

Reproduction of Iron-rich Intermediate Water in the Subarctic North Pacific by High-resolution Biogeochemical Model

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Recent observation studies suggest that iron supply from sediment on the northwest continental shelf of the Okhotsk Sea plays an important role in the subarctic primary production (e.g. Nishioka et al., 2013). Dense shelf water (DSW) takes up iron from sediment, thereby transporting iron into the Okhotsk Sea intermediate water. However, observational data is still limited. In this study, we aim to reproduce the iron-rich intermediate water and the iron circulation, using a high-resolution iron circulation model. Our first version model did not reproduce iron-rich intermediate water. Biogeochemical model developed by Parekh et al. (2005) set total ligand concentration to be constant in all places. Recent observations, however, suggest that ligand concentration varies with sea area and water depth. Therefore, we conducted a new experiment with the ligand concentration changed in the vertical direction. The iron concentration of the intermediate water became higher in the new experiment than in the first experiment. Our model also reproduced high biological production, which utilizes the iron-rich intermediate water. In addition, we investigated effect of the tide and the 18.6-year cycle.

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