



Using climate model simulations and data to understand the sensitivity to magnitude and location of freshwater forcings during the last deglaciation

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Proxy records indicate that the locations and magnitudes of freshwater forcings to the Atlantic Ocean basin as iceberg discharges into the high-latitude North Atlantic, Laurentide meltwater input to the Gulf of Mexico, or meltwater diversion to the North Atlantic via the St. Lawrence River and other eastern outlets may have influenced the responses of the North Atlantic thermohaline circulation and global climate. Meltwater pulse 1a was associated with significant sea level rise but only a slowdown of Atlantic meridional overturning circulation (MOC), while Heinrich event 1 has less evidence of rapid sea level rise but was marked by near collapse of the MOC. Simulations have been performed with the NCAR Community Climate System Model (CCSM3) in which the magnitude of the freshwater forcing has been varied from 0.1 to 1 Sv and inserted either into the northern North Atlantic Ocean or the Gulf of Mexico. These results show interesting differences in terms of the regional and seasonal impacts and the temporal behavior during and after the freshwater event. Implications for detection in proxy records during the last deglaciation will be discussed.