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Evaluation of submarine groundwater discharge by multi-tracer method in the coastal area of Seto Inland Sea

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Submarine groundwater discharge (SGD) is one of the important pathways of nutrients from land to the sea. However, the effect of SGD on the coastal environment of Seto Inland Sea is still not clear. The objective of this study is to evaluate groundwater discharge quantitatively from Saijyo-city to the Hiuchi-Nada. Saijyo-city is located on the northern part of Ehime prefecture which is characterized by abundant groundwater resource. The Hiuchi-Nada is one of the sections of the Seto Inland Sea. We collected seawater samples and measured the profiles of salinity, water temperature and chlorophyll in the southwestern part of the Hiuchi-Nada at August 2009. We also confirmed the spatial distribution of radon (222Rn) concentration, oxygen stable isotope (d18O) and other chemical components in the seawater as the indicator of groundwater discharge. 222Rn concentration in the surface water was uniformly high around the coastal line, while it was higher in more offshore area near the seabed. The result suggests that relatively shallow groundwater would discharge near the coastal line and deeper groundwater would discharge more offshore area. The freshwater contribution ratio estimated by the salinity is approximately 4~24% in the surface water near the coastal line and it is 1~3% in the bottom water of offshore area, respectively.