

Name of research institute or organization:

Bundesamt für Meteorologie und Klimatologie MeteoSchweiz

Title of project:

The weather in 2007: Report for the International Foundation HFSJG

Report by:

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Project description:

The atmospheric conditions in Switzerland during the first period of 2007 were characterized by a succession of breaking temperature records. Record breaking monthly mean temperatures have been recorded for January and April and in addition the winter and the spring experienced the highest temperature anomalies since the beginning of continuous measurements back in 1864. The weather conditions during summer were specified by frequently occurring thunder-storms. Heavy snowfall events at the end of autumn and beginning of winter brought an early snow cover in the mountains which resulted in significantly higher snow depths than during the long-term mean.

Table 1 indicates the clear temperature surplus in 2007 compared to the long-term mean 1961-1990 in both the plains of the northern Alps and the high mountain areas. In Bern it was +1.3°C and at Jungfrauoch +1.4°C warmer than on average. Also the precipitation amounts in 2007 were higher than normal for both stations (respectively 112% and 126%).

Table 1: Comparison of temperature and precipitation in respect to the long-term mean 1961-1990 at the stations Jungfrauoch and Bern. Precipitation is expressed relative to the average amounts. Because precipitation is not measured at Jungfrauoch, values from Kleine Scheidegg have been used instead.

	Jungfrauoch	Bern
mean temperature	- 6.5 °C	+ 9.5 °C
deviation	+ 1.4 °C	+ 1.3 °C
precipitation	1771 mm	1291 mm
relative to average	112 %	126 %

Extraordinary warm winter and spring

The first three weeks of the year 2007 resembled typical conditions for a mild day in March or April rather than a winter day and also February 2007 was determined by mild air masses throughout the entire month. This ended in a surplus of 3°C for the entire winter, which reflects the warmest winter since the beginning of systematic temperature recording. At the station Jungfrauoch (Fig. 1) the second warmest winter has been recorded.

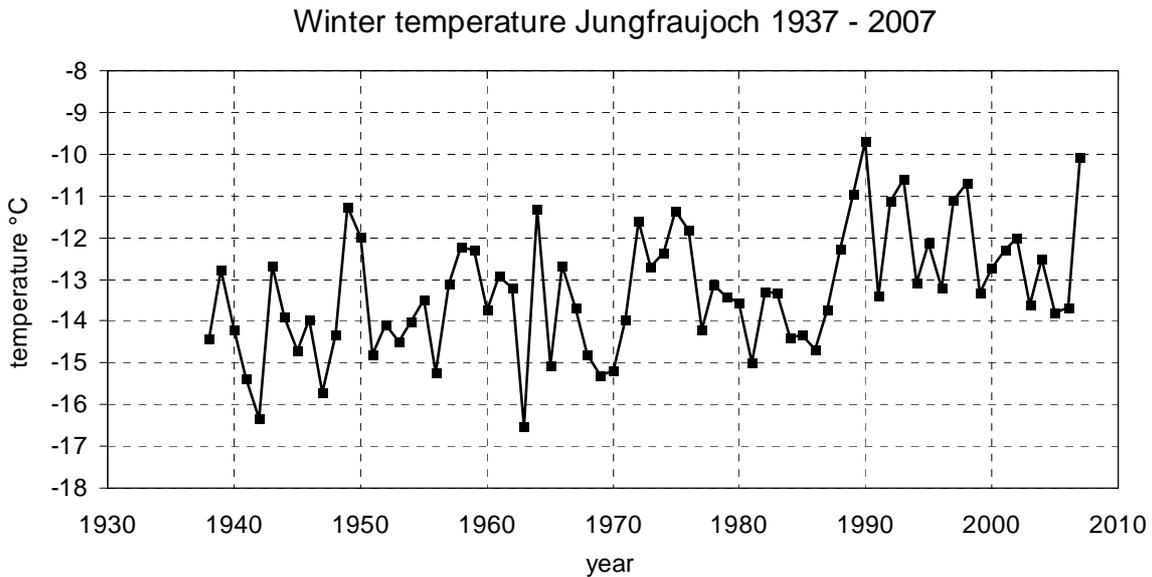


Figure 1: Winter temperatures (1938-2007) measured at the Jungfrauoch station (homogeneous dataset). The winter 2007 (-10.1°C) indicates the second warmest winter during this measurement period.

The continuing warm conditions had also implications for the snow cover. Up to this end in particular the plains of the northern Alps as well as the northern Alps experienced below average snow fall. Finally, but only for a short intermezzo, winter reached Switzerland at the beginning of spring. It was on 22 March to the 23 March that various towns in the German part of Switzerland obtained a significant amount of snow with almost 30 cm whereas the northern Alps received up to 1 meter of fresh snow.

