



## **Effects of lowered vertical mixing under sea ice on the oceanic circulation in a global ice-ocean model**

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We here investigate the effect of lowered vertical mixing coefficient under sea ice on oceanic circulation using a global Ocean General Circulation Model (OGCM). The OGCM used in this study is the Modular Ocean Model version 4.1 (MOM4p1) with  $1^\circ$  horizontal resolution and 50 vertical levels. We use the GM horizontal mixing and a modified K-Profile scheme for vertical mixing. ECMWF (European Center of Medium range Weather Forecasting) reanalysis data with  $0.75^\circ$  resolution during 1980-2012 are used to calculate heat, salt and momentum fluxes with a bulk formula at the sea surface. The model includes a sea surface salinity restoring with 60 days timescale to make up water flux data at the sea surface.

A series of numerical experiments with different vertical diffusivity coefficients between under sea ice and in open ocean shows significant changes not only in the Arctic halocline distribution and the Atlantic Water layer circulation but also in mixed-layer depths at the deep water formation region (North Atlantic and Weddell Sea) and the strength of the Atlantic meridional overturning circulation (AMOC).