Monthly Bulletin on the Climate in WMO Region VI

- Europe and Middle East -

December 2009

Deutscher Wetterdienst

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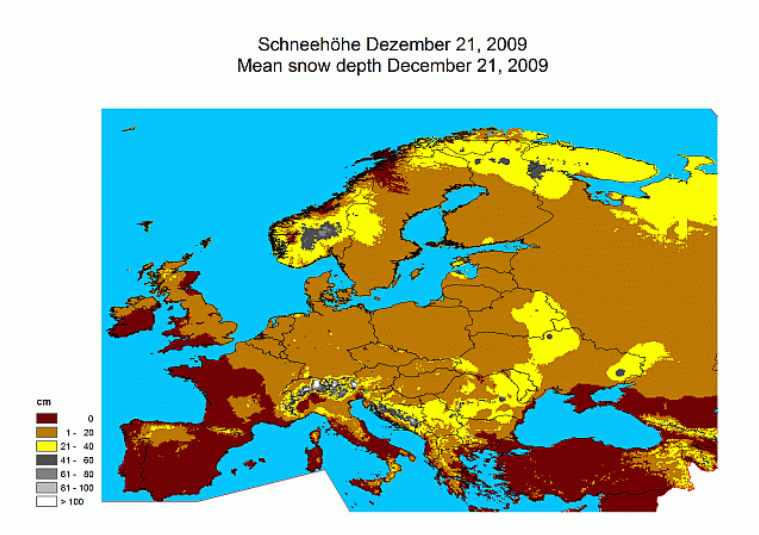
Highlights:

- Cooler than the average for most of the European Continent, but warm in the Arctic and the Mediterranean.
- Mostly wetter than normal for the European continent and the Peninsula Iberica.
- Mostly dull over Europe except the areas influenced by the North Sea and the North Atlantic as well as central European Russia.

Widespread snow in December 2009 caused problems in air and railway traffic



Shown is the snow cover interpolated from SYNOP reports of december 21st close to its maximum extent

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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 under the following topics.

The Monthly Bulletin on the Climate in WMO Region VI will usually be delivered after the 15th and before the 26th of each month for the preceding month. It may eventually be updated afterwards.

Precipitation Climatology / European Climate System Monitoring / European Snow Climatology / European Circulation Indices / Satellite-based Regional Climate Monitoring

Use these links for more detailed information and analyses

Or use the following link and find also related topics:

"European Climate Monitoring" at DWD-MetPortal

Further European monthly climate monitoring products including:

- monthly means and anomalies e.g. of wind speed, relative humidity, as well as parameters on several pressure levels from ARPEGE model output

- anomalies for 42 climate indeces from the ECA&D dataset

- regional tailored products for the Eastern Mediterranean

- drought monitoring products for Southeastern Europe

may be found under these links:

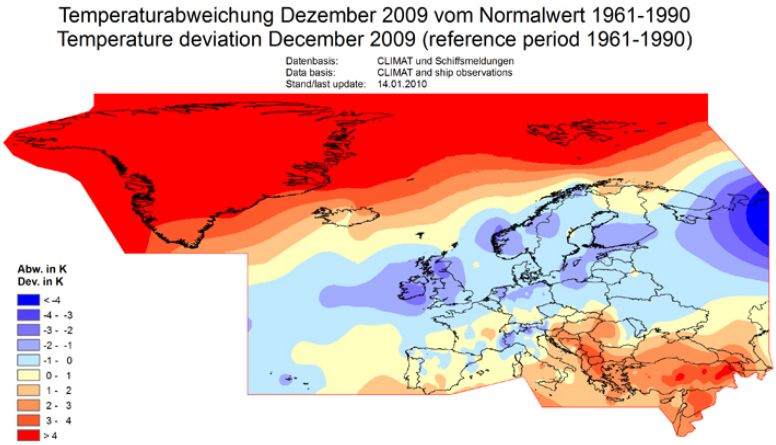
ARPEGE model products / ECA&D monitoring products / Eastern Mediterranean Climate Center / Drought Management Centre for Southeastern Europe/

