# Climate and Energy Systems, 2007-2010
# Statistical Analysis

**http://www.os.is/ces**

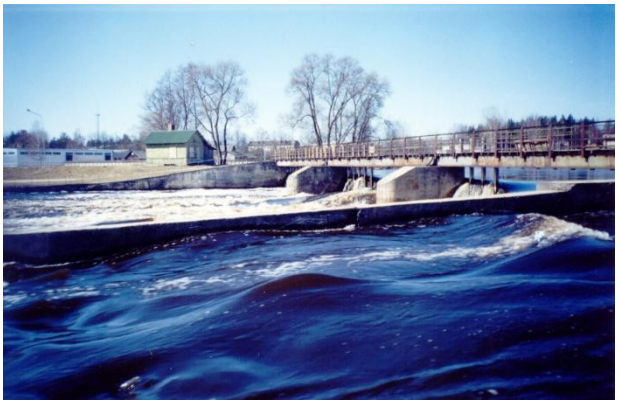
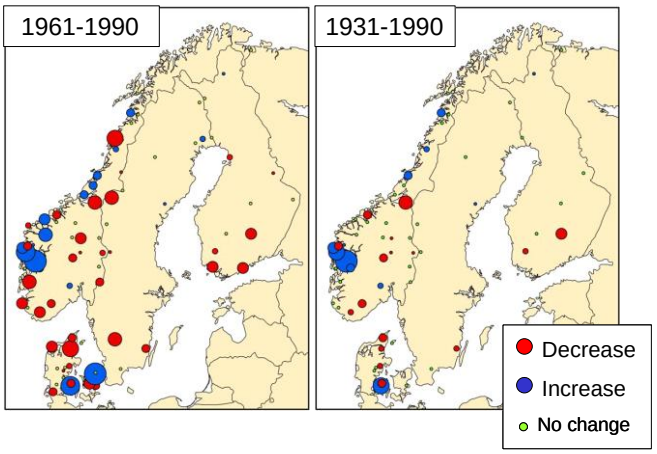


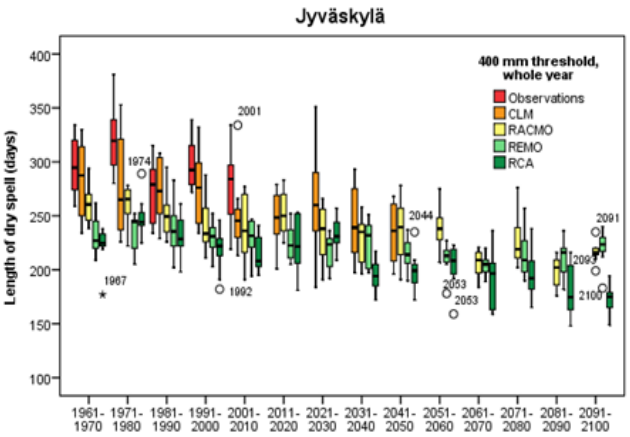
Photo by V. Kudryavskiy, LEGMA

The Climate and Energy Systems (CES) Statistical Analysis working group is evaluating trends and variability in long-term historical hydro-climatological timeseries, such as precipitation and streamflow, to determine if the effects of climate change are already found in these data. Comparisons are also made with expected future trends, based on simulated timeseries from climate scenarios. Patterns of large-scale atmospheric circulation and weather types, both in the past and in the future are also being studied. The emphasis in this project is on changes in the occurrence of extreme events, such as floods and droughts. An increased risk of flooding may have adverse consequences for dam safety, and these implications are also being analysed using flood frequency analysis of historical and scenario data.

## Changes in flooding

The Nordic streamflow database consists of more than 150 long term streamflow records for the region, and the database has been updated to 2005 in this project. Approximately half of these dataseries are suitable for the analysis of daily values, including extremes. Extreme value analyses are conducted using Peak over Threshold methods in which changes in the number of events over a selected threshold, such as the average annual flood for the 1961-1990 reference period, are considered for different time periods.




## Changes in dry spells

A dry spell is a period of time in which the total amount of rainfall during the period is below a threshold level. Peak over threshold methods are being used to analyse the occurrence of dry spells, both from historical data and from climate scenario simulations. There is significant year-to-year variability in the pattern of rainfall, and this variability is assessed based on the range of values from individual years in the analysis.

