



DOWNSCALING THE EFFECT OF ANTHROPOGENIC CLIMATE CHANGE WITH A REGIONALLY COUPLED ATMOSPHERE-OCEAN-MODEL

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ABSTRACT: One of the anticipated aspects of anthropogenic climate change is the rise of sea level. It is caused by several factors, the most relevant are: warming of the ocean leads to thermal expansion of sea water, melting of the ice stored on land leads to an increase of the mass of the ocean, changes in ocean circulation due to climate change and vertical movement of the land can locally lead locally to changes in sea level. A very strong contribution here is the adjustment of the crust in response to the shrinking ice sheets at the end of the last glacial. Changes in groundwater storage (e.g. for irrigation) contribute also substantially to sea level changes.

For almost each of the components of sea level rise a separate model is required. Ocean thermal expansion and changes in ocean circulation are generally derived from climate models. The global climate models used for e.g. the type of simulations used by IPCC (Intergovernmental Panel on Climate Change) are too coarse to yield reliable regional information on sea level changes on shelves. They do not include tides either, which are important for many shelf seas like e.g. the North Sea. A novel regionally coupled atmosphere-ocean model has been used to downscale anthropogenic climate change for the ocean. The resulting changes in regional sea level will be presented.