

**Dissolved Inorganic Nutrient Input to Awur Bay via  
Submarine Groundwater Discharge**

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Submarine groundwater discharge (SGD) is increasingly recognized as an important pathway for nutrient transport from land to ocean. It can be expected to be of particular interest in Indonesia, which has one of the longest coastlines in the world. Abundant fertilization and sewage nutrient inputs into groundwater occur in Indonesia, thus anthropogenic dissolved nutrient input to the coastal water via SGD could be substantial. This study examines groundwater and nutrient flux into Awur Bay, Jepara, Indonesia, using <sup>222</sup>Rn as a tracer for groundwater.

Most groundwater discharge occurs during low tide. Groundwater discharge into the Awur River estuary contributes to 8% of its total water discharge. <sup>222</sup>Rn and DIN concentrations are closely correlated to each other at a beach site, which indicates a substantial amount of groundwater DIN discharge into the ocean. Spatial variation of DIN species shows that its groundwater concentration is comparable with the river and three fold higher than in coastal water. With an average of 145  $\mu$ M DIN in the freshwater endmember, DIN via SGD contributes to high eutrophication level status in coastal water of Awur Bay (TRIX index = 7.7). On the other hand, dissimilar pattern between <sup>222</sup>Rn and DIP concentration both in estuary and beach measurement, albeit low DIP concentration in river water, indicate other source of DIP in the coastal water.

Our study suggests that DIN from groundwater discharge via river channel and the beach contribute to poor quality of coastal water in Jepara.