

A comparison of modelled precipitation in Greenland – a summary

One of the most discussed effects of climate change is the global sea level rise. Antarctica and Greenland glaciers and icebergs are the biggest sources of uncertainty for future sea level rises. The ice in Greenland alone corresponds to approximately 7.2 m of sea level rise globally, if everything were to melt. A model that calculates the surface mass balance uses data from high-resolution models at the Danish Meteorological Institute (DMI) in Copenhagen together with measurement data from automatic weather stations on the Greenland ice sheet. In this model precipitation contributes to adding mass on the surface while increasing average temperatures in the Arctic induces melting of the ice, which reduces mass of the ice sheet. In this study, modelled precipitation is compared between the numerical weather forecast model HIRLAM 7.3, and the high-resolution regional climate model HIRHAM5, both of which are used in the calculations of the Greenland ice sheet mass balance. This study aimed to identify biases in the models, as when identified serve as basis for further development of calculation models of this kind.

The results show that HIRLAM 7.3 on average is a wetter model, that simulate both more precipitation amount and precipitation over larger areas, compared to the HIRHAM5 climate model. Noticeable reasons for the simulated difference in precipitation between the two models are assessed to be in differences between their parameterization of radiation schemes and the topography used in the models. Future studies should compare simulated precipitation from both models with measurement data from the Greenland ice sheet.

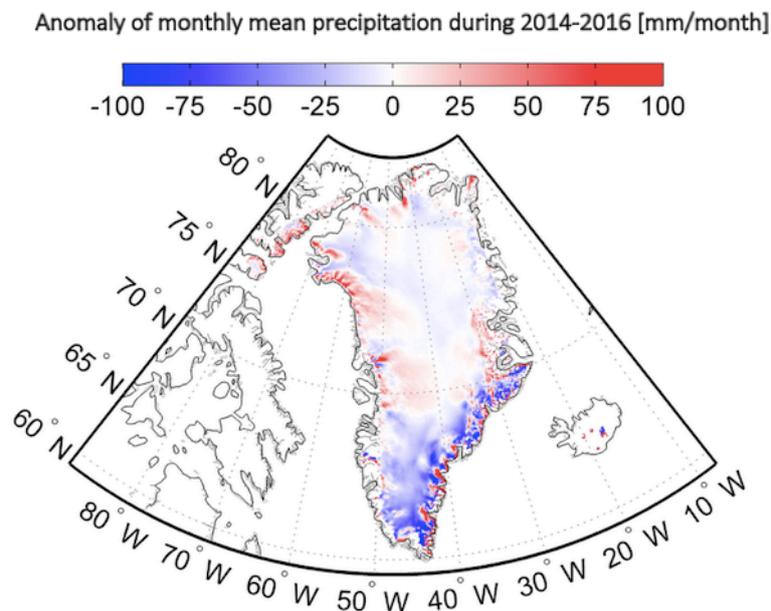


Figure: Anomaly between HIRHAM5 and HIRLAM 7.3, for model output of monthly mean precipitation during the period 2014-2016 in [mm/month] of the Greenland ice sheet. Red indicated larger amount of total precipitation simulated in HIRHAM5 compared with HIRLAM 7.3. Blue illustrate more total precipitation simulated by HIRLAM 7.3 compared with HIRHAM5 in that area.