Complete opposite conditions dominated the April 2007. Switzerland experienced the highest monthly mean temperatures on record. On average, the temperature anomalies reached 5.5°C and in higher altitudes they even obtained 6 - 7.5°C. These anomalous high temperatures exceeded the foregoing maximum by more than 1.5°C. Note, however that the anomalies at Jungfrauoch station were less

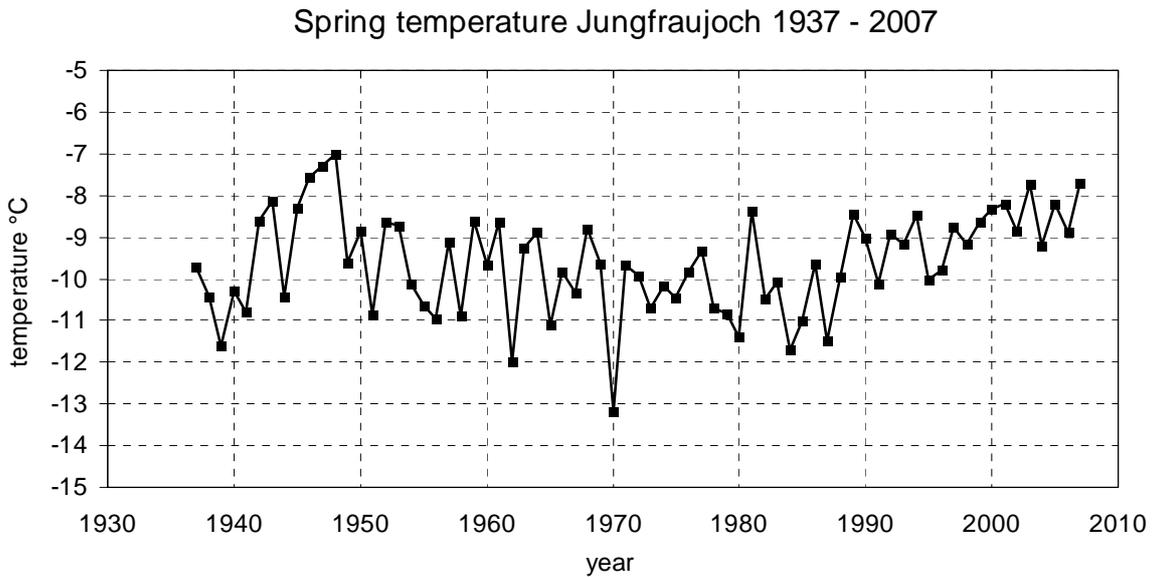


Figure 2: Spring temperatures 1937-2007 measured at the Jungfrauoch station (homogeneous dataset). The spring 2007 (-7.7°C) indicates together with spring 2003 the fourth warmest winter during this measurement period.

Switzerland not only experienced new temperature records but also an exceptional drought. In most of the country less than 30% of the normal precipitation amount was measured. The Ticino and Engadin got less than 20% and some parts of Switzerland got no precipitation at all during this month.

It was primarily the exceptional warm April 2007 that contributed to a new temperature record for the spring season of about 3.3°C above the long-term mean. It is worth to mention that all of the succeeding seasons of autumn, winter and spring experienced a temperature anomaly of about 3°C respectively.

The summer 2007 – A stormy season

Shortly after the beginning of the meteorological summer, the weather conditions put their worst instincts on display. The first 10 days in June 2007 were characterized by a multitude of thunderstorms spreading over entire Switzerland and causing considerable damage. During the evening of the 8 June 2007 the rain gauges registered 100 mm of rain within 1 to 2 hours in the Langeten catchment which is in the region of the Napf. It is assumed that local precipitation amounts even reached 200 mm. During this event, the river “Langeten” found a new path through the village Eriswil causing serious devastation and also flooded the village Huttwil.

Only about two weeks later at the 21 and 22 June 2007, damage causing conditions hit the eastern part of the northern Alps including the northern flatlands. At the evening of the 20 June 2007 the gauges registered 21 mm of rain within 10 minutes in Chur. This high value has never been reached since the measurements had been started the year 1981. At the same evening powerful thunderstorms were also detected in central Switzerland. For instance the rain gauge “Alpthal” in the region of

Einsiedeln recorded 73 mm of rain within one hour and that amount was responsible for serious devastation.

