Effect of Subsurface and River Water Interaction on Nutrient Component in Tidal Rivers in Western Japan and Southern Korea

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Groundwater discharge to the oceans is significant as nutrient supply. This situation is similar to the nutrient condition in tidal rivers. In this research, we aimed to confirm effects of groundwater on nutrient supply to tidal rivers. Our research areas are at the river mouth of Asahi River in Okayama Prefecture of western Japan and Nakdong River in Busan of southern Korea. The widths and depths of these two rivers are 200m and 1km, and 3m and 10m, respectively. We collected river water samples, with continuous monitoring of electrical conductivity and $^{222}$Rn. In addition, water samples of groundwater around there, bottom sea water, and river water at some points around the station were collected. Water samples were analysed in chemical laboratory, for nutrient and inorganic element concentration. Spatial variations from upstream to downstream in $^{222}$Rn and nutrient concentrations indicated decreasing trends. These suggest that head water is source area of nutrient. But $^{222}$Rn and phosphorus concentration were also high in the tidal river. The hourly changes in $^{222}$Rn and nutrient concentrations at the river mouth station of Asahi River indicated the low $^{222}$Rn concentration at high tide whereas high at low tide. The increase of $^{222}$Rn was similar to DIP variation, especially DIP concentration at the low tide was twice of that at the high tide. These suggest groundwater discharge with DIP at the low tide in the tidal river.