

Nutrient regeneration at seawater-groundwater interface zone in Gulf of Etajima and Gulf of Jakarta.

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Tidal pumping is one of the most important factors for nutrient load in local tidal zone. Although most of Submarine Groundwater Discharge (SGD) is recirculated seawater (RSGD), nutrient supply via RSGD is much higher by nutrient regeneration such as remineralization than river discharge or Fresh SGD (Santos et al.2009). Before now, SGD is remarked as important source of nutrients for marine environment. However there are few researches of comparing with different hydrological condition in standing the sight of nutrient production via seawater recirculation due to tidal pumping. So in this research, we focused on the range of tidal fluctuation, and estimate the nutrient supply via SGD by comparing with Gulf of Etajima that has a large tidal fluctuation and Gulf of Jakarta that has a small one.

This study is operated during 9 July 2011 to 10 July 2011 at tidal coast in the north side of Etajima, Hiroshima pref. and during 23 Aug 2011 at tidal coast in Gulf of Jakarta, Indonesia. This area is a granite island located Seto inland sea which is a semi-enclosed sea. Annual precipitation is about 1100mm. Although river discharge is about 10% of rainfall, groundwater discharge is about 20-40% of rainfall (Onodera, 2008). And this area has a large tidal fluctuation. Observed maximum tidal fluctuation is about over 2m. On the other hand, Gulf of Jakarta has small tide fluctuation. In this area, annual precipitation is about 1800mm but, most of rainfall is just only rainy season. This observation is operated at dry season. Therefore in our expectation, almost no FSGD exist.

²²²Rn was measured at 80m offshore from land in Etajima. On the other hand, it was measured at 40m offshore from high tide mark in Jakarta. The flow rate of seawater was measured by laser Doppler anemometer (WH-ADCP: Teledyne RD instruments). Water samples were filtered with syringe filter. After sampling, water samples were preserved in cooler box. After observation, samples were taken back to laboratory, and frozen immediately. And we analyzed the nutrients by flow injection type spectral photometer (SwAAAt, made by BLTEC), dissolved anion by ion chromatography. In this study, we estimated the nutrients flux via mixed SGD with FSGD and RSGD, and their flow rate by calculated mass balance of ²²²Rn, Cl⁻, SiO₂-Si. Nutrient supply and productions via each SGD were estimated from the endmember of salinity for seawater and groundwater.

Keywords: tidal zone, tidal fluctuation, nutrient production, submarine groundwater discharge