

Name of research institute or organization:

**Federal Office of Meteorology and Climatology MeteoSwiss**

Title of project:

The weather in 2017

Report by:

Stephan Bader, Climate Division MeteoSwiss  
English translation by Brigitta Klingler Pasquill

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

The year 2017 brought Switzerland the third-warmest spring and the third-warmest summer since observations started in 1864. The months of February and October also registered intensely warm spells. Thus, Switzerland can again look back on one of the warmest years in its 154-year-old period of meteorological observations. The extreme warmth was accompanied by a winter with total snowfall among the lowest ever and an extremely dry mid-autumn. Finally, some regions in Switzerland recorded their third- or fourth-sunniest year, some places south of the Alps even their sunniest year in the homogenous measurement series spanning over more than 50 years. Especially the months April to June and October were very sunny across the whole country.

As can be seen in Table 1 below, the temperature 2017 was above the norm value 1981–2010 (reference period), with similar deviation in the high alpine regions and in the lowland regions north of the Alps. Precipitation totals reached the normal value in the Jungfrau region. In many parts north of the Alps however the annual precipitation amounts were between 70 and 90 percent of the normal values 1981–2010.

*Table 1. Annual values 2017 referring to the parameters temperature and precipitation as well as the deviations from the reference period 1981–2010 for the stations Jungfrauoch and Berne. As precipitation is not measured on Jungfrauoch the values pertaining to the Kleine Scheidegg are used here.*

|                     | <i>Jungfrauoch</i> | <i>Berne</i> |
|---------------------|--------------------|--------------|
| Average temperature | -6.5 °C            | 9.6 °C       |
| Deviation           | +0.7 °C            | +0.8 °C      |
| Precipitation       | 1655 mm            | 845 mm       |
| Deviation           | 101 %              | 81 %         |

### **North of the Alps coldest January in 30 years**

In the last three decades January temperatures north of the Alps - below 1000 m - varied mostly between -2°C and +3°C. By comparison January 2017 registered an unusually low monthly value of -2.9°C. Only in the years 1987 (-4.3°C) and 1985 (-5.4°C) were colder months of January last recorded north of the Alps. In lower regions north of the Alps January 2017 stands out for its icy cold temperatures, even compared with others of the past 60 years. Equally cold was January 1979 with -3.0°C. However, January 1963, which saw the complete freezing-over of many large lakes, was seriously colder with a monthly average of -6.3°C.

### **February features record warmth**

On 23 February stormy south-westerly winds pushed extremely mild air masses into Switzerland. Several regions registered a maximum day temperature of over 20°C. Sion in Central Valais was warmest with 21.4°C. There were new February records at 17 meteorological stations. Twelve of these measurement series reach back over at least 50 years. At stations with measurement series spanning over more than 100 years the former records were surpassed by more than 1°C: Bern registered a new record value of 18.5°C, Zurich 18.8°C and Lucerne 19.9°C.

### **Winter extremely dry and marked by a lack of snow**

Winter precipitation totals from December 2016 to February 2017 reached only half of the normal values 1981–2010 in the nationwide average. In Western Switzerland and in the Valais only 30 to 50 percent of the normal precipitation values were recorded. Western Switzerland observed – in certain regions - a winter with the least precipitation in 45 to 55 years. A comparable winter drought period in the Valais dates back 40 years.

Little precipitation also means little snow. Some places south of the Alps registered the thinnest snow cover since measurements began 55 years ago. In Bosco-Gurin in the Ticino mountains the average snow depth for the three winter months December 2016 to February 2017 amounted to only 14 cm. Such a scant winter snow cover is unique in the measurement series of Bosco-Gurin, available since 1962. In the multi-annual average, winter snow depth here amounts to almost 70 cm.

In other mountain regions, too, the thin winter snow cover in 2016/17 was at close to record-breaking levels. Davos for example recorded 27 cm, only 1 to 3 cm more than the winters with the least snow up to now: 2006/07, 1995/96 and 1989/90. Arosa registered – on average from December 2016 to February 2017 - only 31 cm of snow, Segl-Maria even as little as 12 cm. At both stations, only one winter with an even thinner winter snow cover had been observed: in Arosa this was the winter 1989/90 with 28 cm and in Segl-Maria the winter 2001/02 with only 7 cm of average snow cover.

