

## Global Response to Fresh Water Release under Different Climate States in a GCM

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Massive discharge or melt water of Ice sheet to ocean is one of the cause thought to be responsible for the climate change such as Younger Dryas or Heinrich events. There is not yet a consensus, however, in the thermal response to fresh water release in North Atlantic in global models and/or the paleoclimatic data in the region far from North Atlantic. Here we ran several sensitivity experiments using a coupled atmosphere and ocean GCM (MIROC3.2) with 500 years water hosing of 0.1 Sv in the North Atlantic which is the same amount and position as CMIP/PMIP protocol under different basic states; 'Modern Hosing' in modern climate with the pre-industrial condition and 'Glacial hosing' under LGM condition (ice sheet, orbital parameter, greenhouse gases conditions in 21ka as PMIP2). The results show a much larger cooling response in North Atlantic through a stronger sea ice-ocean-atmosphere feedback in the Glacial hosing than in Modern hosing. What is surprising is the almost opposite sign of response in the Southern Ocean especially in the last phase after 400 years water release, resulting in warming for Glacial-hosing case and cooling for Modern hosing case. The sensitivity tests show clearly that the bipolar response to fresh water release depends highly on the basic climate state and stages.