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## Water isotope variations in the global ocean model MPI-OM

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**Abstract.** The stable water isotopes  $\text{H}_2^{18}\text{O}$  and HDO are incorporated as passive tracers into the oceanic general circulation model MPI-OM, and a control simulation under present-day climate conditions is analyzed in detail. Both  $\delta^{18}\text{O}$  and  $\delta\text{D}$  distributions at the ocean surface and deep ocean are generally consistent with available observations on the large scale. The modelled  $\delta\text{D}-\delta^{18}\text{O}$  relations in surface waters slightly deviates from the slope of the global meteoric water line in most basins, and a much steeper slope is detected in Arctic Oceans. The simulated deuterium excess of ocean surface waters shows small variations between  $80^\circ\text{S}$  and  $55^\circ\text{N}$ , and a strong decrease north of  $55^\circ\text{N}$ . The model is also able to capture the quasi-linear relationship between  $\delta^{18}\text{O}$  and salinity  $S$ , as well as  $\delta\text{D}$  and  $S$ , as seen in observational data. Both in the model results and observations, the surface  $\delta-S$  relations show a steeper slope in extra-tropical regions than in tropical regions, which indicates relatively more addition of isotopically depleted water at high latitudes.

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