

# Seasonal Bulletin on the Climate in WMO Region VI



- Europe and Middle East -

**Winter 2017/2018**

**Deutscher Wetterdienst**

**Issued: 13 April 2018**



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## Highlights:

- Winter 2017/2018 warm in northern and eastern Europe
- Winter 2017/2018 dry in southern Europe
- Winter 2017/2018 was wet in Pyrenees, the Alps and Balkans
- Unusual high pressure over eastern Europe

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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 <http://www.dwd.de/rcc-cm>*

and at the Global Precipitation Climatology Center (GPCC):

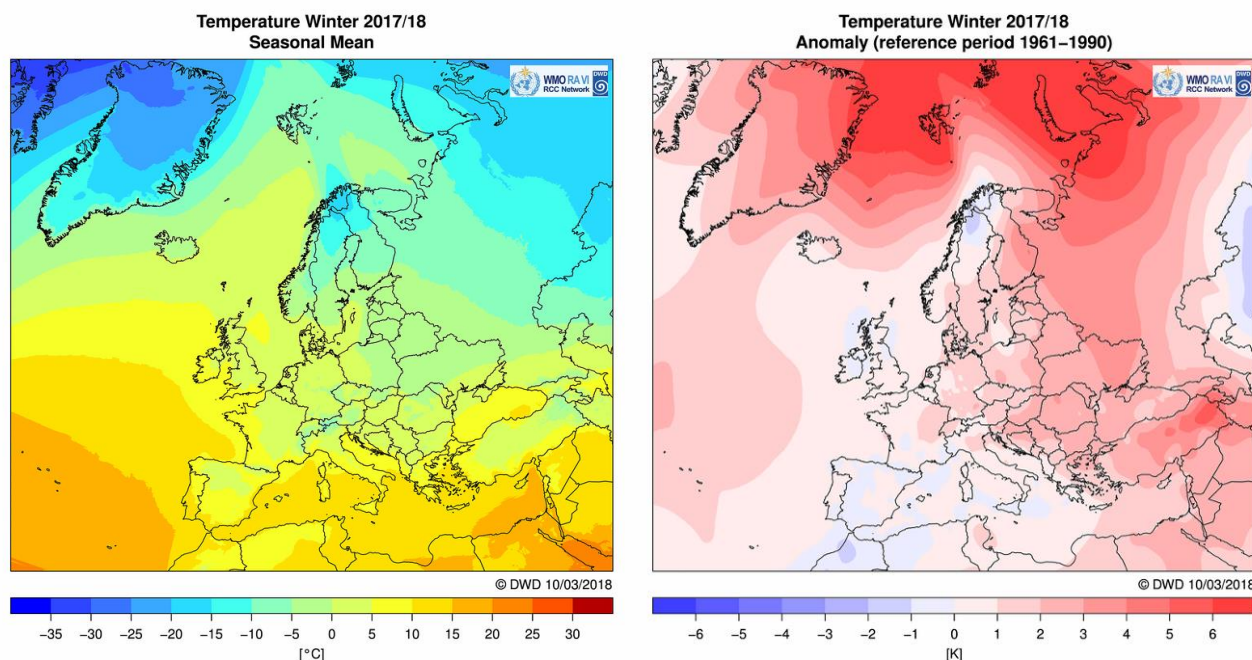
*<http://gpcc.dwd.de/>*

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

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## Temperature



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**Fig. 1:** Temperature: seasonal mean (left) and anomaly (right) in °C for Europe in winter 2017/18 (December 2017 to February 2018)

In many parts of Europe the **winter 2017/18** ended with its lowest temperature at the end of February. In **Norway** the lowest winter minimum temperature was observed on 28<sup>th</sup> of February with -42.0°C. The lowest winter air temperature in **Serbia** of -19.5°C was measured at Kopaonik on February 28. In **Portugal** the lowest winter minimum temperature was -8.6°C in Lamas de Mouro, on 24<sup>th</sup> of February. The country-average winter temperature in Portugal was 8.96°C that is -0.57°C below normal. While in north-eastern **Turkey** the winter temperature anomalies showed values of more than +5.0°C and more than +6.0°C in the Arctic.

