

Name of research institute or organization:

**Federal Office of Meteorology and Climatology MeteoSwiss**

Title of project:

The weather in 2011

Report by:

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### **Report for the International Foundation HFSJG**

With a country-wide temperature surplus of + 2.0 deg C Switzerland experienced 2011 the warmest year since the start of recording in 1864. The year brought also dry and extremely sunny conditions. The first four months were unusually mild and showed extremely low precipitation amounts. Spring 2011 was the warmest in the measurements series. A summer with variable weather conditions and low July temperatures was followed by the second warmest autumn since the start of recording. November brought record dryness in the northern part of Switzerland and record temperatures in the Alps. Large snow amounts fell in mountain areas in September and in October, but a permanent Alpine winter snow cover was build up as of mid-December only. Towards the end of the year higher reaches were covered widely with amounts of snow above average.

Compared with the long term mean from 1961-1990, the year 2011 showed in the plains north of the Alps as well as in the high mountain areas a temperature surplus of slightly more than 2.0 degrees, as shown below in table 1. The amount of precipitation in the Jungfrau region was within the range of the long term average.

***Table 1.** Comparison of temperature and precipitation 2011 in respect to the long-term mean 1961-1990 at the stations Jungfrauoch and Bern. For temperature the deviation from the long-range mean is shown. Precipitation is expressed relative to the average amounts. Because precipitation is not measured at Jungfrauoch, values from Kleine Scheidegg have been used instead.*

	<i>Jungfrauoch</i>	<i>Bern</i>
mean temperature	-5.8 °C	10.1 °C
deviation	+2.1 °C	+2.2 °C
precipitation	1520 mm	789 mm
<b>relative to average</b>	97 %	77 %

#### **Unusually mild beginning of the year**

After the wintery cold and snowy December, particularly in the Center plateau, January was springlike. After the mild January, an even milder February followed. Continuing warm weather as well as very few precipitation resulted in severe lack of snow in the mountains.

### **Record warm spell in spring**

The unusually warm spell reached its maximum in spring. Subtropical air mass brought summer to Switzerland with temperatures of over 25 degrees in the first half of April. Never, it had been as warm this early of the year. April came up with a further record, showing the earliest hot days since measurement began. The unusual continuing heat thus produced the warmest spring since the start of recording in 1864.

### **The great drought**

Weather conditions were dominated by lack of precipitation since beginning of the year which resulted in pronounced drought. In the Upper Engadin occurred the driest beginning of the year; in the region of Engelberg, Central Switzerland, it was the third driest since the start of recording in 1864. In consequence of the dry weather lasting for months, there was acute continuous danger of forest fires all over the country from May.

### **Summer storms**

June and July were characterized by intense storms. Mainly heavy hailstorms caused great damage in addition to severe rainfall followed by as dramatic flooding. The first two summer months were generally wet, and the month of July was the coldest since 2000. The rainy weather condition continued till mid-August. In the second half of August only did long-awaited midsummer prevail.

### **Snowfall and temperature records**

After the midsummer-like start of autumn, humid polar air brought unusually great quantities of fresh snow to the mountains. Once more, sunny and very mild weather conditions followed the winterly interlude. September 2011 finally became the fourth warmest since the start of recording, and in Lugano, the September mean temperature even reached a record. However, polar air abruptly stopped the summer-like conditions in the first days of October. Fresh snow covered higher reaches with 50 to 100 cm. Quick re-warming with massive snow melting and severe precipitation caused flooding with considerable damage.

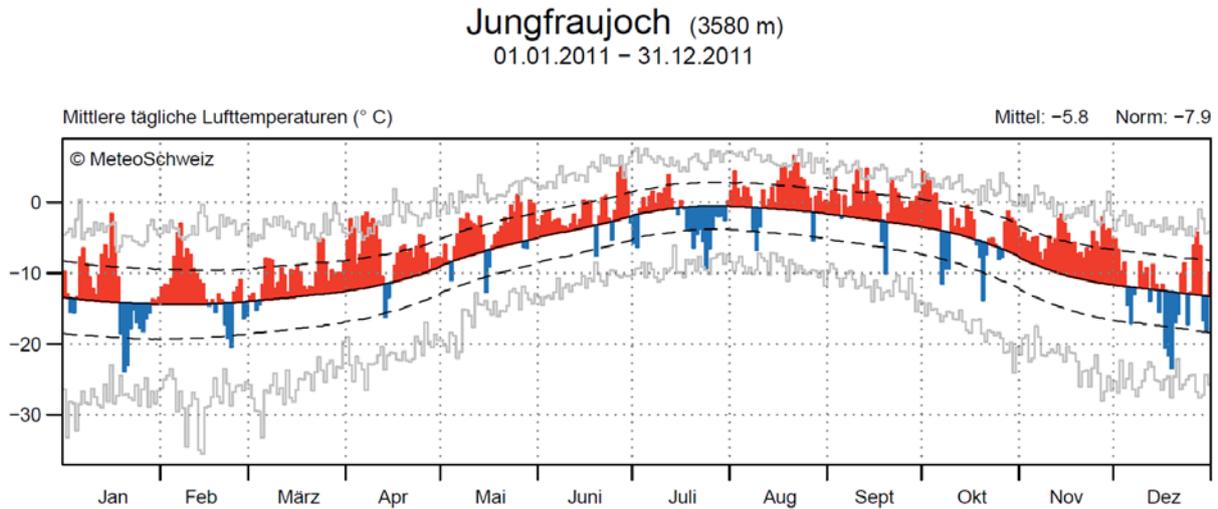
During the steadily warm foehn weather in the first days of November, the maximum temperature in Altdorf reached 23.1 degrees which is an all times November high. Glarus experienced the warmest night in November since start of continuous (automatic) recordings in 1981. Only for 20 minutes, the temperature dropped slightly below 20 degrees.

As a result of permanent high-pressure conditions, precipitation widely held off, particularly from the Valais to Central Switzerland, to Lake Constance, from October 19 till end of November. November 2011 was the driest in these regions since the start of recording in 1864. The mild and very sunny autumn weather brought up the mildest November on mountain peak levels since measurement began in 1864. On Mount Säntis, November's temperatures were 6 degrees higher than the long standing series of reference measurement during the time period of 1961-1990. The previous record holder was at around 4 degrees. The continuous balmy late summer eventually brought forth the second warmest autumn averaged nationwide since the start of recording.

### **Winter snow as of mid-December only**

After the slow beginning of winter, the longed for great amounts of snow finally fell in mid-December in many of the mountain regions. Above all and firstly the Valais was spoiled with snow, followed by the eastern Alps later on in December. In the lowlands it widely snowed for the first time on December 17. The north side of the

Alps was covered in white entirely for the first time on December 19 and 20, from Lake Geneva to Lake Constance, with snowfall in the lowlands btw 5-10 cm, and regionally up to 20 cm. More than half a meter of fresh snowfall was measured in some areas alongside the central and eastern Pre-Alps. Meanwhile, the Ticino was sunny and green up to the alpine regions. However, before Christmas, it became mild and snow disappeared in the lowlands. During Christmas, the mountains offered perfect conditions for winter sports. In the last days of the year, again much snow fell in the mountains, and thus, higher reaches were covered widely with amounts of snow above average.



**Figure 1.** Time series of the daily mean temperatures in 2011 measured at the station Jungfrauoch in comparison to the long-term mean 1961-1990 (solid line) and long-term standard deviation (dashed line). The two grey curves show the highest and lowest daily mean temperature since measurements have been recorded.

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