### **Winter sun in the mountains approaching records**

Sunshine duration in winter amounted to between 110 and 145 percent of normal values 1981–2010 across many parts of the country. In mountain areas the above-average sunny winter of 2016/17 terminated a multi-annual period with mostly below-average sunshine duration. Samedan registered 419 sunshine hours and Davos 409, bringing the winter at these stations up to the second-sunniest since the beginning of homogenous data series in 1959. The sunshine record in December 2016 contributed substantially to this sunshine record. Above-average sunshine was also registered for January 2017. For the winter 2016/17, both meteorological stations registered only a few sunshine hours below the existing record. On the Jungfrauoch it was the sixth-sunniest winter since the beginning of homogenous data series in 1959.

### **Third-warmest spring**

Switzerland and the Jungfrauoch experienced the third-warmest spring since measurements started in 1864. In the nationwide average it amounted to 1.7°C, on Jungfrauoch to 1.9°C above the normal value 1981–2010. On Jungfrauoch only the springs of 2011 with 2.3°C and of 1948 with 2.1°C above the normal value were warmer. The spring months were too mild throughout the season. Averaged over the entire country, March (the second-warmest since observations began) was 3.3°C, April 0.5°C and May 1.1°C above the normal value 1981–2010.

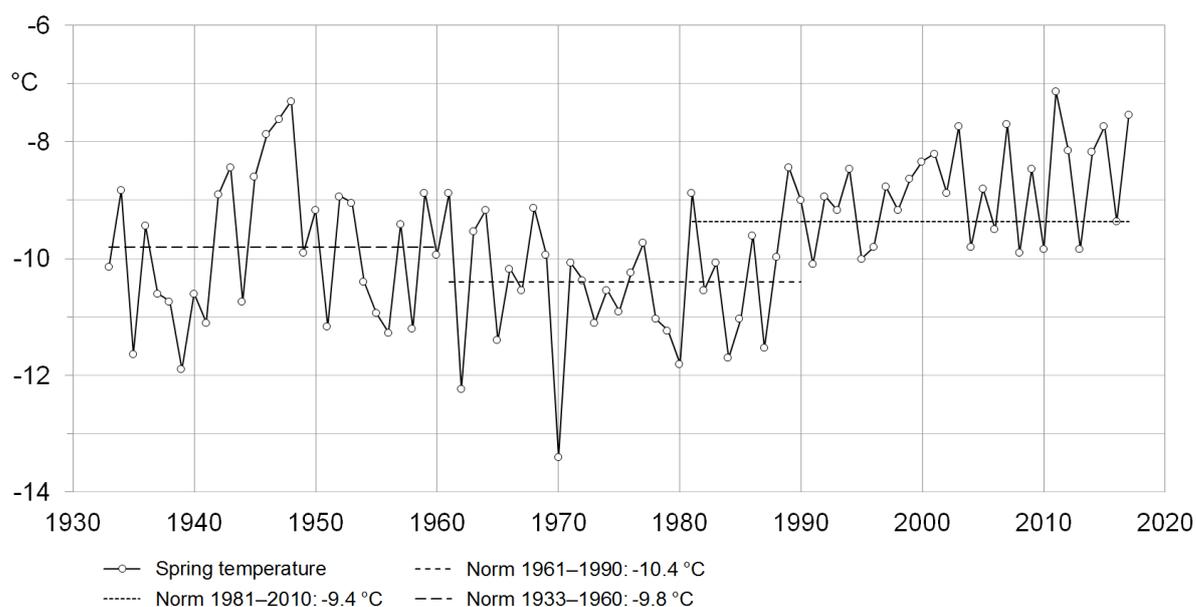


Figure 1. Spring temperatures (MAM) from 1933 to 2017 on Jungfrauoch (3580 m asl; homogeneous data).