Monthly Overview:

Temperature:

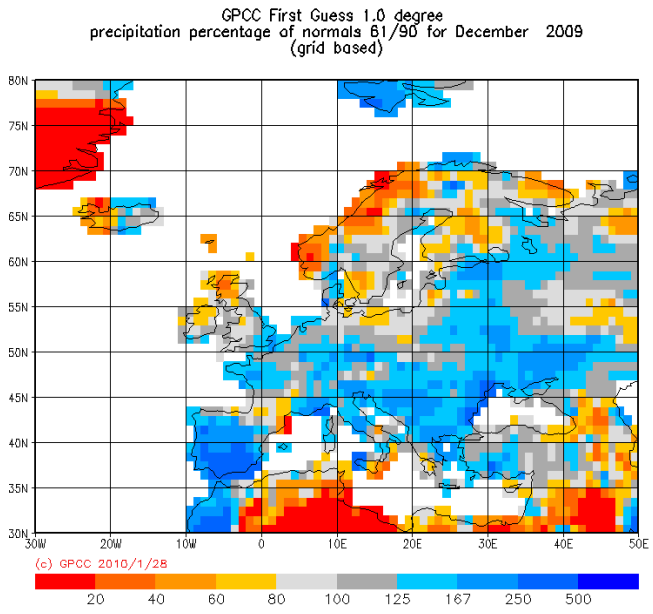
The anomalies of temperature of December 2009 show a remarkable pattern of positive values in the north and northwest, negative values in the middle and positive values in the southeast. Greenland and the Arctic Ocean were 4 K and more warmer than the 1961-1990 normal.Svalbard reported -5.5 deg C as a monthly mean which is 7.9 K above the normal, Hopen reported -3.2 deg C for the monthly mean which is 9 K above the normal. Jan Mayen had a monthly mean of -1.3 deg C, 3.9 K above normal. The North Atlantic Ocean, and most of the European continent except the southeast were cooler than the average with -3 to -2 K anomalies over Ireland and -4 K or below in the eastern parts of European Russia. The Eastern Mediterranean, the Balkan Peninsula

and the Middle East were again warmer than the average with anomalies of 3-4 K for the central Balkan Peninsula and eastern Turkey and Syria and more than 4 K locally in eastern Turkey.



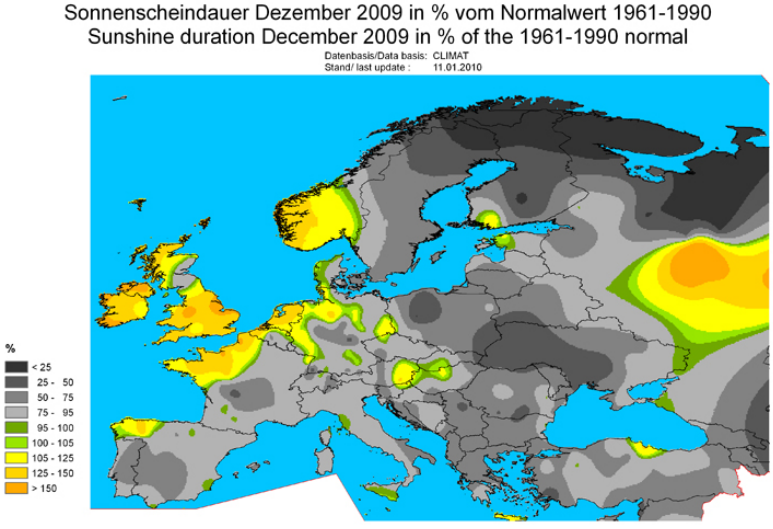
Precipitation:

Precipitation anomalies were positive in December 2009 over most of the western, central and eastern Europe, including the northern Mediterranean and the Peninsula Iberica. The southern Mediterranean and the Middle East as well as the west of Scandinavia, the north of the British Isles and Ireland, southern Greenland and the west of Iceland were relatively dry. The western parts of the Penisula Iberica received widely 200 mm and more, locally more than 300 mm (absolute values are not shown here, see the link 'Precipitation Climatology' above), similarly the eastern Adriatic coast and the western and southern Turkish coast. The west of France and central and northern Spain, the British Isles and Ireland, as well as southern Germany, Switzerland, Austria, southeastern France and Italy, the Balkan Penisula and western Turkey had 100 mm or more and below 50 mm occurred mainly over Scandinavia, the northeast of Central Europe, Eastern Europe and the southern Mediterranean area.



