Modeling the post-LGM deglaciation of the Scandinavian-Barents Sea Ice Sheet; a model intercomparison approach

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We aim at simulating the last deglaciation of the Scandinavian-Barents Sea (SBS) ice sheet. In particular, we focus on the Storfjorden and Bear Island ice streams, for which marine geological evidence suggests that they played an important role in the retreat of the ice sheet from the continental shelf edge during the last deglaciation, e.g., Rebesco et al. 2014, Lucchi et al. 2013, Ingólfsson and Landvik 2013. Two hybrid SIA/SSA numerical ice sheet models are employed, GRISLI, Ritz et al. 2001, and TARAH, Pollard and DeConto 2012. These models differ mainly in the complexity with which grounding line migration is treated.

The ice models are forced, from a spun-up initial condition, with spatially and temporally variable precipitation, surface air temperature, ocean temperature and ocean salinity fields. Climate forcing is interpolated by means of climate indexes between the Last Glacial Maximum (LGM) and the pre-Industrial (PI) climate. Regional climate indexes are constructed based on the non-accelerated deglaciation transient experiment carried out with CCSM3, Liu et al. 2009. Several indexes representative of the climate evolution over Siberia, Svalbard and Scandinavia are employed. The impact of such refined representation as opposed to the common use of the NGRIP $\delta18O$ index for transient experiments is analysed.

In this study, the ice-ocean interaction is crucial to reconstruct the deglaciation scenario in the area of the Storfjorden and Bear Island ice streams. To investigate the sensitivity of the ice shelf/stream retreat to ocean temperature, we allow for a temporal and a (vertical) spatial variation of basal melting under the ice shelves, using an implementation based on Martin et al. 2011 and simulated ocean temperature and salinity from the TraCE-21ka coupled climate simulation.

In this presentation, we will show work in progress, address open issues, and sketch future work. In particular, we invite the community to suggest possibilities for model-data comparison and integration.