### Severe night frost causes substantial damage

The mild temperature in March and at the beginning of April triggered a burst of development in vegetation. Fruit trees flowered around 16 to 18 days earlier than on average in the comparative period 1981–2010. It was one of the earliest fruit-tree flowering in the measurement series. Severe night frosts on 20 and 21 April, however, resulted in a lot of ruin. Substantial damage was caused above all to flowering fruit trees and budding vines.

### Late snow in the lowlands

On 26 April an influx of cold air from the north brought wintery conditions to areas north of the Alps. In Basel 2 cm of fresh snow covered the ground. It was the second-latest date with fresh snow at this station. Only on 28 April 1985 had there been a later fall of fresh snow recorded in the Basel measurement series, again with 2 cm. The measurement series for fresh snow extends back to the winter 1930/31.

Substantial amounts of fresh snow fell from 27 to 29 April along the northern slopes of the Alps and in the Alps themselves. New snow depths amounted in many parts to between 30 and 50 cm, in places even 60 to 70 cm.

### Third-warmest summer

The third-warmest spring was followed by the third-warmest summer since measurements started in 1864. Averaged across the country the summer temperature rose 1.9°C, on Jungfrauoch 1.8°C above the normal value 1981–2010. Only the summers of 2015 and the legendary hot summer of 2003 were warmer: the former with 2.3°C, the latter with 2.9°C above the normal value on Jungfrauoch. Hot temperatures reigned especially in early summer. June, as the second-warmest since observations started, rose 3.3°C above the normal value, averaged across the country. The month featured prolonged high temperatures and a five-day heatwave in the second half of the month.

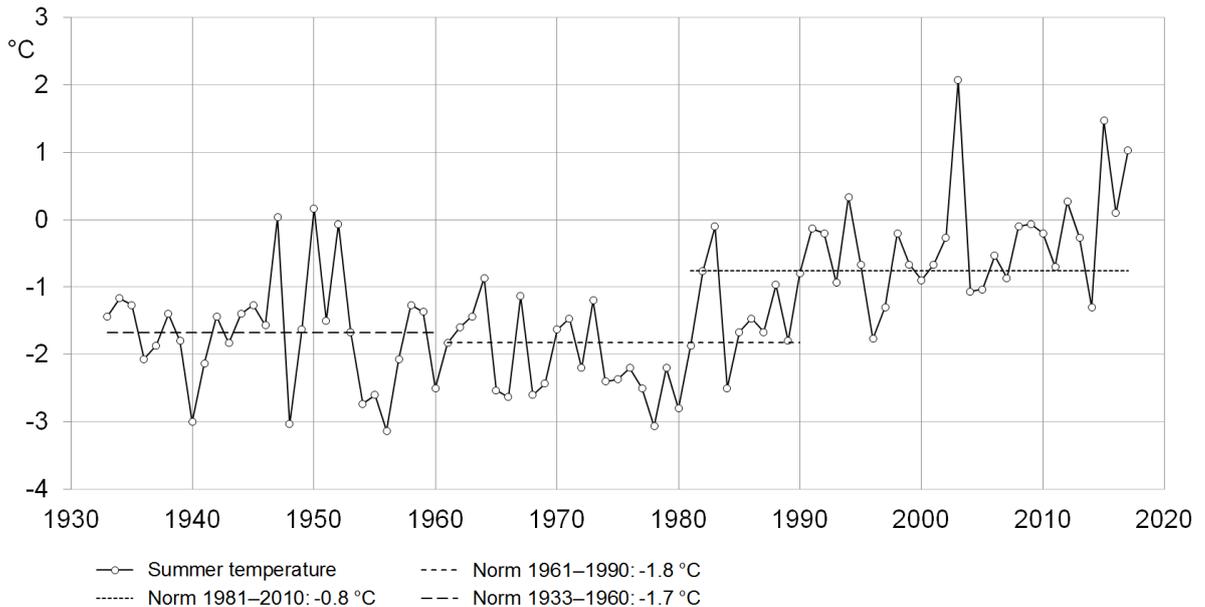


Figure 2. Summer temperatures (JJA) from 1933 to 2017 on Jungfrauoch (3580 m asl; homogeneous data).

