Dynamics of dissolved inorganic nitrogen and phosphorous of the river water in the Kunisaki Peninsula in summer

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Kunisaki Peninsula Usa area in Oita Pref. was designated as GIAHS (Globally Important Agriculture Heritage Systems) in 2013. It has an abundant SATOYAMA represented by KUNUGI (Quercus acutissima) and a unique water use system connected by a number of small ponds. This unique water use system would affect river water quality in each watershed as well as estuarine and coastal biological production. However, its influence is still unclear. In this study, we assessed the effect of forest and water use system on nutrient concentrations in each river water and nutrient transport to coastal region.
Concentrations of DIN, DIP and d-excess of water isotopes ranged from 6.3 to 153.4 μM, from 0.1 to 4.1 μM and from 8.9 to 15.5, respectively. Fluxes of DIN and DIP from each watershed to coastal regions ranged from 0.8 to 140 kg d^{-1}, and from 0.2 to 22 kg d^{-1}, respectively. Although the fluxes were mainly dominated by river discharge, the molar ratio of DIN and DIP (DIN/DIP) varied from 6 to 39. We found positive exponential relationship between DIN/DIP and d-excess. These results suggests that unique water use system affected the difference in DIN and DIP dynamics within the watershed, since a number of ponds increased d-excess values from upstream to downstream. Moreover, in the Kunisaki Peninsula, the forest supplied DIN to the river, while DIP was mainly supplied from the agricultural land.
Therefore, higher d-excess and DIN/DIP showed lower retention time and larger impacts of forest. On the other hand, lower d-excess and DIN/DIP showed higher retention time and larger impacts of agricultural land.

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