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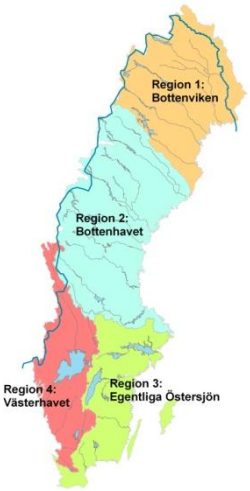
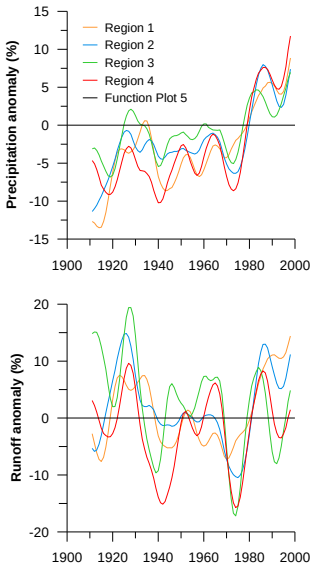
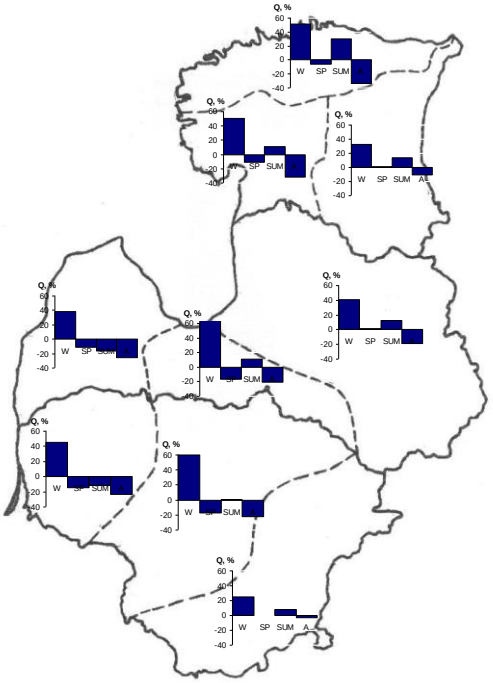
## Regional series analysis

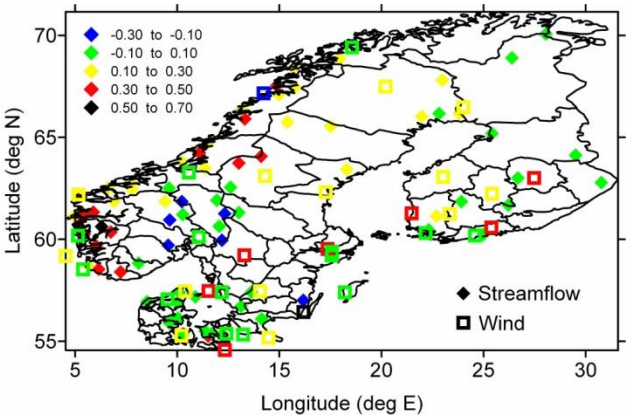
Regional series are compiled based on regions having similar climatological characteristics and streamflow regimes. These series are also useful for evaluating patterns and trends, both in time and by region. Regional series for precipitation, temperature and runoff are being compiled, updated and analysed within the CES project.




Differences in average Q by season (%) between 1991-2007 and 1961-1990 in the Baltic countries




Correlation coefficients for annual wind speed /streamflow with the NAO

## Large-scale atmospheric patterns and hydroclimatological variables

Large-scale atmospheric circulation patterns, are more accurately assessed by Global Climate Models than are local variations. Statistical analyses are, therefore, also being undertaken on trends in streamflow and in wind, relative to, for example, the North Atlantic Oscillation (NAO). Other work is considering the relationship between the occurrence of particular weather types and extreme events, such as floods and droughts.

## Further studies

Other continuing studies in the Statistical Analysis working group include trend studies of flood frequency, analysis of variability and uncertainty in extreme events, statistical methods for dam safety, long-term patterns of precipitation extremes, seasonal and inter-annual variations in wind and streamflow and their dependence on large-scale circulations patterns.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