

Extending the temperature time series of the meteorological station in Graz, Austria back into the late 18th century

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The University of Graz hosts one of the long-term meteorological stations in Austria, which contributes to the HISTALP dataset. It has been recently recognised as WMO "Centennial Station", with temperature data taken at the same location going back to the year 1891. Combined with data from nearby downtown stations (in particular at the former location of the University) the record extends back to the year 1836 - in this form the data are currently used within HISTALP.

The Austrian National Library has recently digitized several volumes of the newspaper "Grätzer Zeitung", which contain daily measurements (morning, noon and evening) of temperature and pressure, recorded in the historic center of Graz by Mr. Rospini (and later by his son and grandsons), a man of great interest in natural sciences. Other volumes of the newspaper are available on microfilm or have been found in archives. The Measurement Series of the Rospini Family started as early as 1781, so far we have been able to compile an almost uninterrupted record from 1797 onwards (with just a few weeks missing in total). Temperatures are given in Réaumur and have been recorded at 7, 15 and 22 (confirmed for 1823, very likely for the time before).

For the year 1837 we performed a consistency check, comparing the recently retrieved data with those from the "official" time series, yielding an annual mean offset of just +0.2 °C. Using the temperature recorded at 15:00 as proxy for the maximum temperature, we can get some insight in the characteristics of different summers. The extremely warm Summer of 1834 is particularly striking, with at least 35 days, where the temperature maximum was 30 °C or higher (note that we slightly underestimate the true number of "Hot Days" with this approach). In the record Summer of 2003 our meteorological station recorded 41 "Hot Days" (with actual maximum temperature measurements), the second highest value in the "official" time series was obtained in 2015 with 34 "Hot Days". The extreme nature of the summer of 1834 is also apparent in the estimated number of "Summer Days" (using the same proxy): On 98 days the temperature reached at least 25 °C. The year 1816 tells a totally different story: A temperature of 25 °C or more has just been recorded on 11 days – the name "year without summer" is therefore well deserved, also in Graz.