

Nitrogen transformation process in newly created salt marsh in the aftermath of the 2011 Great East Japan Earthquake

*Keitaro Fukushima¹, Kazuma Hashimoto², Megumi Kuroiwa³, Katsuhide Yokoyama², Yuichi Suwa³

1. Center for Ecological Research, Kyoto University, 2. Graduate School of Urban Environmental Sciences, Tokyo Metropolitan University, 3. Faculty of Science and Engineering, Chuo University

Dissimilatory nitrate reduction to ammonium (DNRA) is one of the most important processes of nitrate removal in an anaerobic condition. The 2011 Great East Japan Earthquake and subsequent tsunami attack widely created the intertidal salt marsh along the coast due to sea water intrusion and large ground subsidence. It is necessary to elucidate the ecosystem functions of the newly created salt marsh. Salt marsh is located in the conjunction point of river and sea, therefore the conversion of dissolved inorganic nitrogen concentrations and forms in the salt marsh may directly impact the productivity and biodiversity of marine ecosystems. However it is still unknown that the role of this specific salt marsh in nutrient dynamics. In September 2017, the surface sediments were collected at the intertidal and subtidal points of the salt marsh, and their potential rates of denitrification, DNRA, and anaerobic ammonium oxidation (Anammox) were estimated by using a ^{15}N tracer technique. As for the nitrate-nitrogen removal in the sediments, the rate of DNRA was ranged from 24.8 to 177 $\text{nmol g}^{-1} \text{ h}^{-1}$, while the denitrification rate was ranged from 2.9 to 32.8 $\text{nmol g}^{-1} \text{ h}^{-1}$. Our results demonstrate that the DNRA would be significantly important in nitrate removal, and it also suggests that the conversion of inorganic nitrogen from nitrate to ammonium in the salt marsh might affect the species composition of phytoplankton and the primary production in the marsh and the coastal area connected with the marsh.

Keywords: salt marsh, dissimilatory nitrate reduction to ammonium, denitrification