High resolution climatology
- towards climate change services

Development of a longtime dataset of temperature and solid precipitation

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At the Climate Department of the Austrian Central Institute for Meteorology and Geodynamics datasets of temperature and percentage of solid precipitation (e.g. snow, hail) were developed with a spatial resolution of 5' and a monthly temporal resolution for a period of 1780-2008 and 1800-2003 respectively. The area, for which the data was created, is the Greater Alpine Region (GAR), which extends from 4° to 19°East and 43° to 49°N.

For creating the temperature dataset the climatic mean for each month of 1961-1990 and station data were used. As the station density diminishes with time it was necessary to reconstruct the missing parts of the measured series of the stations using a "gappy-data" EOF-method, so that the interpolation of the data within the GAR could be done. This reconstruction is possible as the temperature anomalies are well correlated spatially. Because of the low amount of stations in the beginning of the dataset it was not possible to reconstruct the data back beyond 1780. The spatial interpolation took the different climatic zones into account which are defined in the area. Moreover the different vertical gradients of the anomalies were considered. The combination of the climatic means and the monthly anomalies resulted in monthly time series of the absolute temperature.

As the percentage of solid precipitation is correlated to the temperature a hyperbolic tangent function was developed for each month which combines the monthly mean temperature with the percentage of solid precipitation. To do this the daily data of about 170 Austrian stations was used for the time period 1950-2008. The creation of this function was necessary as no information about solid precipitation is available for older measurements and is not even obtainable from all the stations in the GAR for current data. This function in combination with the temperature dataset resulted in fields of solid precipitation.

The presentation will give information about the used data, the methods used to create the datasets and the datasets themselves.