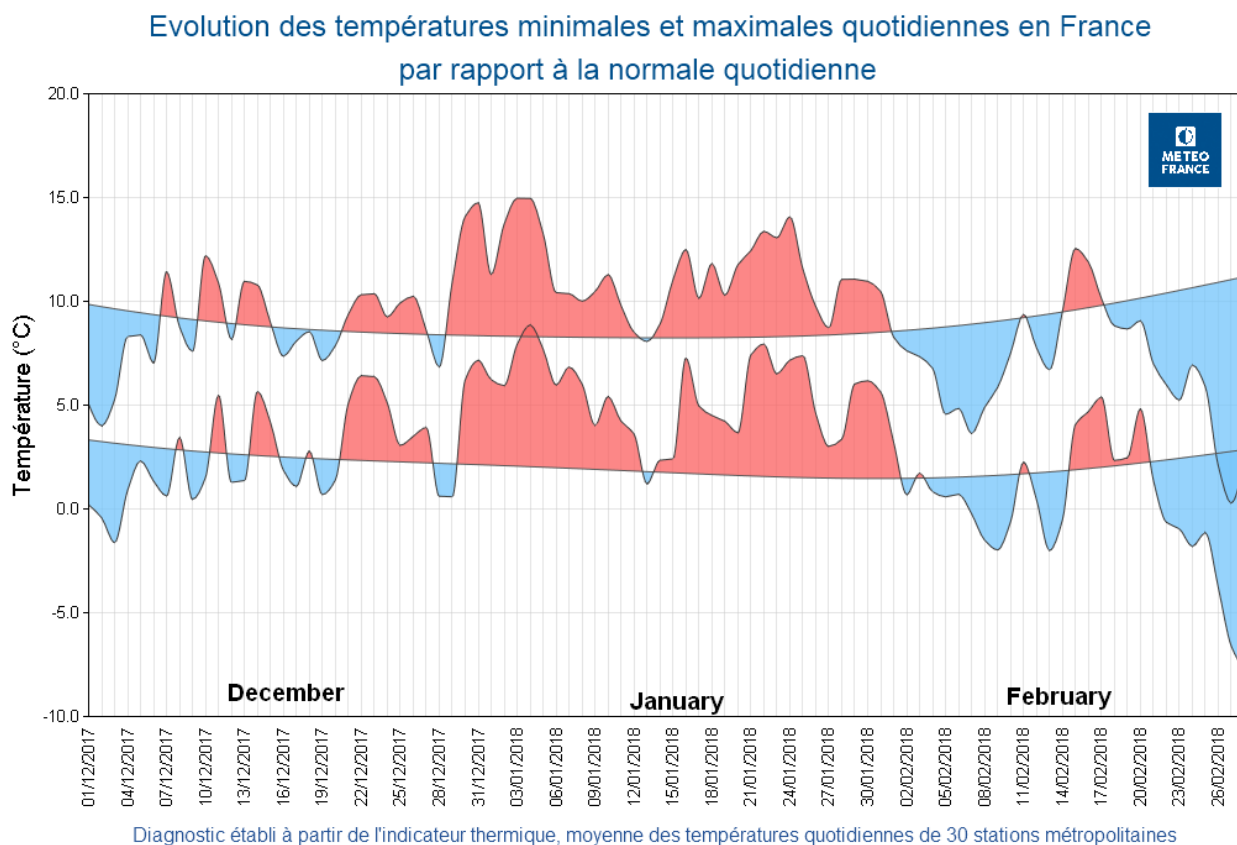
**Table1:** Rank statistic of winter mean temperature for some countries

Country	Rank	Anomaly in °C	Start of time series
Austria	25-30	+1.0 to +1.8 (1961-1990)	1776
Denmark		+1.4 (1961-1990)	
France		+0.6 (1981-2010)	
Germany		+1.4 (1961-1990)	1881
Ireland		-0.8 to 0.0 (1981-2010)	
Norway		+0.6 (1961-1990)	1900
Portugal		+0.6 (1961-1990)	1931
Serbia	12	+0.5 to +2.1 (1981-2010)	
Switzerland		-0.2 (1981-2010)	1864
United Kingdom		+0.2 (1981-2010)	

Most countries have not published a rank statistic since the winter temperatures (2017/18) were about normal for many countries.

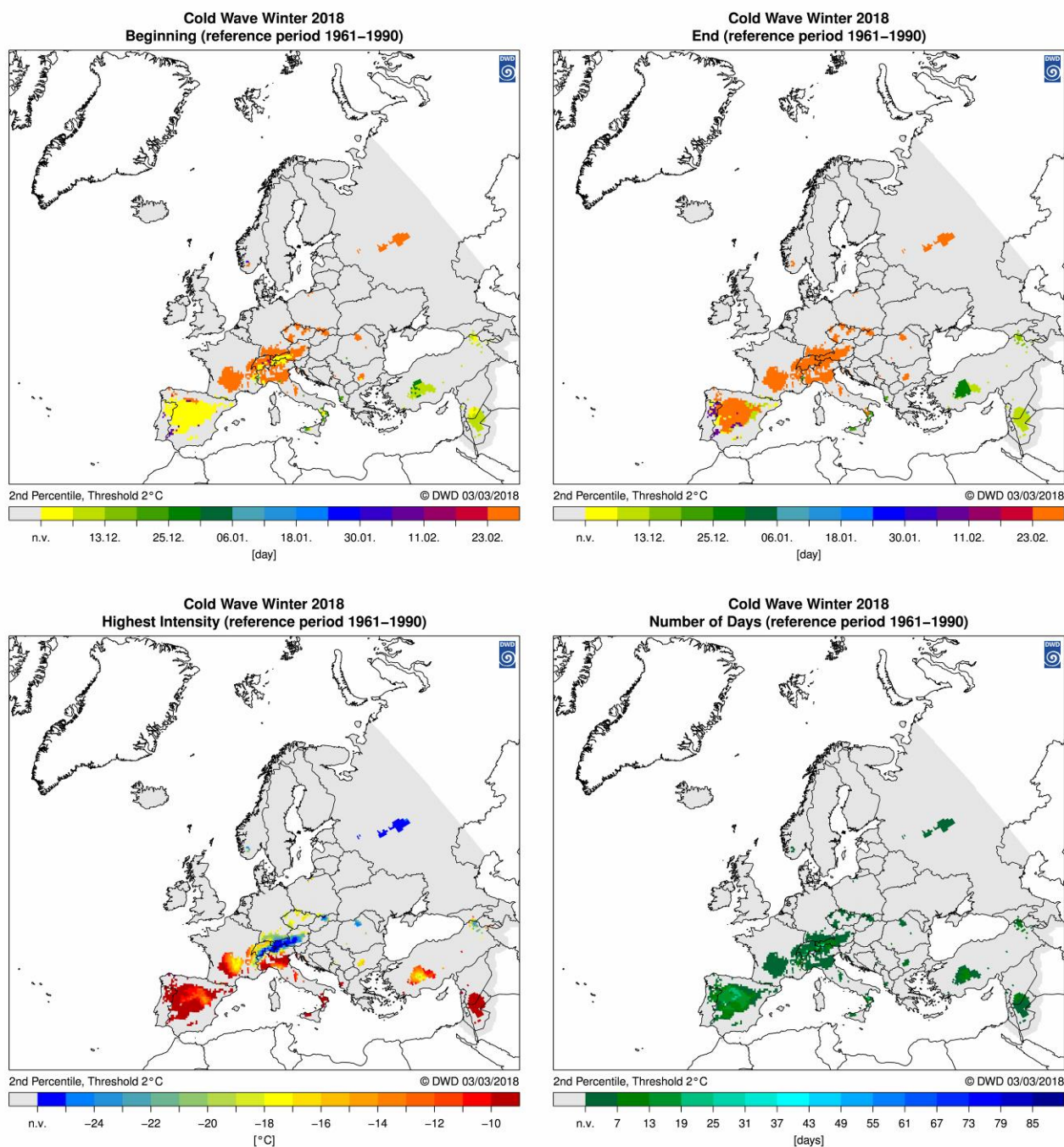
In **Switzerland** this January 2018 was the warmest since measurements begun in 1864. The Winter temperature in the Balkans were in most parts warmer than usual with anomalies of +1.7°C in Sjenica (Serbia) or +2.5°C in Bjelovar (Croatia).

