一級河川における河川-地下水交流が栄養塩分布に与える影響の評価～岡山県旭川を例に～
Evaluation of river water-groundwater interaction and its effect to nutrient variation in Asahi River, Okayama prefecture

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Recent researches have shown the evidence of interactions between river water and groundwater-these interactions have affected the nutrient distribution and dynamics during the discharging. Our objective is to identify the river/groundwater interactions and estimate the nutrient variations along the river Asahi. Research field is located in the River Asahi of Okayama prefecture, western Japan. River water samples were collected from 50 sites along the River Asahi. Stable isotope of Radon (^{222}Rn) and nutrient concentration were analyzed in Hiroshima University. Seasonal variations of data were arranged in this research (February, June, and November, 2015)
Seasonal variations data shows radon(^{222}Rn)concentration was highest in summer(June, 2015), suggesting the high percentage of groundwater contribution in summer. It probably because large quantities of irrigation decreased the river water level in summer, groundwater discharge to river water increased than in other seasons. On the other hand, radon tends to increase release ability with temperature increasing.
The spatial pattern of Radon(^{222}Rn) distribution decreased from upstream to downstream in all seasons.
The results of nutrient showing that dissolved silica concentrations increased from February to November, suggesting the groundwater discharge increased from February to November. However, phosphorus concentrations were highest in June. Nitrogen concentration didn’t show any variations throughout the research seasons.
In the last, we calculated and evaluated the nutrient contribution from river water/groundwater interaction processes in Asahi River based on the above data. Silica variations were mainly controlled by groundwater contributions. The ratio of silica supplied by groundwater was up to 60%. However, phosphorus variations were controlled by river water (surface water and tributaries). The ratio of phosphorus supplied by river water was up to 90%. Nitrogen variations were controlled by groundwater, as the disturbance of denitrification and biological turbulence, nitrogen concentration was lower than the estimated values. In nutrient cycle processes, nitrogen is considered to be supplied mostly from human activities however our results suggest another important nutrient pathway thorough water circulation. In Asahi River, nitrogen is dominant from groundwater, and river/groundwater interactions purify the nitrogen concentration.
In future, we will increase the research area from main stream to tributaries, in order to better evaluate the effect of river/groundwater interaction on nutrient dynamic.

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