



Towards a daily weather type classification for the alpine region back to the late 18th century

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Synoptic weather type classifications for the alpine region go back to the 1950s. The aim of such a combination of various meteorological elements over a certain area is to better understand atmospheric circulation and weather events and to provide a basis for long-term weather forecasts.

For the analyses of climate change an investigation of a change in the atmospheric circulation patterns is of high interest. Such a classification is based on high temporal resolution (subdaily) meteorological information on different parameters.

For Switzerland, three long (~250 yrs) historical time series (Basel, Geneva, Gr. St. Bernhard) that were hitherto available in the form of monthly means only have recently been digitized (in cooperation with MeteoSwiss) on a subdaily scale. The digitized time series contain subdaily data (varies from 2–6 daily measurements) on temperature, precipitation/snow height, pressure and humidity, and subdaily descriptions on wind direction, wind speeds and cloud cover. Based on different combinations of the parameters pressure, wind direction and wind speed, a weather type classification can be performed back to the late 18th century. With information on absolute pressure height, tendencies and gradients, as well as changes in wind direction and wind speed, typical circulation patterns can be expressed and subsequently weather types for the alpine region classified. For Switzerland Schüepp's "Alpenwetterstatistik", which is often used for daily weather type classification in the alpine region, contains daily assignments to weather types for the last 50 years. With a probabilistic approach daily weather types can be assigned, based on centralized weather types of the "Alpenwetterstatistik".

For the analysis of temperature and precipitation anomalies of the year without a summer (1816) in Switzerland, such weather type classifications based on pressure and wind were already conducted and applied. Daily weather types for a 20 year reference period (1796- 1821, with some exceptions) were assigned and compared to the year 1816. With this method anomalous circulation patterns between the year without a summer and the reference period could be analyzed.