### Extremely warm August nights

The month of July, although slightly warmer than the normal value, went by without very hot periods. In August the hot summer weather returned. In many areas it was one of the ten warmest August months since observations started in 1864. The warm temperatures prevailed even at night. Some meteorological stations registered the highest August minimum temperatures since measurements began: in Lugano the temperature on 5 August did not fall below 23.5°C, in Neuchâtel on 4 August not below 23°C. In Geneva on 4 August and in Basel on 3 August the minimum was not below 21.8°C respectively. On 5 August Locarno-Monti registered the second-highest August minimum with 23.9°C. All five measurement series span more than 100 years.

### New Swiss rain record

On the evening of 1 August and in the night to 2 August violent thunderstorms erupted north of the Alps, accompanied by hail and strong gusts of wind. At the northern edge of Switzerland wind gusts attained 90 to 135 km/h, locally even up to 190 km/h. The fierce succession of thunderstorms early in the morning of 2 August at the northern edge of Switzerland brought a new Swiss rain record. At the station of Eschenz a ten-minute total of 36.1 mm fell between 02.40 and 02.50. The previous ten-minute record amounted to 33.6 mm, collected on 29 August 2003 in Locarno-Monti. A comparable ten-minute total of 33.5 mm was registered on 25 June 2017 at the Ticino observation site Crana-Torricella. The previous highest ten-minute total north of the Alps amounted to 32.8 mm, collected on 2 May 2013 in Schaffhausen.

### Cool start to the autumn

In autumn the weather character was very unsettled. September was noticeably cool, above all in the mountains. In summit regions winter announced itself with many days of fresh snow. The Weissfluhjoch, at an altitude of 2540 m, registered 15 days of new snow, resulting in a new September record. The impression of early winter persisted in the first October days. North of the Alps snow fell down to an altitude of 1200 m.

### **Unusually sunny Indian summer**

Around mid-October the weather was dominated for ten days by high-pressure zones. The autumn sun shone frequently from a cloudless bright blue sky. In the lower areas, daily maximum temperature rose in many parts to between 22 and 25°C. The persistent fair weather brought the Plateau and Southern Switzerland the sunniest October, regionally, in the homogenous observation series spanning at least 50 years. At other stations with homogenous observation series of at least 50 years it was the second- or third-sunniest October.

### **Extremely dry south of the Alps**

South of the Alps the fair weather period lasted 20 days. During the entire month of October there was hardly any precipitation. In many parts of Ticino the precipitation monthly totals amounted to between 0.5 and 5.0 mm only, and in the southern Grisons between 10 and 17 mm. The frequent spells of “Nordföhn” contributed to the drought. In Ticino October 2017 was among the five driest October months in the measurement series extending over more than 100 years. Only in the year 1969 was there absolutely no precipitation south of the Alps.

### **Winter commences in November**

In November the areas north of the Alps experienced several episodes of snowfall down to lower altitudes. Einsiedeln at 910 m and Elm at 938 m altitude registered 20 days with a snow cover. In Davos at 1600 m and Arosa at almost 1880 m the landscape was white from 6 November onwards. Thanks to favourable fresh snow conditions some winter sport resorts started their skiing season.

### **A lot of snow in December**

In the first days of December, precisely at the meteorological start of winter, a temporary snow cover of a few centimetres appeared also in low altitudes north of the Alps. On 8 and again on 17/18 December the ground was white in many regions north of the Alps, down to the lowest altitude levels.

On 10/11 December the lowest altitude levels south of the Alps also received a snow cover of a few centimetres. Meanwhile, in the low areas of the Central Valais record snow totals were measured. Sion registered an extreme value of 60 cm within one day. This is far above the previous maximum value of 43 cm, collected in November 1971. Even the previous highest 2-day totals only amounted to scarcely above 50 cm in Sion.

