

ACG035-08

Room:201A

Time:May 27 12:30-12:45

Spatial distribution and seasonal variation of submarine groundwater discharge in the coastal area of Seto Inland Sea

Mitsuyo Saito^{1*}, Shin-ichi Onodera², Xinyu Guo¹, Yuta Shimizu², Koki Onishi², Minoru Tokumasu³

¹CMES, Ehime Univ., ²Grad. Arts and Sciences, Hiroshima Univ., ³Saijyo city

Recent studies have revealed that submarine groundwater discharge (SGD) is one of the important pathways for nutrients and the other dissolved materials such as carbon and trace metals from terrestrial area to the marine environment. Seto Inland Sea is the largest semi-enclosed coastal sea in Japan. Recently, some researchers tried to estimate SGD at the specific area of the Seto Inland Sea by field research and numerical model approach. Nevertheless, deep (confined) groundwater discharge was not evaluated in these studies. The objective of the study is to confirm the spatial distribution and seasonal variation of SGD including both of shallow and deep groundwater in the coastal area of Seto Inland Sea. The study area is southwestern part of the Hiuchi-Nada located in central part of the Seto Inland Sea, and has a size of approximately 30 km * 13 km. We conducted the measurement of vertical profiles in salinity and water temperature at 13-15 sampling stations in July and November 2011. Radon-222 (²²²Rn) concentration was measured at surface and bottom layers using electronic radon detector (RAD7, Durrige Co.). Radon-222 (²²²Rn) is one of the useful tracers of SGD because groundwater has extremely high concentration in ²²²Rn compared with river water and seawater.

Vertical profiles of salinity and water temperature indicate the presence of stratification with a pycnocline at depth of about 5 m in July, whereas it was completely mixed in November. ²²²Rn concentration in the surface layer was relatively high in the several sites near the coast line. Meanwhile, in the bottom layer, high ²²²Rn concentration was detected in the offshore area at southern part of the study area in both July and November. Therefore, the result indicates that deep (confined) groundwater discharge from seafloor throughout the year.

*This research was supported by the research grant of Saijyo city and Nissay financial group in 2010.

Keywords: submarine groundwater discharge, spatial distribution, seasonal variation, coastal area of Seto Inland Sea