

## Future Climate Change Index for Greenland Evaluated through Pattern Scaling and CMIP5 - Enhanced and Utilized Climate Information from One RCM Simulation.

Martin Olesen, Jens Hesselbjerg Christensen, Fredrik Boberg, and Martin Stendel

Danish Meteorological Institute, Copenhagen, Denmark (mol@dmi.dk)

Climate change affects the Greenlandic society both advantageously and disadvantageously. Changes in temperature and precipitation patterns may result in changes in a number of derived society related climate indices, such as the length of growing season or the number of annual dry days or a combination of the two - indices of substantial importance to society in a climate adaptation context.

Detailed climate indices require high resolution downscaling. We have carried out a very high resolution (5 km) simulation with the regional climate model HIRHAM5, forced by the global model EC-Earth.

Evaluation of RCM output is usually done with an ensemble downscaled output with multiple RCM's and GCM's. Here we have introduced and tested a new technique; a translation of the robustness of an ensemble of GCM models from CMIP5 into the specific index from the HIRHAM5 downscaling through a correlation between absolute temperatures and its corresponding index values from the HIRHAM5 output.

The procedure is basically conducted in three steps: First, the correlation between temperature and a given index for the HIRHAM5 simulation by a best fit to a second order polynomial is identified. Then, the standard deviation from the CMIP5 simulations is introduced to show the corresponding standard deviation of the index from the HIRHAM5 run. And finally, a bias correction based on observations as well as the CMIP5 ensemble is calculated.

Results based on selected societal relevant indices with focus on for the future climate in Greenland calculated for the rcp4.5 and rcp8.5 scenarios will be presented.