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The influence of the North-Sea on coastal precipitation

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The North-Sea has a large influence on the distribution of precipitation over the Netherlands. This influence is strongest in Autumn, where an increased amount of precipitation occurs over the coastal areas (<50 km from the sea), and in Spring where it leads to a relatively drier coast.
However, it is not clear how rising temperatures of the North-Sea due to climate change will influence the precipitation distribution within the Netherlands in the future climate.One reason being that the present-day climatological distribution of precipitation is (likely) to a large extend caused by temperature differences between land and ocean, and these may not change much as climate changes.
Also, dependencies of precipitation on sea surface temperatures mainly occur under certain circulation conditions, where cold and unstable area is transported with (north) westerly circulation over the land, and it is not clear how these circulation statistics will change. During the last 50 years the coastal area has become considerably wetter in summer compared to the inland area, and this observation is not well understood.

Using a regional climate model (RACMO) we studied the influence of the North-Sea on coastal precipitation. We performed several 30-year climate integrations for the present and future climate using a newly implemented single-layer ocean slab model. We show the ability of this slab model to create realistic coastal SSTs, even when driven by low-resolution boundaries (ie. from GCMs). The statistical link between coastal SSTs, the circulation, and coastal precipitation is then analysed. We find a weak to moderate sensitivity of coastal precipitation anomalies to increased coastal SSTs.