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Analyses of submarine groundwater discharge based on Radon-222 concentrations of the coastal water in Japan

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Radon-222 is one of the useful tracers for evaluating submarine groundwater discharge (SGD), because the groundwater has extremely high concentration in 222Rn compared with surface water. In this study, we attempted to compile and compare radon data observed in ten study areas in Japan, with SGD observed by seepage meters as well as local environmental parameters such as precipitation, gradient, permeability, basin area, tidal range, and others. We used geographical information system (GIS) and digital elevation model (DEM) to evaluate the characteristics of the basin. The highest 222Rn concentrations was recorded in Yuza (Northwestern Tohoku area) in Japan, where the highest SGD by seepage meter was observed. 222Rn concentrations increases with precipitation within the study areas of four bays in Yuza and four bays in Otsuchi. Multivariable analyses of driving factors of submarine groundwater discharge were performed in the ten study areas.

Keywords: submarine groundwater discharge, Radon, coastal groundwater