



Modeling sea level change in response of ice sheet melting

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Variations in regional and global sea level are caused by different mechanisms. A major contributor is the change of temperature of the ocean. Furthermore, there are also changes in sea level caused by ocean mass variations, mostly due to the mass loss of mountain glaciers, and major ice sheets in Greenland and the West Antarctic. We study relative sea level change including the changes originating from the mass loss of the major ice sheets and of the glaciers in Alaska. The oceanic change is modeled with the finite element sea-ice ocean model. The gravitational sea level response to the surface loading are computed using Green's functions. Furthermore, the regional changes caused by the viscous Earth response to past glacial loading are taken into account. In our study, we apply realistic melting rates and compare our results to time series from tide gauges in the North Atlantic. The modeled relative sea level change, without applying the melt scenarios, compares reasonably well with tide gauge records in different coastal regions in the North Atlantic. Including the mass loss of the major ice sheets and of the glaciers in Alaska into the ocean model further improves modeled relative sea level change. Its correlation with tide gauges increases from around 0.7 to above 0.8.