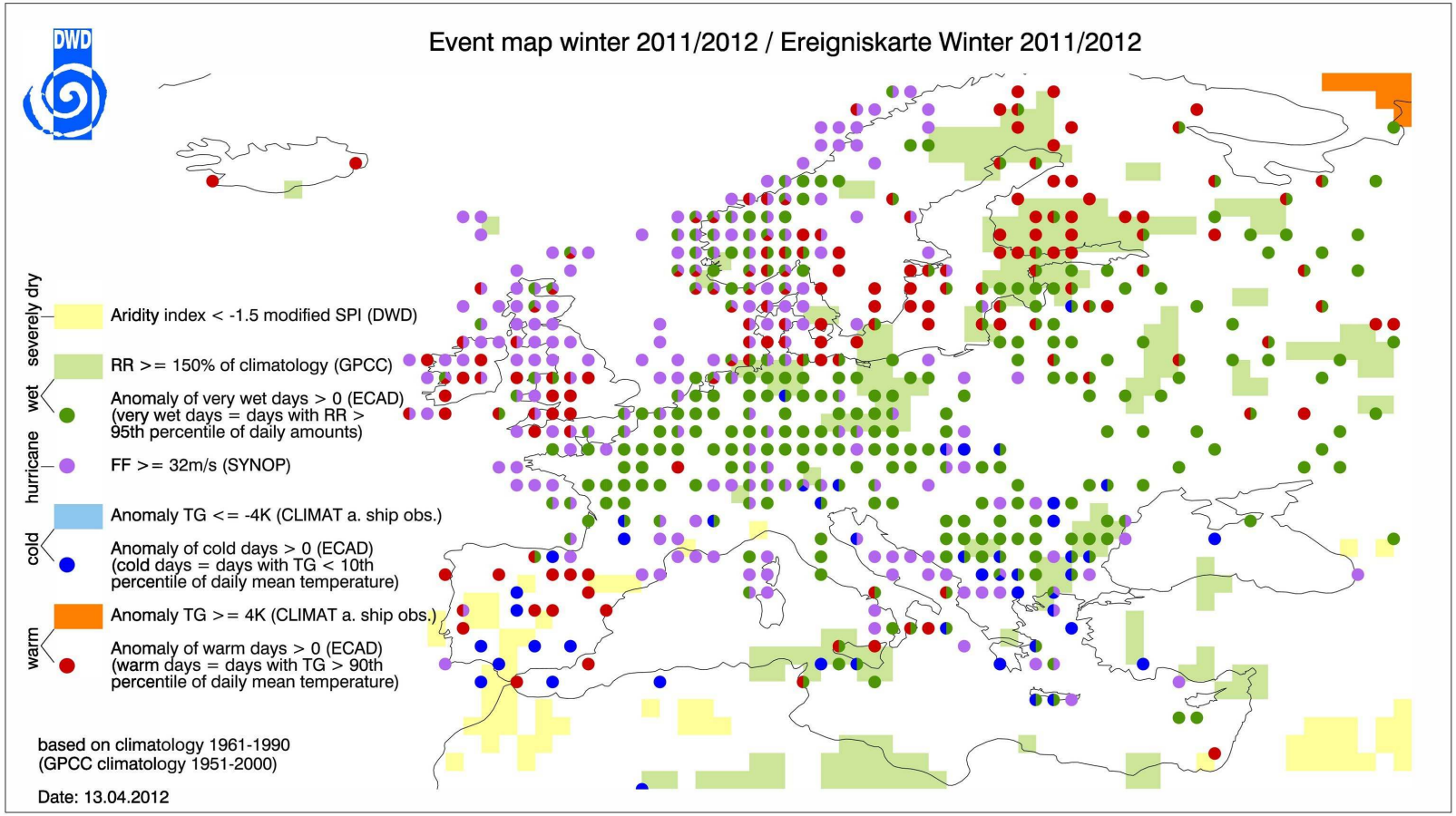
RX1d: highest 24 hours total (in mm), RX5d: highest 120 hours total (in mm), R10: highest number of days with heavy precipitation (10 mm/d), R20: highest number of days with very heavy precipitation (20 mm/d), TN: lowest mean minimum temperature (° C), TNN:lowest absolute minimum temperature (° C), TX: highest mean maximum temperature (° C), TXX: highest absulute maximum temperature (° C)

