

Hydrological Yearbook of Switzerland 2019

Discharge, water level and water quality of Swiss water bodies

Summary of the publication «Hydrologisches Jahrbuch der Schweiz 2019»
www.bafu.admin.ch/uz-2019-d

Summary

Weather conditions

The annual mean air temperature in most parts of Switzerland in 2019 was 0.8 to 1.2 °C above the 1981 – 2010 average. Annual precipitation widely totalled 80 to 100 % of normal levels. From Upper Valais through northern Ticino and the Gotthard region to Graubünden as well as in the eastern part of the northern Alps, precipitation was mostly between 110 and 130 % of the norm.

Snow and glaciers

In the north, winter 2018/19 was one of the six snowiest in the past 20 years. December and January saw particularly heavy precipitation. In the south, the winter was exceptionally dry, with precipitation falling mainly in November and April. Conditions in May 2019 were looking favourable for Swiss glaciers, with above-average amounts of snow still lying at high altitudes. However, massive glacier melt during the summer heatwaves resulted in another year of heavy ice-volume losses.

Discharge conditions and lake levels

Following a year of markedly low water levels in 2018, 2019 was fairly unspectacular in hydrological terms. The mean annual discharges for large river basins ranged from 25 % below to 20 % above the averages for 1981 – 2010. Significantly below-average discharges were recorded in the north and north-west of Switzerland. The values in the south and south-east of the country were well above average. Flooding in June affected a number of regions. Heavy precipitation combined with melting snow resulted in high water levels and discharges in many waters in eastern, central and southern Switzerland, with discharges at some FOEN gauging stations reaching new highs.

Unlike 2018, when the annual mean water levels of most large lakes were below the long-term average due to a prolonged drought, 2019 was a very balanced year. However, the level of Lake Constance was at danger levels 2 and 3 on almost 30 days from 12 June during the flooding. Danger level 2 was also reached on Lake Maggiore, where the water level was in this range on five days in late October and on four days in late November.

Water temperatures

Although 2019 was another very warm year for air temperatures, the annual mean water temperatures did not reach record highs. No new annual maxima were recorded in 2019. After a balanced spring, new monthly maxima were observed at some locations in Switzerland during the long periods of warm weather in June and July.

Stable isotopes

In February 2019, a cold snap resulted in precipitation with below-average δ values for the time of year. In parallel with high air temperatures, high δ values in precipitation compared with long-term observations were recorded in the spring, summer and autumn. A cold spell in November then brought lower δ values once again. These seasonal changes in $\delta^{2}\text{H}$ and $\delta^{18}\text{O}$ values were also evident in watercourses.

Suspended sediment loads

Unlike 2017 and 2018, 2019 was a relatively wet year. Monthly total sediment loads in summer were above those for the reference period 2014 – 2019 at nearly all monitoring stations. North of the Alps, heavy precipitation in June and August caused heavy total sediment loads exceeding the monthly averages.

Groundwater

From the start of 2019 until the autumn, low groundwater levels and spring discharges compared with the long-term average were measured at a third of monitoring stations. Just under half of all monitoring stations recorded high groundwater temperatures for 2019.

Further information

Further information on the topics of the Hydrological Yearbook and the FOEN hydrometric monitoring networks, and current and historical data can be found online at:

www.bafu.admin.ch/hydrologicalyearbook

Current and historical data:

www.hydrodaten.admin.ch/en

FOEN Hydrological Bulletin:

https://www.hydrodaten.admin.ch/de/hydro_bulletin.html

FOEN Groundwater Bulletin:

<https://www.hydrodaten.admin.ch/de/grundwasserbulletin.html>

Results of the NAQUA National Groundwater Monitoring Programme:

www.bafu.admin.ch/naqua

Results of the National River Monitoring and Survey Programme (NADUF) – data download:

<https://opendata.eawag.ch/dataset/naduf-national-long-term-surveillance-of-swiss-rivers-2020-1>

National River Monitoring and Survey Programme (NADUF) – monitoring network:

www.bafu.admin.ch/naduf

Results of the National Surface Water Quality Monitoring Programme (NAWA) on maps:

<https://s.geo.admin.ch/7902c509b7>

National Surface Water Quality Monitoring Programme (NAWA):

www.bafu.admin.ch/nawa

Water indicators and further information about water

www.bafu.admin.ch/water

More information about micropollutants:

Gewässerüberwachung: Den Schadstoffen im Rhein auf der Spur (Water body monitoring: On the trail of pollutants in the Rhine). Article in the FOEN's environment magazine 1/2017 about the Rhine monitoring station at Weil am Rhein (available in German and French)
<https://www.bafu.admin.ch/bafu/de/home/themen/wasser/dossiers/magazin--umwelt--1-2017---wasser-qualitaet/den-schadstoffen-im-rhein-auf-der-spur.html>

Überprüfung des Reinigungseffekts. Auswahl geeigneter organischer Spurenstoffe (Verifying removal efficiency. Selection of suitable organic micropollutants). Article (in German) in the journal Aqua & Gas 2/2015, pp. 34–40
www.aquaetgas.ch

Verordnung des UVEK zur Überprüfung des Reinigungseffekts von Massnahmen zur Elimination von organischen Spurenstoffen bei Abwasserreinigungsanlagen vom 3. November 2016 (DETEC Ordinance of 3 November 2016 on verifying the removal efficiency of measures to eliminate organic micropollutants at wastewater treatment plants). Available in German, French and Italian
www.admin.ch/opc/de/classified-compilation/20160123/index.html