

Name of research institute or organization:

Federal Office of Meteorology and Climatology MeteoSwiss

Title of project:

The weather in 2012

Report by:

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Report for the International Foundation HFSJG

In 2012 the annual mean temperature in Switzerland was about one degree Celsius above the norm value 1961-1990. Annual precipitation amounted to a surplus of five percent compared to the norm. The year started in very wintery fashion with above-average snow in the mountains and an intensely cold spell in February. The spring was extremely warm, very sunny and rather dry. The summer however developed rather slowly and only August brought real high summer weather including a heat wave. Some snowfall down to medium altitudes in early autumn produced a first hint of winter while October was characterized by a glorious Indian Summer followed by an abrupt change with snow down to the lowlands. The snow theme remained in the foreground with an episode of severe wintery weather at the end of November on the southern slopes of the Alps, in the Valais and Jura and with intensive snowfall all over Switzerland down to low altitudes in the first half of December.

As can be seen in Table 1 below, the year 2012 was too warm compared to the long-term average 1961-1990 (reference period), with a temperature surplus of slightly over one degree both in the lowland regions north of the Alps and in the high Alpine regions. Precipitation totals reached about 120 percent of the normal values in the Jungfrau region and 110 percent in the lowland regions north of the Alps.

Table 1: Annual values 2012 referring to the parameters temperature and precipitation as well as to the deviations from the reference period 1961-1990 for the stations Jungfrauoch and Bern. 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	-6.7 °C	9.2 °C
Deviation	+1.2 °C	+1.3 °C
Precipitation	1874 mm	1128 mm
Deviation	119 %	110 %

Masses of snow in the mountains at the start of the year

As the year 2011 came to its close there was already an above-average amount of snow in many parts of the Swiss Alps. A strong north-westerly front in the first days of 2012 brought again large amounts of snow at high altitudes, increasing the danger of avalanches. In Andermatt in the Central Alps slightly over 2 m of snow were recorded, the third-highest January snow cover since observations started in 1966. In the Swiss lowlands, however, temperatures remained mild and there was scarcely any snow.

Intensively cold in February

After a period with sunny and mild winter weather Switzerland was seized by the most powerful cold spell in 27 years from the beginning of February on. In lower regions of Eastern Switzerland, cold air from Siberia caused the daily mid-temperatures to fall as low as -9 to -10°C from 1 to 14 February. In Western Switzerland the values were slightly higher, in Southern Switzerland considerably higher with -2 to -8°C. On the plain north of the Alps minimum temperatures fell locally below -20°C, in the high Alpine valley of the Engadin below -30°C. In the second week of February smaller lakes on the Swiss Plateau froze. Access to the frozen „Pfäffikersee“ was possible and the ice cover on the „Greifensee“ was also open to the public for a short while. In the upper part of Lake Zurich a lot of ice skaters enjoyed themselves on the frozen bay of Rapperswil, and there were extended ice sheets along many shore areas.

During the cold spell some snow fell occasionally north of the Alps, causing permanent snow cover in many low-altitude areas as well. However, snow depths were generally moderate in these places.

Extreme cold followed by extreme warmth

In the second half of February temperatures turned out exceptionally mild, starting south of the Alps. On 25 February 2012 the temperature in Locarno-Monti rose to 23.3°C, breaking the February record since observations started in 1935. The former February record of 1948 was more than 1°C below this mark.

The exceptional warmth finally extended to all Swiss regions and lasted up to the first days of April. Overall, it was the second warmest March in Switzerland, south of the Alps even the warmest since observations began in 1864. North of the Alps sunshine duration reached record values while in the Alps values were on a par with former records.

Summer temperatures in spring

After the period of record-breaking warmth the weather continued unsettled and cool until mid-April. A “Föhn” storm in the last April days, however, generated summery conditions. On 28 April the highest April temperatures were recorded by some weather stations since observations began, e.g. in Berne 28.2°C (since observations started in 1864) or in Lucerne 29.1°C (since 1886). In the Alps, too, it was extremely mild. In Davos (1600 m a.s.l.) the thermometer rose to 19.4°C. This was the same temperature as measured on 25 April 2007 and a record for April since observations started in 1877. A short while later high summer temperatures set in. On 11 May there was plenty of sunshine and widespread temperatures of 27 to 29°C, in isolated sites a very hot day (above 30°C) was recorded, a rare event so early in May in the lowlands of the German-speaking part of Switzerland. The zero degree level was as high as 4140 m a.s.l., an altitude which had not been reached before in the past 40 years in the first part of May.

