

The flux of nutrients in continental shelf waters to the Northwest Pacific Ocean

HYUNG-MI CHO¹ AND GUEBUEM KIM^{1*}

¹School of Earth and Environmental Sciences, Seoul National University, 1 Gwanak-ro, Gwanak-gu, Seoul 08826, Republic of Korea (*correspondence: hm0410@snu.ac.kr, gkim@snu.ac.kr)

We estimated the fluxes of nutrients in shelf waters including regions of the Yellow Sea and the East China Sea, which are known as one of the largest continental shelves in the world, to the Northwest Pacific Ocean. In order to determine the fluxes of dissolved inorganic nitrogen (DIN) and phosphorus (DIP), dissolved total nitrogen (DTN) and phosphorus (DTP), their ratios against ²²⁸Ra activities were measured in shelf waters in February 2017 and April 2018. In February 2017, DIN and DIP showed good correlations against ²²⁸Ra as the shelf water was vertically well mixed. In April 2018, DIN and DIP showed good correlations with ²²⁸Ra except for surface waters where nutrients are almost fully utilized under stratified conditions. The cross-continental-shelf (CCS) fluxes of DIN and DIP were estimated by multiplying nutrients/²²⁸Ra ratios by the CCS fluxes of ²²⁸Ra obtained from inverse modeling. The fluxes of DIN and DTN from the continental shelf were 15–45% and 25–65% of those from the atmosphere, respectively. Moreover, the P flux from the continental shelf was 100–200% of magnitude greater than the atmospheric P deposition. Our results suggest that the CCS fluxes of nutrients may play a critical role on nutrient availability in the Northwest Pacific Ocean.