The country-average daily temperature in **France** (Fig. 2) showed 3 cold waves during this winter, at the beginning of December 2017, at the beginning and the end of February, while January 2018 was much warmer than normal.



**Fig. 2:** Daily Winter maximum and minimum air temperature from 30 main stations of France. Blue areas indicate anomalies below and red areas anomalies above the long term mean. (Graph provided by Meteo France 2018)

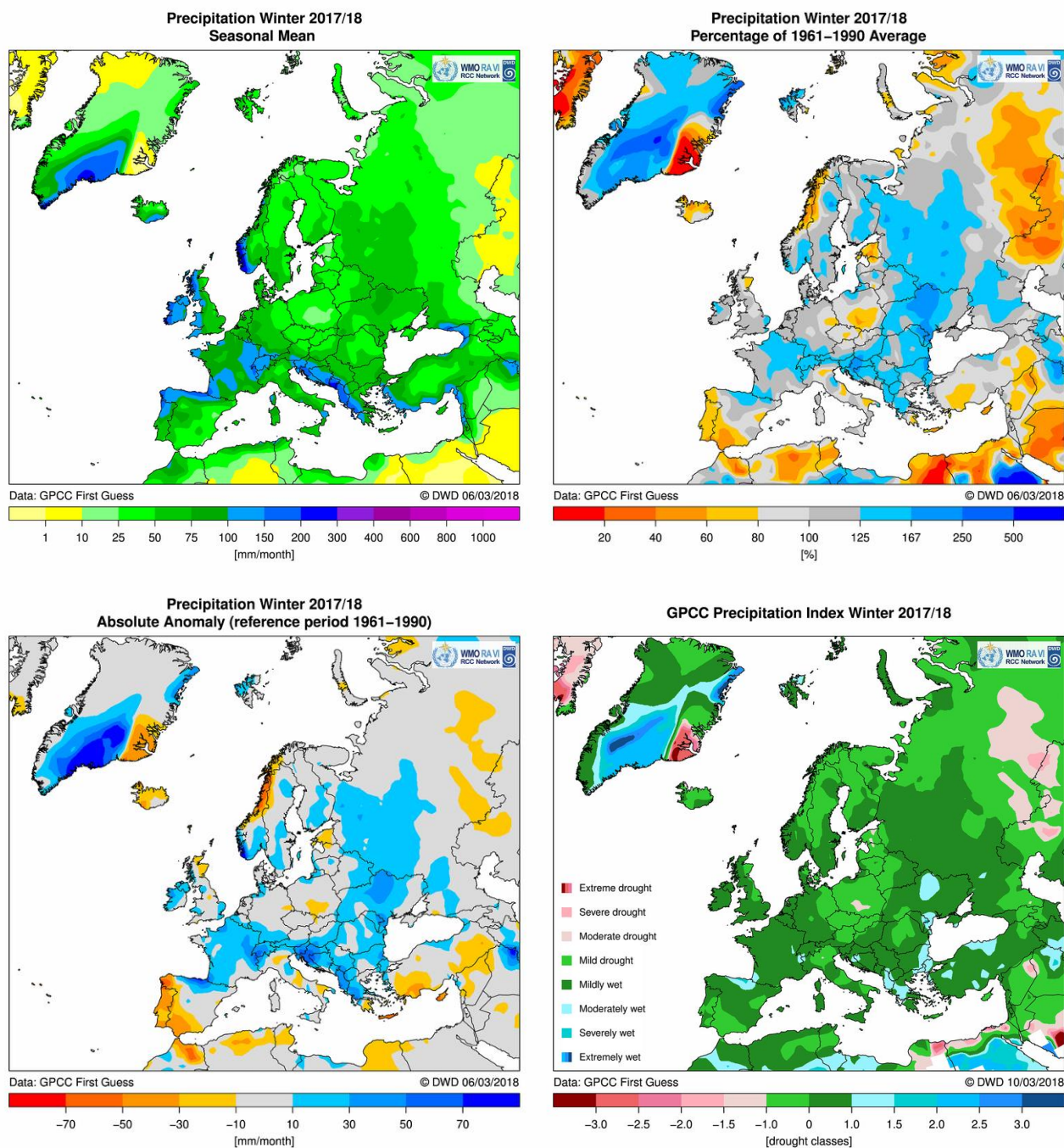
In Spain and also in the higher altitudes of the Alps there were several cold waves (defined as the minimum temperature below the 2nd percentile and below 2°C) this winter (fig 3). The first in the beginning of December affected mainly Spain. Another one from mid to the end of December 2017 could be seen in southern Italy, the Middle East, central and north-eastern Turkey. The last cold wave occurred at the end of February and affected regions of higher altitudes in Central Europe. This is in accordance with the high snow amounts in the Alps and the snow occurrences up to southern Europe in February 2018 (see fig. 5 and 6)



