



Documentation of MeteoSwiss Grid-Data Products

Daily Precipitation (preliminary analysis): RprelimD

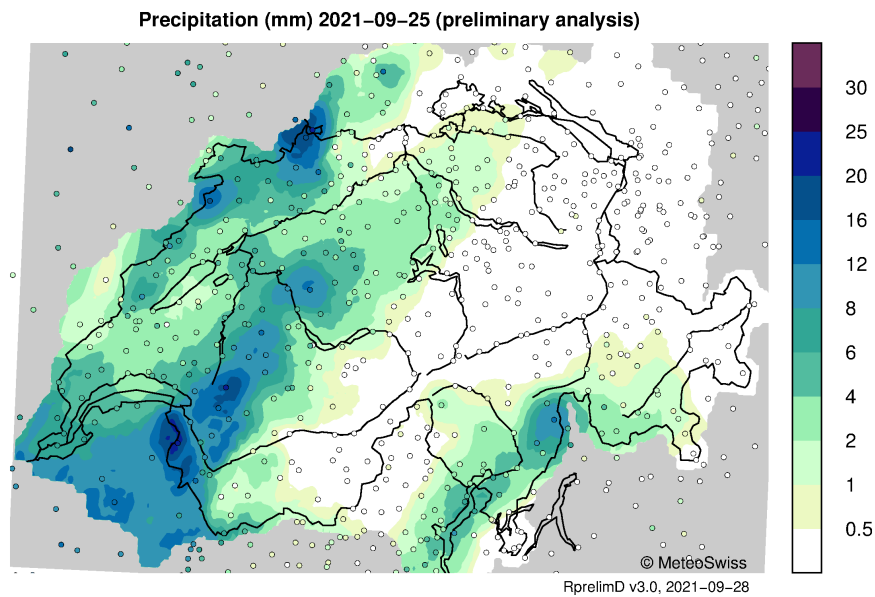


Figure 1: Preliminary analysis of daily precipitation (mm) for 25. September 2021.

Variable	Daily precipitation on day D, corresponding to rainfall and snowfall water equivalent accumulated from 06:00 UTC of day D to 06:00 UTC of day D+1. In millimeters (equivalent to liters per square meter).
Application	Real-time precipitation monitoring. Water resources and hydropower management. Hydrology, agriculture and tourism.
Overview	RprelimD is a near real-time analysis of the distribution of daily precipitation over Switzerland and adjacent hydrological catchments. The analysis for a day becomes readily available on the following day. The limited number of measurements available for this real-time analysis makes RprelimD a “preliminary analysis”, which is superseded by a more reliable “final analysis” (product RhiresD) after a delay of about one month. RprelimD is addressed to near real-time applications that can accept larger quantitative uncertainty.

