



## **The sea level response to ice sheet freshwater forcing in the Community Earth System Model**

Aimée Slangen and Jan Lenaerts

Utrecht University, Institute for Marine and Atmospheric research, Netherlands (aimee.slangen@gmail.com)

We show the effect of a realistic ice sheet freshwater forcing on sea-level change in the fully coupled Community Earth System Model (CESM). This not only includes the effect on the ocean density and dynamics, but also the gravitational response to mass redistribution between ice sheets and the ocean. We compare a ‘standard’ model simulation (NO-FW) to a simulation with a more realistic ice sheet freshwater forcing (FW) for two different climate scenario’s (RCP2.6 and RCP8.5) for 1850–2100. We find that the effect on the global mean thermosteric sea-level change is small compared to the total thermosteric change, but on a regional scale the ocean steric/dynamic change shows larger differences in the Southern Ocean, the North Atlantic and the Arctic Ocean (locally over 0.1 m). The gravitational fingerprints of the net sea-level contributions of the ice sheets are computed separately, showing a regional pattern with a magnitude that is similar to the difference between the NO-FW and FW simulations of the ocean steric/dynamic pattern. Our results demonstrate the importance of ice sheet mass loss for regional sea-level projections in light of the projected increasing contribution of ice sheets to future sea-level rise.