Country	RX1d [mm]	RX5d [mm]	RR10 [days]	RR20 [days]	TN [°C]	TNN [°C]	TX [°C]	TXX [°C]
Albania	47.0	109.0	14	8	4.1	-4.4	12.7	31.5
Austria	67.0	188.0	28	9	-15.3	-29.3	4.6	27.0
Bosnia and Herzegovina	-	-	-	-	-3.6	-19.0	2.1	26.1
Belgium	52.0	78.2	21	5	-1.2	-17.3	7.5	29.0
Bulgaria	123.0	173.0	9	3	-5.3	-20.1	7.1	30.1
Belarus	25.0	46.4	5	1	-7.9	-31.6	-0.4	22.7
Switzerland	184.0	286.0	38	27	-9.9	-26.6	8.3	27.1
Cyprus	38.0	101.0	18	6	-	-	-	-
Czech Republic	32.0	97.7	13	6	-	-24.3	-	28.1
Germany	59.3	187.1	32	19	-14.4	-29.3	6.5	28.6
Denmark	-	-	-	-	-1.2	-20.1	4.7	24.4
Algeria	-	-	-	-	3.3	-3.4	20.5	34.6
Estonia	25.0	40.6	8	1	-7.3	-32.1	2.1	21.2
Canar. Island	-	-	-	-	-	7.4	20.7	31.6
Spain	115.0	241.0	22	5	-2.5	-14.4	18.6	36.6
Finland	28.4	45.5	7	1	-14.5	-39.8	0.1	17.1
France	144.0	296.0	16	10	-4.2	-20.8	14.3	32.1
United Kingdom	55.0	101.8	22	4	1.2	-12.9	9.6	29.2
Georgia	37.0	91.0	9	0	-	-	-	-
Greece	85.0	122.3	18	7	-0.0	-10.4	14.8	29.5
Croatia	97.0	123.1	20	6	-7.9	-25.0	12.7	30.6
Hungary	15.6	27.6	3	1	-3.5	-22.5	5.2	27.6
Ireland	69.0	102.2	12	3	4.0	-6.3	10.5	20.5
Israel	59.0	109.2	16	6	5.4	-0.1	21.9	39.1
Iceland	6.7	14.3	0	0	-1.8	-7.3	3.6	14.1
Italy	101.0	153.2	20	10	-13.6	-25.0	16.3	31.7