A wet and grey start to the summer

Only a day after the summer heat Switzerland came again under the influence of a polar cold front. With heavy rainfalls temperatures on the Plateau reached little over 10°C. In mid-May it snowed down to an altitude of 600 m a.s.l. Further strong precipitation followed in the last third of May. The first half of June was grey and wet in the entire country: sunshine duration north of the Alps amounted to only 10 to 20% of the long-term average values. In the Valais and south of the Alps these values were higher, but with about 30% clearly below the expected sunshine duration. The first three weeks in July were also dominated by unsettled weather episodes and the repeated influx of cool air masses. At the end of this period, which can hardly be described as summery, a splendid waterspout was observed in the lower part of Lake Zurich on 21 July in changeable and cool west-wind weather.

Hot summer weather only in August

From the beginning of summer hot weather spells were limited in many areas to short periods in the last thirds of June and July while in the Ticino summer weather prevailed throughout July. Only August brought persistent warm summer conditions to all of Switzerland. After the middle of the month the entire country was seized by an intense heat wave. Temperatures of above 30°C were recorded up to altitudes of over 500 m a.s.l., and at some higher-altitude stations record values for the month of August were observed. On the Jungfrauoch, temperatures rose to a new, absolute maximum of 12.8°C. With 36.9°C the weather station in Sion reported the highest temperature. This was the highest temperature registered by MeteoSwiss in our country since the record heat of the summer of 2003. However, the values registered then were substantially higher.

First harbingers of winter

A powerful polar front on the threshold of August to September put paid to the summer heat of 2012. There was a lot of precipitation on the northern slopes of the Alps and some Alpine passes had to be closed due to snowfall. After a period of summery high pressure weather a new strong influx of cold air on 11 to 12 September again brought snow as far down as medium altitudes. As cold air from the North arrived, several waterspouts could be seen on Lake Constance on 13 September. A few days later the same scenario was repeated: mild late summer weather followed by a cold spell with snow in the mountains.

In the last September days a pronounced „Föhn“ situation established itself, bringing abundant precipitation to some southern regions of the Alps. The large amount of rain made the waters of the Maggia river rise dangerously on 26 and 27 September. After the subsequent quick changes between sunny/mild and wet/grey days a further powerful cold front followed in mid-October with heavy precipitation. Along the eastern slopes of the Alps an uninterrupted snow cover appeared above 800 m a.s.l. and in the Canton of Graubünden there were 10 to 20 cm of fresh snow above 1000 m a.s.l. On the Swiss Plateau temperatures remained under 10°C in the daytime.

Beautiful Indian Summer

After this wintery episode Switzerland enjoyed a splendid Indian Summer from 17 to 25 October. Even in medium altitudes temperatures rose partly above 20°C in sunny weather conditions, which is exceptionally mild for this season. As a consequence some weather stations in alpine locations reported new temperature records for the second half of October. From 23 October regions below 1000 to 1400 m a.s.l. north of the Alps disappeared under a dense blanket of fog.

Winter down to the lowlands in October

A massive influx of polar air masses in the last days of October spread a wintery cover over most parts of Switzerland. On 28 October there were overall 1 to 10 cm of fresh snow in the German-speaking parts, 10 to 20 cm in slightly higher altitudes, locally even more. The persistent snowfall down to low altitudes brought a new October snow record to St. Gallen: 33 cm, exceeding by far the former record of 18 cm (30./31.10.1974, according to the measurement series starting in 1959). At the Langnau im Emmental station 30 cm of snow were measured, the former record amounting to 27 cm (30.10.2008; measurement series starting in 1958). At lower altitudes lower values were registered. There were 19 cm of snow in Zurich on the morning of 29 October. The October record so far dates back to 30.10.2008 with 20 cm (measurement series starting in 1931). The two events are therefore on a similar scale. Towards the Alps snow levels were not as spectacular compared to former October events. There was no snow in the area of Lake Geneva, in low-altitude sites of the principal valley of the Canton of Valais, of the Ticino and in the valleys of the rivers Aare, Reuss and Rhine.

Mild and sunny late autumn in mid-November

From 12 November a stable autumnal high pressure situation with sunny mountain weather established itself. The zero degree level rose to above 3000 m a.s.l. in the daytime, pushing the maximum temperature on the Jungfrauoch (3580 m a.s.l.) up to +3°C. In the lowlands north of the Alps typical November fog developed while the Ticino enjoyed a lot of sunshine.

Heavy snowfall

In the last days of November heavy precipitation started in the west and above all south of the Alps. In the Jura, in the northern Ticino and in the Simplon area the snow line sank to about 800 m a.s.l. There were 80 to 120 cm of fresh snow along the southern slopes of the Alps, from Monte Rosa to Simplon, Ticino and to the Valle Mesolcina while 30 to 50 cm were measured on the main ridge of the Alps and in the Upper Valais; 40 to 60 cm in the Jura above 1500 m a.s.l. The centre of this heavy precipitation event was located in the area of Valle Maggia – Locarnese.

