



## Homogenization in Norway

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### Background

Analysis of climate variability and change demands access to long term high-quality instrumental climate records. Such series are however often affected by inhomogeneities (artificial shifts) due to changes in the measurement conditions (relocations, instrumentation, change in environment, etc.). These changes may have the same magnitude or even exceed the multi decadal climate signal. When studying long-term variations, trends or cycles in climate a direct analysis of raw data series can therefore lead to wrong conclusions about climate variability and change.

To deal with this problem homogenization procedures have been developed for detecting and adjusting inhomogeneities. Several methods exist. COST Action ES0601 HOME made a comparison of the methods most commonly used applying benchmark datasets with known synthetic inhomogeneities.

### The homogenization methods

The Norwegian Meteorological institute (Met Norway) will deliver homogenized temperature and precipitation series with monthly resolution back to the 1860s. The method implemented at the institute is the traditional method, the Standard Normal Homogeneity Test (SNHT) developed by Alexandersson (1986). We have used HomeR, a novel program in R developed by the EU COST action ES0601 (2011) (<http://www.homogenisation.org/>) for the homogenization for monthly data. We have also worked with some daily homogenization methods (Splidhom). We have cooperated with the national Meteorological institutes in Sweden, Finland and Estonia, and the University in St. Petersburg in Russia to complete the homogenized data series for the national border areas. It would have been interesting to show the results for this homogenization studies in a presentation.

A particularly important aspect of homogeneity analysis is documentation of the reasons for homogeneity breaks in the time series. Corrections and adjustments of the time series should be supported by metadata describing changes at the station.

### 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).