

Development of simultaneous monitoring method of submarine groundwater discharge and primary production in coastal seas

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In recent years, a number of studies have shown that submarine groundwater discharge is an alternative nutrient pathway and can drive primary production in coastal seas. However, very little is known about quantitative relationship between input of groundwater and response of primary production, because both processes are temporally variable. Recent technological advances (i.e., automation) have increased our ability to assess submarine groundwater discharge in coastal ecosystems using natural tracers such as radon-222 (²²²Rn). Simultaneous monitoring of ²²²Rn with indicators of primary production such as pCO₂ and/or chlorophyll-a would allow us to grasp the nexus of both processes. Therefore, automated radon and CO₂ gas analyzer were connected in series and a closed air loop was established with gas equilibration devices to examine the nexus between submarine groundwater discharge and primary production. In this presentation, we will report the results of simultaneous monitoring of ²²²Rn and pCO₂ with other parameters in several coastal environments.

Keywords: simultaneous monitoring, submarine groundwater discharge, primary production, coastal seas