Role of river inflows from Kamchatka Peninsula in the Okhotsk Sea

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The Okhotsk Sea is a unique ocean in that sea ice forms at the lowest latitude in the world. The sea ice formation plays important roles in water mass formations not only in the Okhotsk Sea but also in the North Pacific Ocean. The river inflows from the surrounding coasts affect the sea ice formation by changing stratification. Especially, the contribution from the river inflow from the Amur River on the western side of the Okhotsk Sea has been widely discussed. The roles of the Amur River in chemical and biological cycles have been also investigated. On the hand, the role of the river inflows from the Kamchatka Peninsula on the eastern side of the Okhotsk Sea is not well known.
In this study, we simulated the northern part of the Okhotsk Sea to investigate the roles of river inflows from the Kamchatka Peninsula. FVCOM (Finite-Volume, Primitive equation Community Ocean Model; Chen et al. 2003) was used. JRA55-do (Tsujino et al., 2018) was used for the atmospheric forcing. The river inflow dataset also came from JRA55-do based on Suzuki et al. (2017). The unstructured horizontal grid spacing was decreased from about 9.0 km at the southern boundary to about 1.4 km along the northern boundary.
The model runs with and without the river inflows from the Kamchatka Peninsula were compared. The salinity significantly increased without the river inflow along the coast of Kamchatka (by more than 1 unit at maximum). The salinity increase also spread toward the western Okhotsk Sea. With these changes in salinity, ice formation in the Okhotsk Sea was also affected.

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