Geophysical Research Abstracts
Vol. 13, EGU2011-10388, 2011
EGU General Assembly 2011

Modelling the Freshwater Budget of the Arctic Ocean using the LOVECLIM global climate model

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The Arctic Ocean is a major source of freshwater for the North Atlantic, although the total flux of freshwater is not constant due to seasonal variations in sea-ice cover, river runoff, net-precipitation and ablation of the Greenland ice sheet. The net result of these sources of freshwater is a large volume of freshwater travelling from the Arctic region into the sub-arctic seas. Recent observations and projections from numerous climate models highlight that the Arctic region is warming at a greater rate than other regions of the world. This would suggest that freshwater fluxes within the Arctic Ocean are likely to be altered and this highlights the need for a greater understanding of the various processes and mechanisms that operate within the Arctic region.

We present here simulations that investigate the ability of the LOVECLIM global climate model to calculate freshwater fluxes within the Arctic Ocean over the later part of the 20th century. The model is forced with forcings appropriate for that time period. Freshwater fluxes are calculated and compared with *in situ* measurements, obtained form the literature, to assess the relative values and the proportional distribution of freshwater that the model simulates. It is known that large freshwater pulses in the North Atlantic have had a dramatic effect upon the climate, therefore it is imperative that climate models and earth system models are able to simulate freshwater flow as accurately as possible.

Freshwater flux values have not previously been calculated using models, bar a few notable exceptions, this study will lay down a starting point for such future modelling studies.