Freshening of coastal regions of east Antarctic based on a hybrid parameterization technique

BF Li[1], XL Pan[1], W Gan[2] and YW Watanabe[1]

[1] *Graduate School of Environmental Science, Hokkaido University, Sapporo, Japan*
[2] *Faculty of Environmental Earth Science, Hokkaido University, Sapporo, Japan*

The Southern Ocean coastal regions is suffering continuous freshwater input from the Antarctic glacier due to the ongoing global warming, resulting in a prominent seawater freshening (*Rignot et al*., 2019). This will have widespread impacts on the global ocean. Recent studies about the freshening in the Southern Ocean coastal regions based on satellite monitoring and ship-based observations are spatiotemporally limited by the severe weather conditions of the Southern Ocean. This may bring large uncertainties to our understanding for the response of the Antarctic to the climate change. To estimate more accurate freshwater input, Pan, Li et al. (2022) proposed a new method based on the multiple linear regression (MLR) parameterization technique using only basic hydrographic parameters and found that the rate of glacier-derived freshwater input reached a maximum of 268 ± 134 Gt year^{-1} during the early twenty-first century. In this study, we used a developed neural network (NN) based the MLR parameterization (*Pan et al*. submitted) and apply it to the observations of the coastal regions of the east Antarctic. On the day of the presentation, we will discuss quantitatively the freshening conditions of the coastal area of the east Antarctic.

References
Rignot, E. *et al*. Four decades of Antarctic Ice Sheet mass balance from 1979–2017. *Proc. Natl. Acad. Sci.,* **116**, (2019).
Pan, X. L. Li, B. F. and Watanabe, Y. W. Intense ocean freshening from melting glacier around the Antarctica during early twenty‑first century. *Sci. Rep*., **22**, 383, 2022.
Pan, X. L. *et al*. Spatiotemporal high-resolution mapping of biological production in the Southern Ocean, submitted.
Pan, X. L. Li, B. F. *et al*. Global distribution of decoupling between silicate and nitrate in the ocean, submitted.