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Historical climatology in Norway update

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Model simulations indicate that future global warming will be more significant at high latitudes and that future precipitation distribution, in general, will increase at high latitudes and decrease at low latitudes (IPCC 2007). In order to understand the effects of the past and present climate variability, and to predict future climate change, we need to analyze both past and present climate dynamics. The number of reconstructions of past temperature variations has increased significantly during the last decades. There is, however, a general lack of data on accurately dated variations in precipitation, especially during the winter season.

To improve, reduce, and quantify uncertainties of national and regional climate scenarios will require improved understanding of climate variability on annual and seasonal timescales. Data on past climate variability will help to assess climate sensitivity and potential human-made climate effects and impacts.

HistKlim-project

At the Norwegian Meteorological Institute we are working with this. Especially, we work with this in the project HistKlim. In this project, we encounter various challenges, including when they change instruments for wind, including copper formula in calculating the daily average temperature measurement of precipitation, change of instruments. The important thing here is metadata. We're working to build a database of metadata.

Instrumental meteorological observations

The Norwegian Meteorological institute has done a great digitalization work through its HistKlim activity. In southern Norway, early instrumental temperature series extend back to the beginning of the 19th century (1860), and one series even exists from the late 18th century (Trondheim), but the early series may have several shortcomings, mainly due to insufficient sheltering from direct solar radiation and also to uncertainties regarding observation times and instrument calibration (Moberg et al. 2003). Nevertheless, they may contain very valuable and detailed information on the weather. It is possible to use different sources of proxy data to adjust and calibrate the early instrumental temperature series in order to obtain homogeneity (Nordli 2001a). Thus, an aim in the project is to review the early instrumental series and improve them.

The homogenization methods

Meteorological institute (Met Norway) will deliver homogenized temperature and precipitation series with monthly resolution, as well as some series with daily resolution back to the 1860s.The method implemented at the institute is HomeR, a novel program developed by the EU COST action ES0601 (http://www.homogenisation.org/). This program, together with the traditional method, the Standard Normal Homogeneity Test (SNHT) developed by Alexandersson (1986), will be used in the project.

Climate change

The summers of 2003 and 2010 were exceptionally warm in Europe. These summers broke the 500-yr seasonal temperature records over about 50% of Europe (Barriopedro et al. 2011). In Norway, the five warmest summers after 1900 were 1937, 1947, 1997, 2002 (warmest; 2.3oC warmer than the mean), and 2006 (met.no). Precipitation in Norway shows an upward trend since 1900 (∼20% increase), especially after the mid-1980s, the wettest year being 2011 (∼30% higher than the normal; met.no).