



Impact on the Atlantic Ocean of Extreme Greenland Sea Heat Loss in a Range of Coupled Ocean-Atmosphere Models

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The ocean response to extreme winter heat loss in the Greenland Sea is investigated using the control runs of two coupled ocean-atmosphere models from the Hadley Centre, HadCM3 and HadGEM1. The comparison between these two models is instructive because HadGEM1 was developed to improve on the scientific performance of HadCM3. We contrast the meteorology and surface characteristics of extreme heat loss years in the two models. In addition we examine the impact of extreme heat loss on Greenland Sea T-S properties as well as the transport of over flow waters through the Denmark Strait and across the Iceland-Scotland Ridge. Implications for the Atlantic Meridional Overturning Circulation are also considered. A third model, the Fast Ocean Rapid Troposphere Experiment (FORTE) coupled climate model, was used to prescribe different heat flux anomalies over the Greenland Sea. This enabled an examination of the ocean response to a greater range of winter heat flux anomalies than those found within the control runs of the Hadley Centre Models.