**Fig. 3:** Cold waves in Europe in winter 2017/18 (December 2017 to February 2018): Beginning of the first cold wave (top left) and ending of the last cold wave (top right); lowest minimum temperature during the cold wave (bottom left) and number of days that match the criteria (below the 2<sup>nd</sup> percentile and below 2°C; bottom right)



## Precipitation



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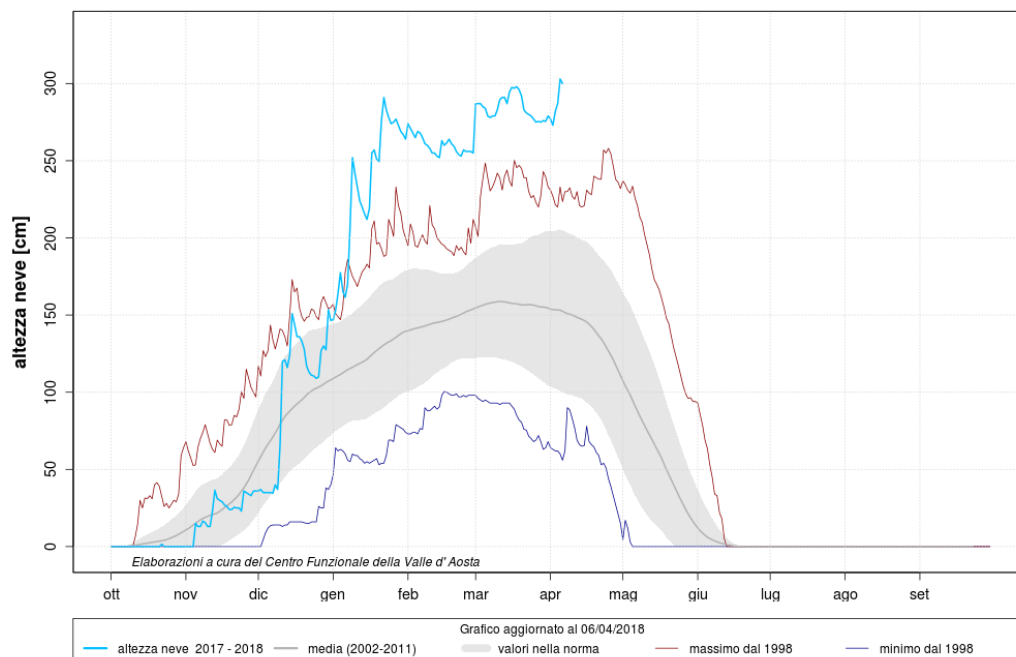
**Fig. 4:** Seasonal precipitation for Europe in winter 2017/18 (December 2017 to February 2018): totals (mm/month, top left), relative anomalies (in % of normal; top right), absolute anomalies (mm/month, bottom left) and GPCC precipitation index (in drought classes, bottom right)

The precipitation amounts for Croatia in winter 2017/18 expressed as percentages (%) of 1961 - 1990 average, shows that these precipitation amounts were mainly above the average and ranged from 89% to 189%. The seasonal precipitation amounts ranged from 154.6 mm in Gradište to 619.3 mm in Zavižan. In Bosnia and Herzegovina seasonal precipitation amounts ranged from 220.5 mm in Gradacac to 577.1 mm in Bihac.

## SNOW

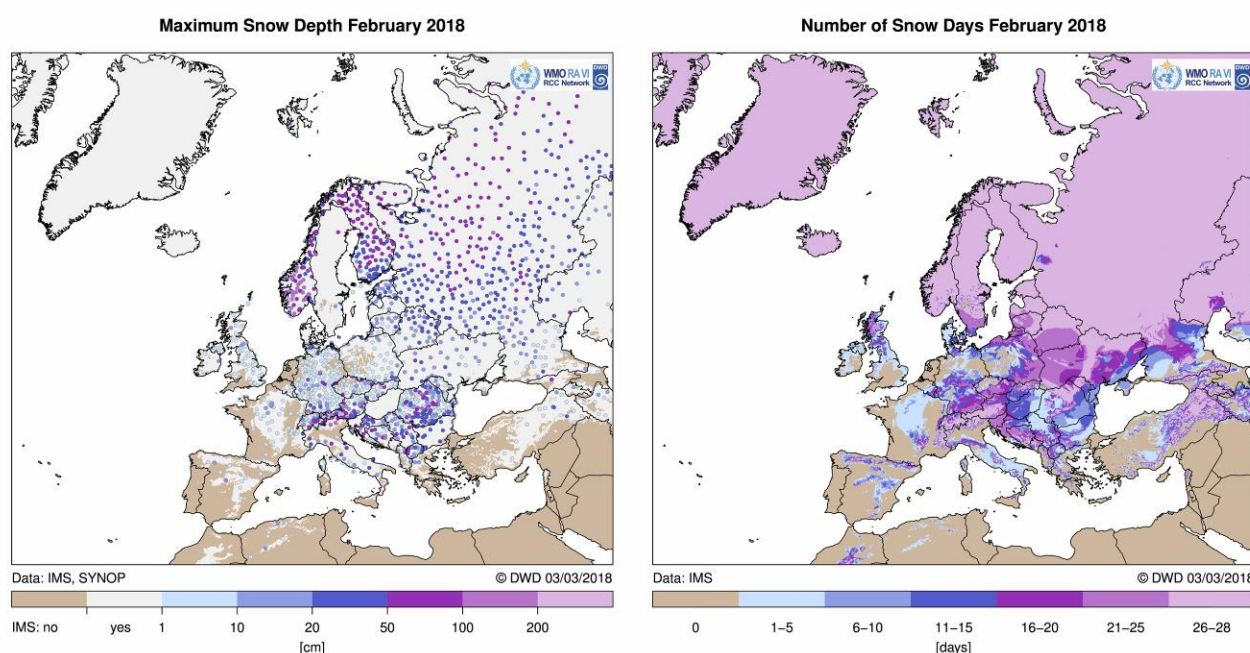
This winter a lot of snow occurred in **Switzerland** with many avalanches. The avalanche danger was, especially in January, high to very high in large parts of the Swiss Alps. In Arosa at 1880 m a.s.l., the winter of 2017/18 produced an accumulated new snow amount of 5.3 m. In the last 50 years, a larger amount of fresh snow occurred only in the winter of 2011/12 with 5.8 m. At the Valais measuring site in Grächen at 1600 m a.s.l., an accumulated new snow amount of more than 2 m was registered, which is one of the highest winter sums since the start of measurement 50 years ago. **Italy** also reported new breaking records of snow depth at the Aosta valley.