Sunshine Duration:

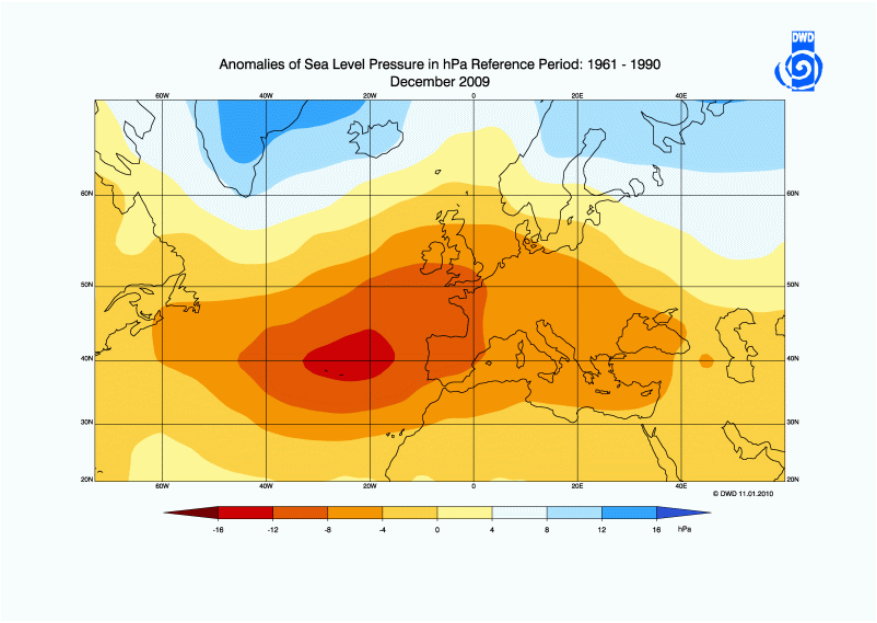
Most of Europe was dull in December 2009 except the areas around the North Sea and the northeastern Atlantic as well as the central European Russia.



Air Pressure (surface):

The anomaly of the surface level air pressure compared to the reference period 1961-1990 was negative over most of the area of interest reaching farest to the north (> 60 deg N) around 0 deg