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Data base	<p>RprelimD is based on measurements at rain-gauge stations with a near real-time data delivery into the MeteoSwiss data archive. Today (in 2021), this involves approximately 250 stations from SwissMetNet for the territory within the national border (MeteoSwiss 2010). Over the foreign parts of “hydrological Switzerland” data from about 100 more stations is integrated. These originate from national and regional authorities in our neighboring countries. The resulting station network has an average inter-station distance of about 25 km, with flatland and valley floor conditions relatively better covered than high-mountain conditions. Also, the parts of the domain in France and in Lombardia (Eastern part of Northern Italy) have a relatively coarser observational coverage.</p> <p>The rain gauges of MeteoSwiss are mostly automatic tipping bucket and weighing gauges. Some manual gauges of the Hellmann type, with real-time data delivery, are included too. The gauges over the foreign parts of the domain are, mostly, tipping buckets.</p> <p>The data included for the preliminary precipitation analysis runs through early quality control tests, but a thorough assessment for gross errors is conducted only after its actual use for RprelimD.</p>
Method	<p>Since version “v3.0” of RprelimD, the method employed for the analysis is exactly similar to that used for RhiresD “v2.0”. For detail on the method, the reader is referred to the product description of “RhiresD” and the literature cited therein.</p> <p>It is worth mentioning that with version “v3.0” the analysis procedure has switched from a reconstruction concept with long-term observations only to a direct interpolation with all available observations. The continuous conversion of manual into automatic rain-gauges, over the past ten years, has made this possible. As a result, the delivered fields are spatially more detailed than the earlier versions. The methodological alignment of RprelimD with RhiresD also ensures a better mutual consistency.</p>
Target users	<p>RprelimD is addressed to users with a need for timely data access (quasi real-time) but tolerance to limited quantitative reliability. It is meant to provide an overview of the recent rain-fall activity in Switzerland (and neighboring regions) for qualitative or rough quantitative applications in hydrology and water resources management. Agronomy, insurance and tourism are other sectors of potential application.</p>
Accuracy and interpretation	<p>RprelimD is a timely available, yet preliminary estimate of the distribution of precipitation in Switzerland. It builds on the interpolation method employed for the final analysis RhiresD, but with roughly only one half to two thirds of the observations and with only minimal data-quality checking. The limitations outlined in the “accuracy and interpretation” section for RhiresD apply for RprelimD too, and the error statistics listed there are to be considered lower bounds of the conditions for RprelimD. We refer the reader to the corresponding section of the product documentation of RhiresD for detail.</p> <p>Rain-gauge observation is prone to measurement and transmission errors, particularly in the cold season, at high altitudes, and under heavy short-term precipitation. RprelimD may be affected by erroneous data quite frequently, which may manifest in unrealistic minima and maxima in the field. We urgently recommend users to update their data archives with the final RhiresD analysis as soon as it becomes available.</p> <p>It should be noted that RprelimD (like RhiresD) does not reproduce local extremes unless they are directly observed. The fields are generally much smoother than real precipitation fields on km-scale resolution. It is statistically more appropriate to interpret the estimates as regional area-mean precipitation over a 20x20 to 30x30 km² neighborhood. The limitation in</p>

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effective resolution is even more pronounced in RprelimD than in RhiresD because of the limited station coverage.

Related products

RhiresD: The final analysis of daily precipitation with all station measurements included, notably the manual measurements that were not available in real time. Compared to RprelimD, RhiresD is quantitatively more accurate, has a higher effective resolution but is accessible only with a delay of about one month. It is recommended to update RprelimD data with RhiresD, as soon as it becomes available.

RhydchprobD: A probabilistic daily precipitation analysis, based on all rain-gauge data available in real time. The product is probabilistic (i.e. has 50 ensemble members), it reproduces the statistics of extremes more accurately. See also Frei and Isotta, 2019.

CPC: An hourly precipitation dataset obtained from a formal statistical combination of simultaneous radar and rain-gauge measurements. This data product is available in near real-time and addresses user needs for very high temporal resolution. (See the corresponding documentation.) Aggregation of CPC over one day does not replicate RhiresD.

Grid structures

RprelimD is available in the following grid structure:

ch02h.lonlat, ch01h.swiss.lv95

Versions

v3.0: The current operational version of RprelimD.

v2.0: This version was operational for many years until 2021. It was calculated using a statistical reconstruction method and was building on much fewer observations from automatic rain gauges with long-term series only. Also, this version was restricted to a domain within the national borders and did not incorporate foreign data. The switch to version v3.0 is a major improvement with a better representation of spatial detail.

Update cycle

RprelimD is updated every day. The analysis for day D is available at 10:00 of day $D+1$.

References

Frei, C., and Isotta, F. A., 2019. Ensemble spatial precipitation analysis from rain-gauge data: Methodology and application in the European Alps. *J. Geophys. Res. Atmos.*, 124. <https://doi.org/10.1029/2018JD030004>
MeteoSwiss, 2010: SwissMetNet: Ein Messnetz für die Zukunft. Federal Office of Meteorology and Climatology MeteoSuisse, Zürich, 2 pp. [Available from www.meteoswiss.ch](http://www.meteoswiss.ch).

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