

Estimation of recharge temperature, flow and denitrification in coastal groundwater, using dissolved gas.

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Nitrogen load to the groundwater by application of fertilizer in the farmlands has affected nitrogen cycle processes and water environment. Nitrate pollution occurs and denitrification process increases with producing N₂ and N₂O gas. In addition, recharge water in various altitudes converges in coastal groundwater and transports nitrate.

In this study, we examined to confirm recharge temperature, flow and denitrification in coastal groundwater, using dissolved N₂ and Ar gas. Our study site is located on a small and steep catchment covered by citrus grove of Ikuchi Island in Hiroshima prefecture, western Japan. We collected groundwater samples at the observation wells with the depth of 3m, 10m, 15m, 20m, 30m and 40m. After collecting without mixing of air, dissolved N₂ and Ar gas concentrations were analyzed by gas chromatography.

As a result, when the excessive amount of dissolved N₂ gas concentration was estimated from the groundwater temperature,

There was a negative correlation with dissolved oxygen content. It is thought that this is because denitrification -N₂ production is considered to be carried out so that there is less dissolved oxygen, suggesting the activity of anaerobic denitrifying bacteria.

This is also compatible with the results of previous studies, and it can be considered that the evaluation of denitrification state becomes possible by considering more diversely.