### Altezza neve - Pré-Saint-Didier 2044 m s.l.m.



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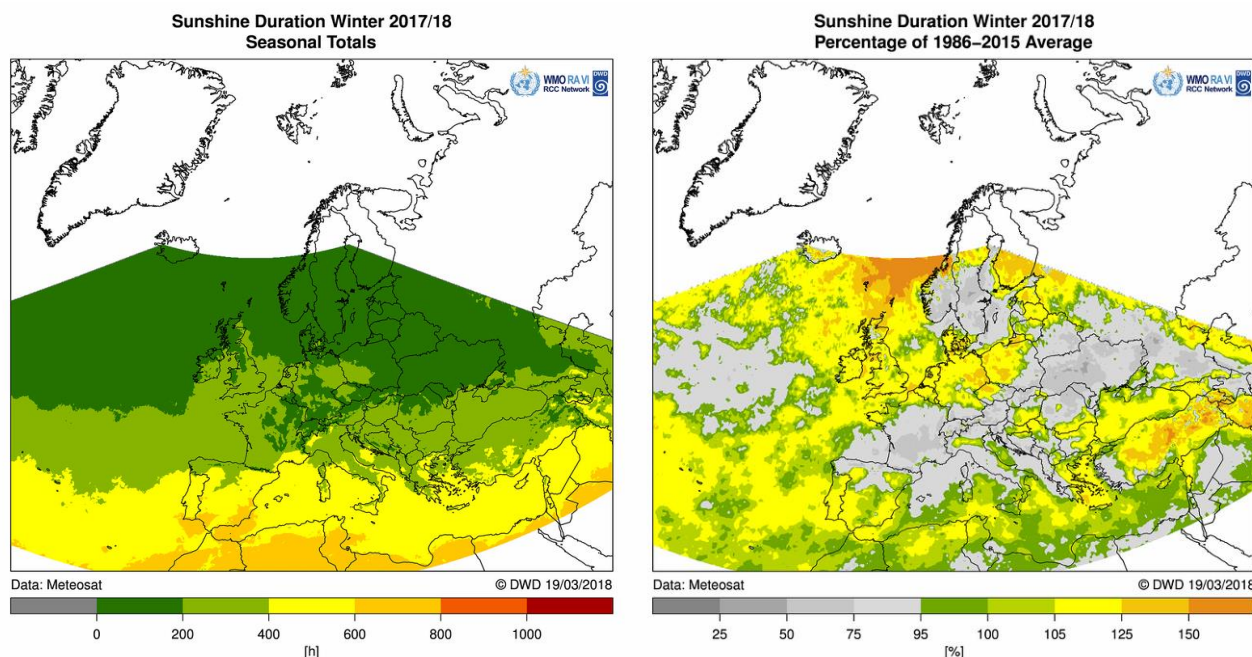
**Fig. 5:** The accumulated snow depth since October 2017 (light blue) compared to the long term average (in gray color), the minimum (dark blue) and maximum (red) at station Pré-Saint Didier (2044 m a.s.l.; source: Centro funzionale regionale Regione Autonoma Valle d'Aosta <http://cf.regione.vda.it/neve.php>)



**Fig. 6:** Monthly satellite based snow cover for February 2018 (IMS) with maximum snow depth at SYNOP stations (left) and Number of days with snow cover (right, based on daily satellite snow cover data)

