



Effect of horizontal grid resolution on simulations of the subtropical mode water in the North Pacific

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We investigate how the Subtropical Mode Water (STMW) can be simulated differently in the North Pacific using a global Ocean General Circulation Model (OGCM) with non-eddy and eddy permitting resolution. The OGCM used in this study is the MOM version 4.1 and has a total of 50 levels along the vertical direction with enhanced resolution near the surface. The CORE version 2 (normal year forcing) data derived from the air-sea flux climatology averaged over 60 years (1948–2007) are used to calculate heat, salt and momentum fluxes with a bulk formula at the sea surface. The sea surface salinity is restored to the climatological monthly mean surface salinity of the Polar Science Center Hydrographic Climatology on a 60-day timescale, to make up the fresh water flux at the sea surface. Two models that have horizontal resolutions of 1° and $1/4^\circ$, respectively, are integrated during 50 years. The inter-annual variation of the STMW volume was well reproduced with the eddy-permitting grid resolution although the model was forced by a climatological atmospheric forcing. The annual formation and erosion volume of STMW varies by 7% and 9% of the mean volume, respectively.