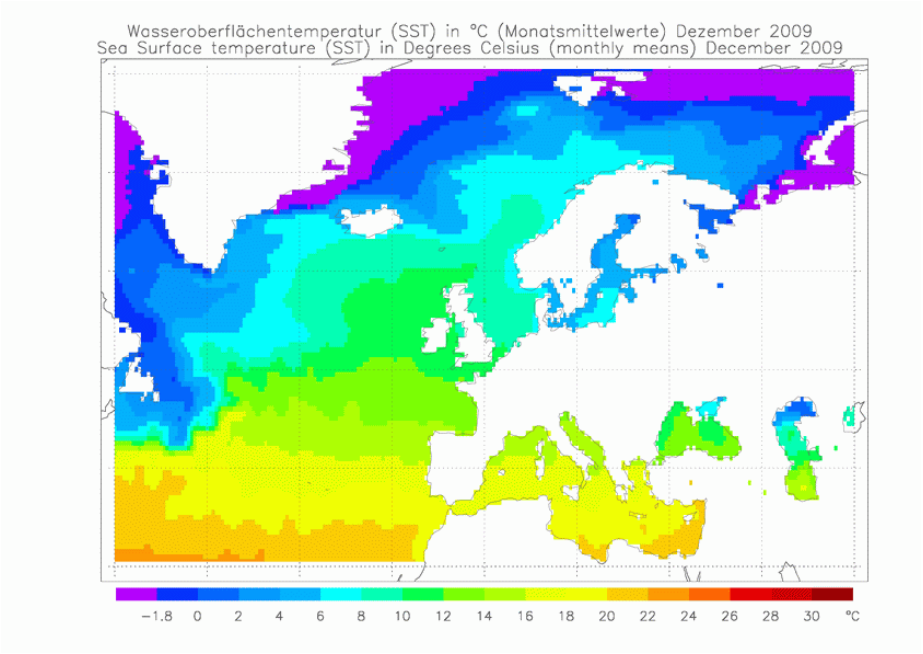
longitude and less in the west (52 deg N, 40 deg W) and in the east (48 deg N, 50 deg E). The lowest values of -18 hPa are centered west of Spain (about 40 deg N and 35 deg W), so the 'Azores high/Iceland low'-structure is more or less turned around. The region of anomlies of -4 to -8 hPa include Central Europe and the Mediterranean region. Areas of positive anomalies lie over Greenland (12 hPa) and northern Scandinavia and Russia (8-12 hPa).



Sea Surface Temperature:

The map on the right side shows the monthly mean of the sea surface temperature for the month. The analysis is a result of the numerical weather forcast model GME of DWD.

The monthly mean SST of December 2009 of Europe and the North Atlantic resembles most the distribution of December 2002 within the series since 2000. The SST of the northern and eastern North Atlantic including the North Sea and the Norwegian Sea as well as in the Mediterranean had a positive anomaly relative to the period 1971-2000 according to the analysis of the Climate Modeling branch/EMC/NCEP. Only the Central North Atlantic was partly cooler than the refererence.



Circulation Indices:

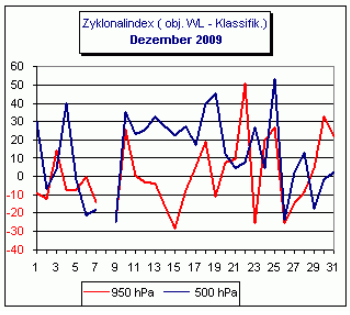
Circulation indices are a means to analyse the atmospheric large scale influences upon climate. One of the best known indices is the North Atlantic Oscillation (NAO). Another well known one is ENSO which is especially connected to the El Niño phenomenon.

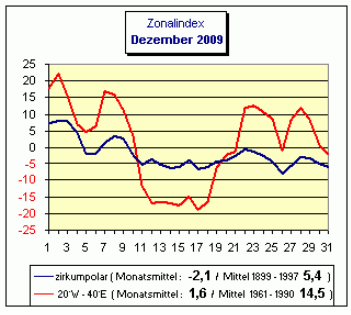
"A contributor to the persistent cold and snow across much of the Northern Hemisphere's mid-latitudes in December 2009 and January 2010 could be the fact that the atmosphere was in an extreme negative phase of the Arctic Oscillation (AO). The AO is a seesawing strengthening and weekening of semipermanent areas of low and high atmosphere pressure in the Arctic and the midlatitudes. One consequence of the oscillation's negative pase is cold, snowy weather in Eurasia and North America during the winter months. The extreme negative dip of the Arctic Oscillation Index in December 2009 was the lowest monthly value observed for the past six decades" (from http://earthobservatory.nasa.gov/NaturalHazards/).

See also in correspondence the very low value of the Zonal Index compared to the 1961-1990 mean.