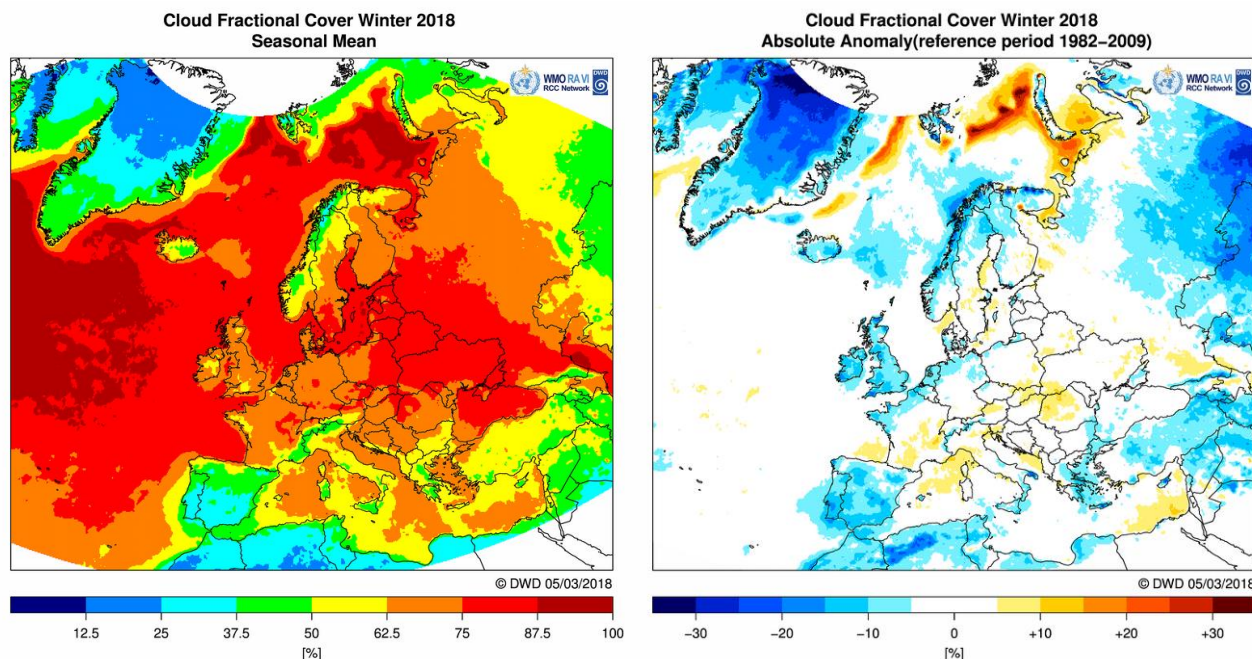


## Sunshine Duration and Cloud Cover



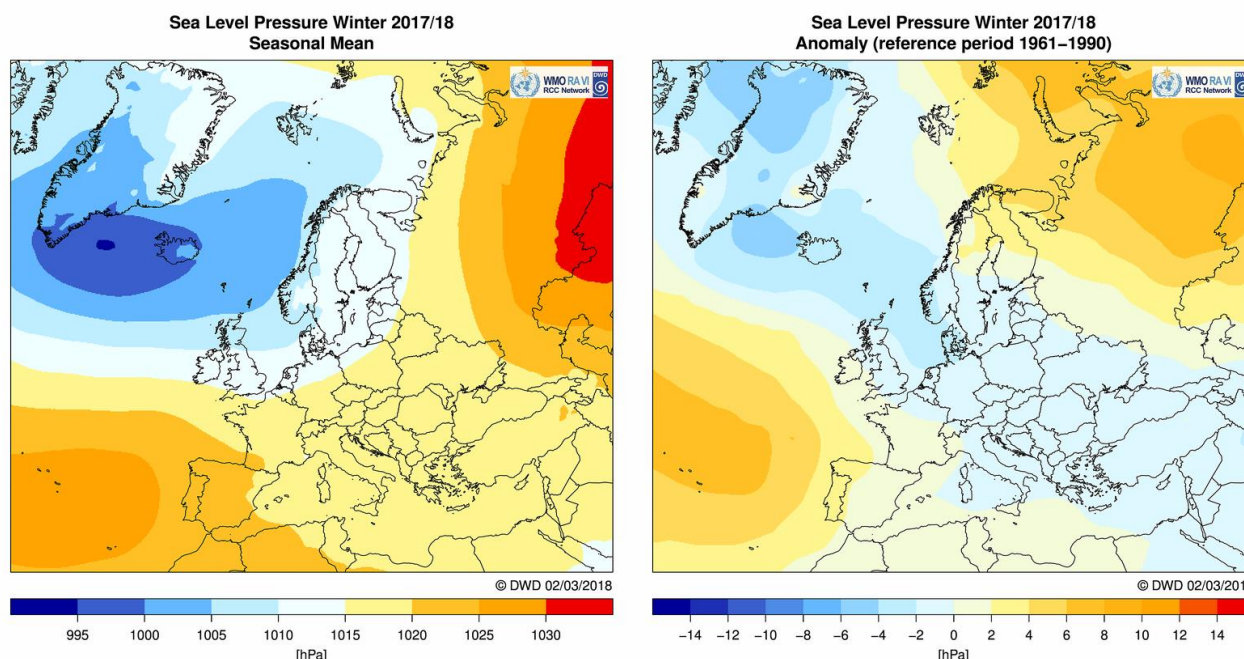
**Fig. 7:** Seasonal sunshine duration for Europe in winter (DJF) 2017/18: mean (left, in h) and relative anomaly (right, in % of normal, Data source: satellite data as provided by CM SAF (Satellite Application Facility on Climate Monitoring [www.cmsaf.eu](http://www.cmsaf.eu)).

Many parts of Europe received less than average sunshine in winter 2017/18. Only parts of Iberia, the United Kingdom, Central Europe, the Baltic States, Greece and Turkey noted above-normal sunshine. This coincided well with below-normal cloud cover anomalies in southern and western Europe. In contrast, eastern Europe showed more clouds and less sunshine than normal in winter 2017/18.



**Fig. 8:** Seasonal cloud cover for Europe from satellites in winter (DJF) 2017/18 in %: mean (left) and absolute anomaly (right).

## Surface Air Pressure



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**Fig. 9:** Sea level pressure for winter (DJF) 2017/18 in hPa: mean (left) and anomalies (right)

The surface pressure distribution for winter 2017/18 was dominated by high pressure over Eastern Europe. In December 2017 the pressure anomalies exceeded +6 hPa Eastern Europe. In January 2018 the positive pressure anomalies of more than +12 hPa were again located over Eastern Europe. In February 2018 the maximum pressure anomalies of more than +14 hPa occurred in northern Scandinavia and northern Russia.

The zone of below-normal pressure ranged from Greenland and Iceland to Central Europe up to the Middle East. This winter the North Atlantic Oscillation (NAO) was well developed except of December but the Polar/Eurasia Pattern (POL) and the East Atlantic/West Russia Pattern (EAWR) dominated the teleconnections.

