

Biogeochemical effects of submarine groundwater discharge in coastal waters

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Global submarine groundwater (including saline water) discharge (SGD) is found to be 3-4 folds of the river water discharge in magnitude [1]. Due to high ionic strength, saline groundwater is highly enriched in chemical species, including nutrients, trace elements, and radionuclides. Therefore, SGD-driven fluxes of chemical species have been found to be very important in many local and regional studies. Our study shows that SGD driven fluxes of inorganic nutrients [2], organic nutrients [3], trace elements [4], and rare earth elements [5] are significant in coastal waters off a volcanic island, Jeju, Korea. SGD plays a critical role in inventories of these components in coastal waters and associated biological production. Enhanced nutrient fluxes through SGD also have caused pH increase in the coastal euphotic zone of this island. Therefore, we suggest that SGD is particularly important for coastal water biogeochemistry off oceanic islands standing in oligotrophic oceans.

[1] Kwon et al. (2014) *Geophys. Res. Lett.* Doi: 10.1002/2014GL061574. [2] Kim et al. (2011) *Limnol. & Oceanogr.* **56**(2): 673-682. [3] Kim et al. (2013) *J. Sea Res.* **78**: 18-24. [4] Jeong et al. (2012) *Appl. Geochem.* **27**: 37-43. [5] Kim and Kim (2014) *Mar. Chem.* **160**: 11-17.