Monthly values of different circulation indices relevant for Europe:

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





Index	Monthly Mean Value	Reference Value Period	Producer
NAO	-1.93		cpc/noaa
EA	na		cpc/noaa
EA/ WR	na		cpc/noaa

ZI_EU	1.6	14.5	1961-1990	dwd

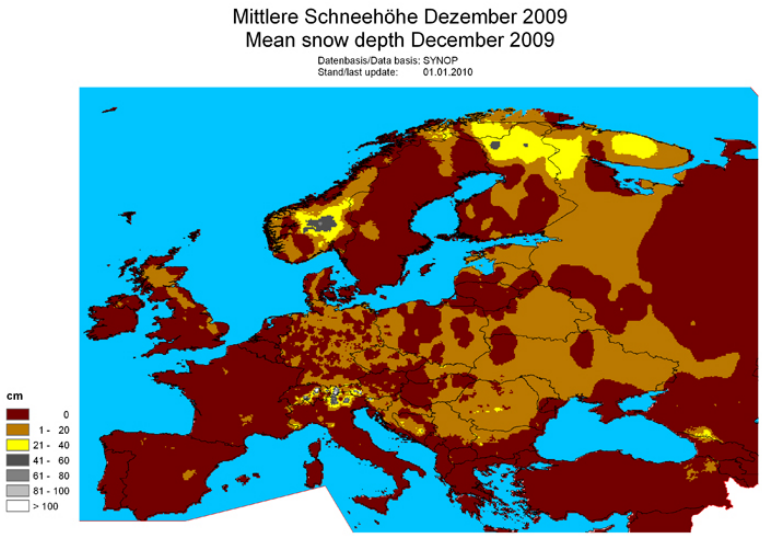
Mean Snow Depth :

The precipitation and the cold temperatures of December 2009 caused a widespread snow cover so that a mean snow depth of up to 20 cm occurred also in the lower lands over areas of Scotland and northern Enland, southern Norway, Germany, Poland, Czechoslovakia, the Alps, the northern Balkan States, the Ukraine, Belarus, the western parts of the Russian Federation and generally north of the Arctic Circle.

The following table shows the snow covered area for 7 mountaneous subregions in km**2 and in %:

(see http://www.dwd.de/ecsm for definition of the subregions and more information)

Region	Covered Area (km**2)	Covered Area (%)
Germany	100450	28
Fennoscandia	569122	19
Caucasus	34249	6
Eastern_Alps	53253	34
Pyrenees	5982	3
Carpathian_Mts_N_Balkan_Peninsula	265479	26
Western_Alps	20911	17



Summaries

Summary 1: Monthly Statistical Values

The content of the following table is based upon the data provided on the web by National Meteorological and Hydrological Services (NMHSs) in form of tables, maps or texts in monthly climate bulletins. The tables usually contain values for a number of stations or regions (UK*).

TMX = highest reported mean temperature of the month; TMN = lowest reported mean temperature of the month; TXX = abolute highest temperature reported; TNN = absolute lowest temperature reported; w/n/c = warm/normal/cold (reference usually 1961-1990; in some cases(*) 1971-2000); RRmx = highest sum of precipitation reported for the month; RRmx = lowest sum of precipitation reported for the month; RRdx = highest daily sum of precipitation reported for the month; w/n/d = wet/normal/dry (reference usually 1961-1990; in some cases(*) 1971-2000); SHx = highest reported sum of sunshine duration for the month; SHn = lowest reported sum of sunshine duration for the month; s/n/d = sunny/normal/dull (reference usually 1961-1990; in some cases(*) 1971-2000); na = value not available

