

Annual Variability of Biogeochemical Changes in the East China Sea Shelf waters During Summer

HYEBIN KIM¹, TAE-HOON KIM¹ AND YONG HWA OH²

¹Chonnam National University

²Korea Maritime and Ocean University

We investigated the biogeochemical variability in the cycling of dissolved organic matter (DOM) and dissolved nutrients in the East China Sea continental shelf during the summers of 2015, 2016, 2017, and 2019. The distribution of nutrients varied depending on the influence of water masses, including Changjiang Diluted Water (CDW) and Kuroshio intrusion, as well as precipitation and biogeochemical remineralization processes.

In 2015 and 2019, the influence of CDW was relatively weak, resulting in no distinct variations in dissolved nutrients and DOM concentrations. However, in 2016, both Dissolved organic carbon (DOC) and dissolved inorganic nitrogen (DIN) concentrations were relatively high, which was attributed to a strong CDW influence and a higher freshwater contribution. Notably, in 2017, dissolved inorganic phosphorus (DIP) concentrations significantly increased, with precipitation-driven external inputs affecting the surface layer, while remineralization of organic matter was the dominant process contributing to DIP accumulation in the bottom layer.

Analysis of the annual variations in stoichiometry revealed that in CDW-influenced shelf waters, both DOC and DIN tended to increase, whereas in the outer shelf region, higher DOC/DIN ratios indicated intensified nitrogen limitation. In particular, during 2016 and 2017, a significant decrease in surface DIN concentrations further reinforced nitrogen limitation, potentially altering the utilization of DOC and the biological production processes.

This study highlights the role of water mass mixing, precipitation, and remineralization in regulating nitrogen, phosphorus, and carbon cycling in the East China Sea shelf and provides valuable insights into how biogeochemical processes influence nutrient utilization and organic carbon dynamics.