

Influence of climate change on groundwater quality and quantity for 3 decades and the effect of land originated material into the coastal area

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Global warming has caused an increase in rainfall and a decrease in snowfall in Hokuriku area, Japan. In the Katakai River alluvial fan located in Uozu City, Toyama, a previous study was mentioned that climate changes have been responsible for the increase of groundwater table for the past 3 decades. The shallow groundwater flows into Toyama Bay as submarine groundwater discharge (SGD) and its water flux is estimated an increase by up to 30%. SGD is not only a source of nutrient but also of carbon, so the change of groundwater quality and quantity may result in the change of material runoff from land to the coastal area. The aim of this study is to clarify (1) the change of water quality which accompanies the rise of groundwater table; and (2) the effect of the change in water quality on the coastal area, analyzing hydrogen and oxygen stable isotopes as well as chemical composition. Results of observation of two monitoring wells (Uozu City) show that the change of pH and nitrate concentration varied due to an increase in rainfall and an increased use of organic fertilizer. Also, both pH and HCO_3^- concentration have been decreasing over the last decade, and the $\text{CO}_2(\text{aq})$ concentration calculated from them become larger 2-3 times than about a decade ago. These results suggest that $\text{CO}_2(\text{aq})$ flux from the land to coastal area may continue to increase in this region due to continuing climate change and artificial impact.

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