Country	Tmx [°C]	Tmn [°C]	Txx [°C]	Tnn [°C]	w/n/c	RRmx [mm]	RRmn [mm]	RRdx [mm]	w/n/d	Shx [h]	Shn [h]	s/n/d
Austria	1.9	-12.1	17.3	-28.1	na	209	22	47	na	110	27	na
Belgium	2.9	na	5.3	0.2	c	80.8	na	na	w	46	na	d
Bulgaria	7.1	1.0	23.2	-17.6	w	145	41	60	w	na	na	na
Switzerland	na	na	18	-34.2	c	na	na	na	w	na	na	d
Cyprus	na	na	23.1	6.4	na	146.3	81.3	31.5	na	na	na	na
Czech_Republic	0.5	-5.2	15.8	-21.9	na	79.9	28.2	24.0	na	54.6	21.9	na
Germany	3.8	-12.0	14.3	-27.4	c	202	21	44.5	w	102	15	d
Denmark	2.0	0.0	9.6	-14.3	c	120	44	26.5	w	66	16	s
Spain	na	na	25.2	-17.1	c	276	46.4	na	w	171.1	43.7	d
France	na	na	23.2	-23.5	c	188.8	14.4	91	na	137	25	na
Croatia	11.5	-1.8	na	na	w	461.8	80.6	70	w	70	<30	d
Hungary*	na	na	21.8	-25.5	w	116.8	0.0	36.8	na	na	na	na
Ireland	5.9	2.3	13.1	-10.0	c	199	49	40.3	d	81	45	s
Italy	na	na	27	-18	na	240	0	na	w	na	na	na
Lithuania	-0.5	-3.7	10	-20	na	na	na	na	na	na	na	na
Latvia	-3.0	na	na	na	c	72	na	na	w	na	na	na
Moldova	na	na	16	-23	c	124	50	na	w	na	na	na
Montenegro	12.7	0.1	20.1	-19	w	860	63	128.1	w	na	na	na
Macedonia	7.7	2.3	23.1	-10.6	na	188.9	43.3	na	na	na	na	na

Malta	14.9	na	20.7	7.9	w	102.8	na	38.4	d	179.8	na	s
Netherland	5.2	na	na	-18.4	na	117	60	na	w	72	44	s
Arktis	-7.9	-1.3	5.6	-25.4	w	43.7	17.9	17.2	na	na	na	na
Norvegian_Sea	6.1	4.2	na	na	na	na	na	na	na	na	na	na
Norway	5.3	-9.5	12.2	-36.8	na	217.6	1.1	50.3	na	na	na	na
Poland	0.0	-7.5	na	na	na	30	90	na	na	na	na	na
Madeira	na	na	23.6	13.5	w	1102.9	286.1	166.6	w	na	na	na
Acores	na	na	19.4	9.6	c	223.6	na	54.6	w	na	na	na
Portugal	na	na	20.1	-8.1	c	613	144.4	93.7	w	143	40	d
Romania	5.0	-7.4	19.7	na	w	217.3	<10	50.7	w	na	na	na
Sweden	na	na	8.3	-37.3	c	na	na	36	na	na	na	na
Serbia*	5	1	24	-21	w	148	60	na	w	na	na	na
Turkey*	15.5	-2.9	na	na	w	290.2	33.3	na	w	na	na	na
United_Kingdom	3.7	-0.2	13.5	-18.4	c	158.6	74.7	42.5	na	73.3	31.5	s

Summary 2: Reported Maximum Windgust (m/s) in the Month

Country	FFx [m/s]	Location	Day
Switzerland	38.9	Altdorf	21
Germany	35.6	Zugspitze	27
France	45	Mont-Aigoual	19
Madeira	43.6	Ponta_do_Pargo	22
Portugal	39.4	Dois_Portos/Torres_Vedras	23
United_Kingdom	35.5	Needles_Old_Battery	6

Summary 3: Selected Reported Phenomena in the Month

Selected phenomena that where reported by the National Meteorological Services are listed in the following table. Selected phenomena may be: Tornados, Hail with large (> 5cm diameter) hailstones, etc.

Country	Phenomenon	Reported Impact (y/n)	Day	Location
Italy	Tornado	y	14	Catania

Selected Significant Events

- Portugal reported December 2009 the wettest of the century. Compared to 1971-2000 the anomaly overall was +89 mm for the mainland of Portugal. But also Madeira and the Acores had the highest precipitation amounts since 1931.
- During the 18th - 20th of December northern and central-northern regions of Italy had abundant snowstorms which caused a snowdepth of about 30 cm and involved about 30 % of the country area. Roads, railway and air traffic was affected severely. The City of Venice was flooded.
- People died by the cold. 7 victims were reported by Germany around the 20th, overall perhaps more than 80 people died across Europe.