On 29 November cold air masses from the north brought some fresh snow also to the lowlands north of the Alps. Along the pre-Alps from 700 to 900 m a.s.l. there were 40 cm of snow while lesser amounts of fresh snow were registered toward the Alps.

Lots of snow at the beginning of winter

The influx of cold air generated the first “ice day” with temperatures below zero during the whole day in many regions north of the Alps exactly at the beginning of the meteorological winter (1.12.). Marking the arrival of winter even further, an active snow front crossed the entire area north of the Alps on the following day. Dense snow flurries wrapped the lowlands into a blanket of powdery fresh snow on that first Sunday in December, with snow heights of 2 to 10 cm, locally even to 20 cm.

From 3 to 4 December the Valais was snowed in. In Sion 30 cm of fresh snow fell, Brig got 50 cm and at Ulrichen in the Upper Valais the snow cover was as deep as 80 cm.

The second December weekend was also very wintery. After a substantial snowfall in the night Switzerland presented itself mostly in white on Saturday morning (8.12.2012). From Lake Geneva to Lake Constance the Swiss Plateau was under a snow cover of 5 to 35 cm and in certain regions of the northern slopes of the Alps 50 to 65 cm. Even Locarno-Monti (367 m a.s.l.) in the Ticino reported 1 cm of snow. In low altitudes north of the Alps the snow cover remained for about a week before it disappeared on the third December weekend, which brought rain and mild temperatures. South of the Alps however it snowed heavily on that weekend and as a result there were 10 to almost 20 cm of snow in the low regions of the Ticino.

Annual balance

Averaging the total of Swiss measurements, the year 2012 was about 1°C too warm in comparison with the norm value 1961-1990. In the Ticino the temperature surplus amounted to +1.6°C regionally, in the Valais up to +1.8°C, in lower areas north of the Alps however only from +0.6 to +0.8°C.

Precipitation was significantly above average in northern Switzerland and regionally on the north-eastern slopes of the Alps, resulting in 120 to 130 percent of the norm value. The valleys south of the Alps in parts received 110 to 120 percent of the norm value 1961-1990. In other parts of the country values amounted to 100 to 115 percent of the norm.

Sunshine duration reached 110 to 120 percent of the norm 1961-1990 on the Swiss Plateau from Lake Geneva to Lake Constance. In most other areas values were around 100 to 110 percent.

Jungfrauojoch (3580 m)
01.01.2012 – 31.12.2012

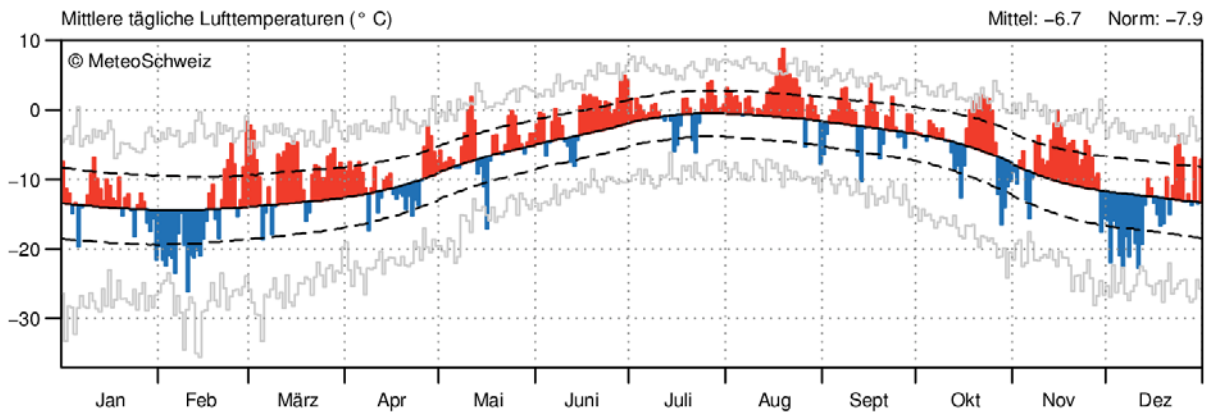


Figure 1: Development of the 24-hour mean temperatures 2012 at the station Jungfrauojoch, in relation to the long-term mean value 1961-1990 (unbroken line) and the long-term mean fluctuation (broken line, standard deviation). The two grey curves show the highest and the lowest 24-hour mean temperatures since observations started.

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