In December a lot of snow fell in the mountains. Shortly after mid-month over 170 percent of the normal snow totals were registered in many parts of the Alps. In the entire Alpine region of Switzerland conditions for the seasonal ski tourism were ideal.

### **Annual balance**

In most parts of Switzerland the annual temperature rose 0.7 to 1.2°C above the normal values 1981–2010. Averaged across the country the annual temperature was 0.8°C above the normal value 1981–2010. This means that Switzerland looks back upon the sixth-warmest year since observations began in 1864. Five of the six warmest years were registered after the year 2000.

In many parts north of the Alps annual precipitation reached 70 to 90 percent of the normal values 1981–2010. Alpine areas received mostly 90 to 115 percent, southern valleys of the Valais, however, only 60 to 80 percent of normal values. South of the Alps annual precipitation amounted to 80 to 95 percent of the normal values.

North of the Alps and in southern Ticino the annual total of sunshine duration amounted to 110 to 120 percent of normal values 1981–2010. The other parts of Switzerland recorded 100 to 110 percent of normal values. Lugano and Locarno-Monti in Ticino registered the sunniest year, some other regions of Switzerland the third- or fourth-sunniest year in the homogenous measurement series extending over more than 50 years.

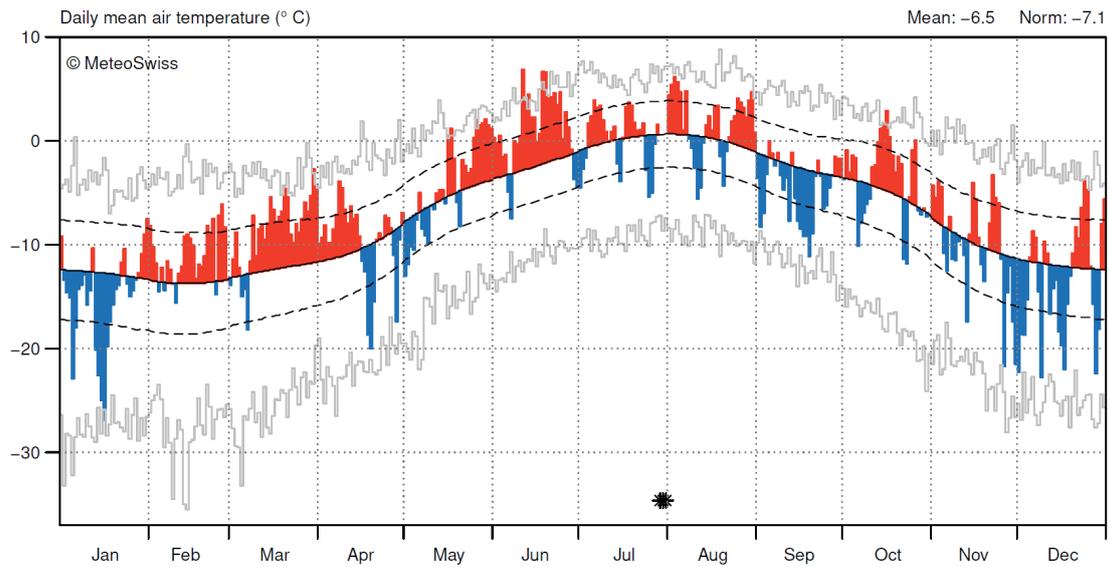


Figure 3. Development of the 24-hour mean temperatures 2017 on Jungfrauoch (3580 m asl), in relation to the long-term mean value 1981–2010 (solid line) and the long-term mean fluctuation (dashed line, standard deviation). The two grey curves show the highest and the lowest 24-hour mean temperatures since observations started. Three Missing values end of July (x).

Address:

---

Bundesamt für Meteorologie und Klimatologie MeteoSchweiz  
Abteilung Klima  
Operation Center 1  
Postfach 257  
CH-8058 Zürich-Flughafen  
e-mail: [klimainformation@meteoschweiz.ch](mailto:klimainformation@meteoschweiz.ch)  
URL: <http://www.meteoschweiz.admin.ch/home.html?tab=overview>