**Table2:** Standardized Northern Hemisphere teleconnection indices for winter 2017/18 relevant for Europe (source: [ftp://ftp.cpc.ncep.noaa.gov/wd52dg/data/indices/tele\\_index.nh](ftp://ftp.cpc.ncep.noaa.gov/wd52dg/data/indices/tele_index.nh), AO, source: [http://www.cpc.ncep.noaa.gov/products/precip/CWlink/daily\\_ao\\_index/monthly\\_ao\\_index.b50.current.ascii.table](http://www.cpc.ncep.noaa.gov/products/precip/CWlink/daily_ao_index/monthly_ao_index.b50.current.ascii.table))

Year	Month	NAO	EA	EAWR	SCA	POL	AO
2017	December	0.73	-0.50	-1.63	-0.48	-1.95	-0.06
2018	January	1.17	0.55	-1.62	0.44	-1.48	-0.28
2018	February	1.34	-1.38	-1.40	0.43	-2.24	0.11
2017/18	Winter	1.08	-0.44	-1.55	0.13	-1.89	-0.08

North Atlantic Oscillation (NAO)

East Atlantic Pattern (EA)

East Atlantic/West Russia Pattern (EAWR)

Scandinavia Pattern (SCA)

Polar/ Eurasia Pattern (POL)

Arctic Oscillation (AO)



## Climate Extremes and Severe Weather Events

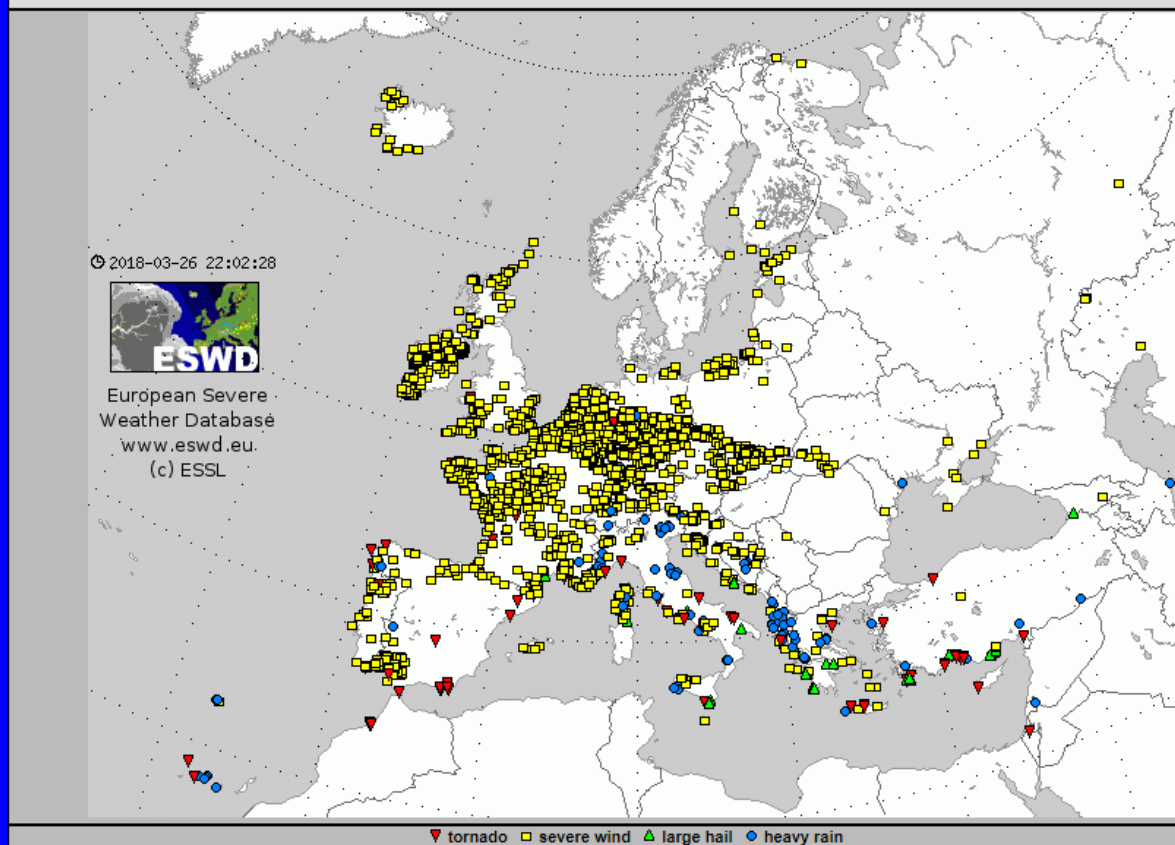
### Selected data from the database

**selected:** all reports - large hail, heavy rain, tornadoes, severe wind gusts  
- occurring between 01-12-2017 00:00:00 and 28-02-2018 24:00:00 GMT/UTC

