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The ocean response to freshwater forcing from Greenland as simulated by the climate model EC-Earth3

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Climate models usually can not afford to include an interactive ice sheet component for Greenland, which leads to a wrong representation of the variability of the freshwater fluxes released from the Greenland ice melt into the North Atlantic. We propose here to force externally a climate model (EC-Earth3) over several decades (1920-2014) with an observational dataset of runoff and solid ice discharge values for Greenland and surrounding glaciers and ice caps. It has been shown in a similar study with the IPSL-CM6-LR model that an enhancement of freshwater can modify the circulation and the convection in this region. The simulated mixed layer depths in the Nordic seas and the strength of the Atlantic Meridional Overturning Circulation will be investigated to assess the impact of these increasing freshwater fluxes on the oceanic circulation over the period. The response in salinity and stratification in the Arctic will also be analysed as well as the ability for the system to capture abrupt changes like the 1995 warming in the subpolar gyre.