Diffusive benthic nutrient flux in the central of East China Sea

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To evaluate the importance of nutrient supply from sediment, phosphate, silicate, nitrate and nitrite in the porewater, overlying water, and entire water column were measured in the central of East China Sea. A measurement of multi-size particulate characterizing contour (LIIST) was carried out together with CTD casts also to quantify the influence of suspended particle. All nutrient concentrations in the porewater were greater than overlying water at stations B1 (32.9N, 126.0E) and C1 (32.7N, 124.8E), suggesting sediment was one of nutrient sources to the water column. Nutrient diffusion fluxes were calculated from the corresponding concentration gradients at these two stations, accounting for 20-60% of primary productivity. In contrast, at station C4 (31.2N, 126.0E), sediment was a nutrient sink. Bottom water at station C4 had low dissolved oxygen (DO, 1.8 ml/l), high weighted nutrients, and finest suspended particle relative to stations B1 and C1. Thereby, opposite nutrient diffusion at station C4 is most likely caused by organic matter remineralization at bottom water. However, phosphate concentrations at the bottom seawater were greater than the overlying water at all three stations. It might be affected by lateral transport near bottom or phosphate was absorbed by high concentration of particles at the seafloor. This study infers that nutrient flux from sediment to the overlying water, and further diffusion to the water column depends on the sediment property (e.g. grain size), in situ biogeochemical process and may associated with water transport.

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