One day later, in the morning of the 21 June 2007, a fast proceeding storm-front boomed across the flatlands of Switzerland from Lake Geneva to Lake Konstanz. The black cloud literally swallowed all the villages on its path and turned the day into night. Berne and Fribourg were hit by heavy showers including floods, stormy winds and several deracinated trees. Towards the east the precipitation amounts decreased slightly, however, the city of Zurich could not manage the vast amount of water. The streets were turning into rivers and the drainage system was desperately overloaded.

The thunderstorms also did not stop in July. At the 19 July the Bernese Oberland was again hit by a large cell of heavy precipitation that eventually caught the region of Interlaken. Hail, with the size of a golf ball or even tennis ball, was responsible for considerable damage in the surrounding. And just the following day a heavy thunderstorm made street and train track impassable in the region of Brünig Pass.

Finally in August the series of thunderstorms came, after two additional extreme events, to its end. First, a southwesterly flow configuration brought moist air from the Mediterranean sea towards the northern Alps and caused long-lasting wet conditions. Some regions of the midlands recorded extreme rain amounts resulting in critical flood conditions. Action forces were fighting against rivers that spill over from the region of Berne towards Aargau and Thur. Fortunately the situation relaxed before the real big damage started. Second, during the last days of August 2007, exceptional thunderstorms hit the Lake District, the Freibergen und the Bernes Jura. Within a very short period some of these areas recorded higher rain amounts than normal for the entire month. Accordingly the effects were obvious resulting in local land slides and floods. Note that the village Lyss has been hit again intensively and this accounts for already the third time during this summer.

Due to the succession of three extraordinary wet summer months some parts of Switzerland, including the western and northwestern parts, experienced the wettest summer since recording in 1864.

Golden autumn and early winter

The first weeks in October were characterized by mild conditions and clear views in the mountains. Temperatures reached almost 20°C in major parts of Switzerland and the northwestern part even got 22°C. After these days Switzerland got caught by cold polar air. The first harbinger of winter was still in October. At the 20 October 2007 a small but area-wide snow cover was measured along the central and eastern Alps at medium altitudes and some areas even got snowfall in the lowlands. Three weeks later Switzerland was hit by the first considerable winter outbreak. Within one week all central and eastern Alps were fully covered by snow and above 1000 asl the snow depth reached 50 – 100 cm. The snow showers didn't stop in the following days, which denoted for some regions snow depths of up to 150 cm, whereas the eastern Bernes Oberland, the Gotthard region and parts of Grisons got 100 cm. Winter resorts could never open so early in the season.

After a strong Föhn periode snow again

Towards the end of November, a strong Föhn period wiped away almost the entire snow cover at lower altitudes. However, from the 9 to 12 December 2007 an additional snow period, this time including the Valais, with intensive snow falls and low temperatures let the snow depths again accumulate far above the long-term mean for this time of the year. Together with the sunny conditions in the second half of the December the ski areas experienced a perfect start into the winter season 2007/2008.

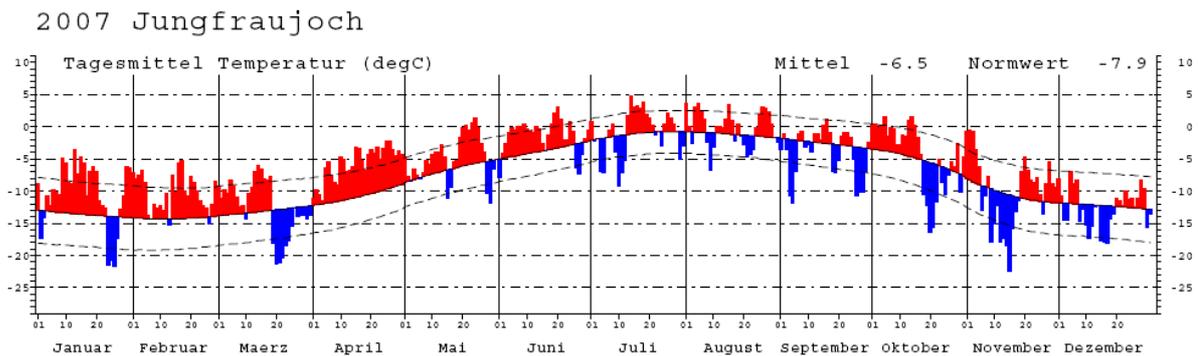


Figure 3: Time series of the daily mean temperatures in 2007 measured at the station Jungfraujoch. Color bars represent anomalies in respect to the long-term mean 1961-1990 and red indicates positive and blue negative anomalies. The dashed lines represent the standard deviation.

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