number of selected reports: 3161

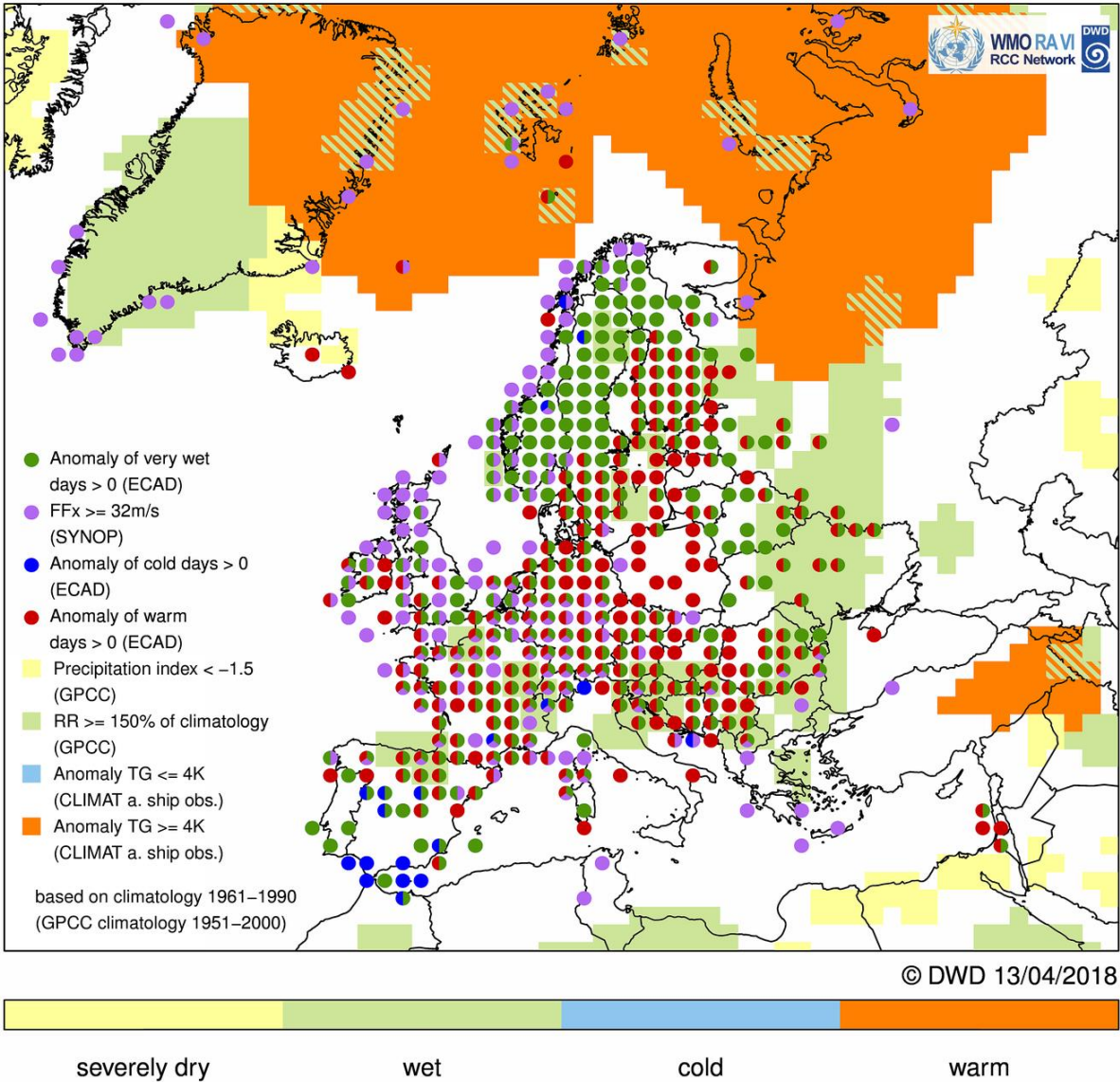
Only the first 25 selected events are shown in the table

[Dynamic map](#)   Static Map



Source: European Severe Weather Database (<http://www.eswd.eu/>)

Event Map Winter 2017/18



## References

### Seasonal summaries in RA VI at national web-sites:

- Austria: <http://www.zamg.ac.at/cms/de/klima/news/einer-der-drei-sonnigsten-winter-der-messgeschichte> (accessed 06.04.2018)
- Austria: HISTALP Langzeitklimareihen - Österreich Winterbericht 2017/18  
<http://www.zamg.ac.at/cms/de/klima/news/histalp> (accessed 06.04.2018)
- Belgium: <http://www.meteo.be/meteo/view/fr/1124472-Bilan+climatologique+saisonnier.html> (accessed 06.04.2018)
- Bosnia and Herzegovina: <http://www.fhmzbih.gov.ba/latinica/KLIMA/analiza-mjesec.php> (accessed 10.04.2018)
- Croatia: [http://klima.hr/klima\\_e.php?id=ocjsez\\_e](http://klima.hr/klima_e.php?id=ocjsez_e) (accessed 06.04.2018)
- Denmark: Vejret i Danmark - vinteren 2018-2018 <http://www.dmi.dk/vejr/arkiver/maanedsaesonaar/> (accessed 06.04.2018)
- Estonia: <http://www.ilmateenistus.ee/kliima/aastakokkuvotted/ulevaated/> (accessed 06.04.2018)
- France: <http://www.meteofrance.fr/climat-passe-et-futur/bilans-climatiques/bilan-2018> (accessed 06.04.2018)
- Germany: [https://www.dwd.de/EN/ourservices/klimakartendeutschland/klimakartendeutschland\\_monatsbericht.html](https://www.dwd.de/EN/ourservices/klimakartendeutschland/klimakartendeutschland_monatsbericht.html) (accessed 06.04.2018)
- Ireland: <http://www.met.ie/climate/monthly-weather-reports.asp> (accessed 06.04.2018)
- Netherlands: <http://www.knmi.nl/nederland-nu/klimatologie/maand-en-seizoensoverzichten/> (accessed 06.04.2018)
- Norway: <https://www.met.no/vaer-og-klima/maanedens-vaer-vs-klima> (accessed 06.04.2018)
- Portugal: <http://www.ipma.pt/pt/publicacoes/boletins.jsp?cmbDep=cli&cmbTema=pcl&idDep=cli&idTema=pcl&curAno=-1> (accessed 06.04.2018)
- Serbia: [http://www.hidmet.gov.rs/eng/meteorologija/klimatologija\\_produkti.php](http://www.hidmet.gov.rs/eng/meteorologija/klimatologija_produkti.php) (accessed 10.04.2018)
- Switzerland: <http://www.meteoschweiz.admin.ch/home/klima/klima-der-schweiz/monats-und-jahresrueckblick.html> (accessed 06.04.2018)

### Main URLs:

(URLs of used data and further information)

- CM SAF: <http://www.cmsaf.eu>
- ESWD: <http://www.eswd.eu/>
- GPCC: <http://gpcc.dwd.de>
- RCC-CD (ECA&D): <http://www.ecad.eu>
- RCC-CM: <http://www.dwd.de/rcc-cm>