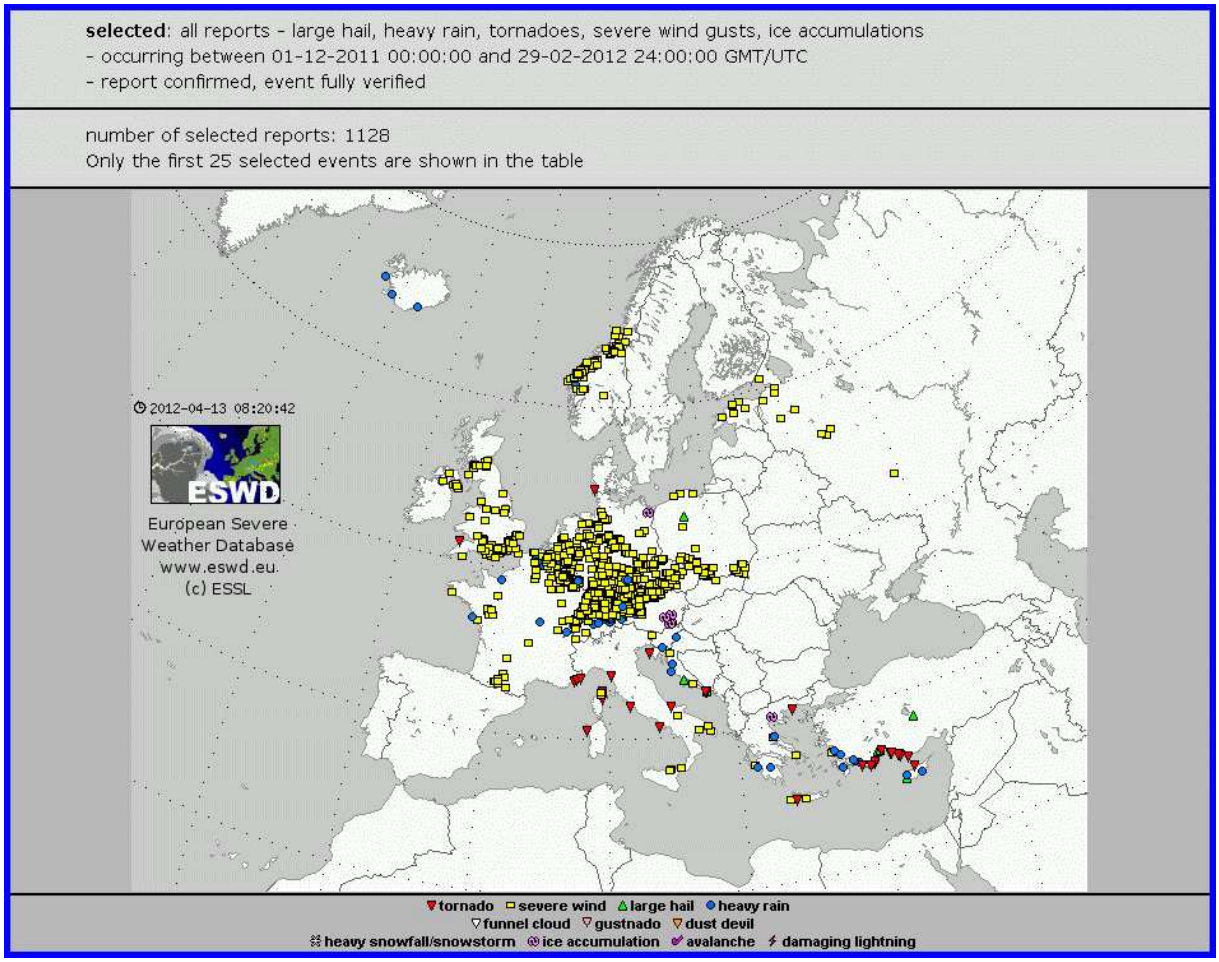
Kyrgyzstan	-	-	-	-	-19.3	-32.3	-9.6	25.2
Kazakhstan	-	-	-	-	-25.4	-42.5	-1.6	32.9
Lithuania	20.0	33.8	9	2	-6.0	-28.5	0.9	20.4
Luxembourg	21.7	56.2	7	3	-0.7	-15.0	4.4	26.0
Latvia	34.0	49.7	10	2	-7.3	-30.5	0.9	18.0
Moldova	26.0	36.3	2	0	-4.6	-22.1	0.4	26.6
Netherlands	34.2	70.5	11	5	0.0	-20.2	6.7	27.0
Norway	122.6	239.8	46	29	-17.1	-39.7	6.8	23.1
Poland	32.6	45.1	6	1	-9.7	-29.8	4.0	25.6
Portugal	63.0	163.0	5	4	-0.4	-8.8	15.9	34.0
Romania	65.0	93.4	14	4	-14.2	-28.5	4.9	30.1
Serbia	36.0	58.9	10	3	-8.1	-28.8	5.4	29.6
Russian Federation	67.0	123.0	17	7	-22.9	-40.0	2.2	32.4
Sweden	36.7	39.2	4	1	-18.7	-42.6	3.8	22.1
Slovenia	85.7	110.4	8	4	-11.9	-25.0	5.4	26.4
Slovakia	34.0	48.5	4	2	-8.7	-29.0	4.5	28.1
Tajikistan	99.0	108.5	11	3	-9.9	-26.6	7.4	34.6
Turkey	25.0	45.4	2	1	-2.7	-12.9	16.1	30.0
Ukraine	284.3	298.3	8	2	-7.0	-30.0	3.2	26.7
Uzbekistan	-	-	-	-	-10.5	-25.3	8.4	36.0

Maps of Climate Extremes and Severe Weather Events:

Map of Climate Extremes and Events of the Season:


Event map winter 2011/2012 / Ereigniskarte Winter 2011/2012
DWD
severely dry
Aridity index < -1.5 modified SPI (DWD)
RR >= 150% of climatology (GPCC)
wet
Anomaly of very wet days > 0 (ECAD)
(very wet days = days with RR >
95th percentile of daily amounts)
hurricane
FF >= 32m/s (SYNOP)
Anomaly TG <= -4K (CLIMAT a. ship obs.)
cold
Anomaly of cold days > 0 (ECAD)
(cold days = days with TG < 10th
percentile of daily mean temperature)
Anomaly TG >= 4K (CLIMAT a. ship obs.)
warm
Anomaly of warm days > 0 (ECAD)
(warm days = days with TG > 90th
percentile of daily mean temperature)
based on climatology 1961-1990
(GPCC climatology 1951-2000)
Date: 13.04.2012

Map of reported Severe Weather Events of the Season:



References:

Francis,J.A.; Vavrus, S.J. (2012): Evidence linking Arctic amplification to extreme weather in mid-latitudes

Geopysical Research Letters Vol. 39, L06801, doi: 10.1029/2012GL051000, 2012