

Catchment environmental changes inferred from reservoir sediments in Noto Peninsula

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This study aims to reveal the sedimentation records and the transport processes of organic matter and sediment in the reservoir-catchment systems in Noto Peninsula, Japan. This area confronts the catchment environmental changes (vegetation and land use changes, etc.) related to change in human activities (population decrease and ageing, etc.) expected to affect the material transport. Small reservoir-catchment system is suitable for clarifying material transport processes and responses to the natural and artificial environmental changes because of its sensitivity.

Study sites are two small reservoirs (Bishaguso-ike and Shin-ike) located in Noto peninsula in the central Japan. Surface sediment cores (26 cm and 31 cm length, respectively) were collected from these reservoirs using a HR type core sampler (Rigo, Japan) in October, 2009. The contents of total organic carbon (TOC) and total nitrogen (TN), carbon and nitrogen isotope ratios ($\delta^{13}\text{C}$ and $\delta^{15}\text{N}$), and grain size were analyzed for 1 cm interval. Vertical profiles of radionuclide activity concentration (^{210}Pb and ^{137}Cs) were also measured to estimate sedimentation rate and age of the cores.

In Bishaguso-ike, the age of the core was estimated at about 40 years based on the ^{210}Pb dating method. It also indicates that sedimentation rate of the reservoir decreased to 25 % of previous value in 1980s. The C/N ratio of reservoir sediment decreased from 13 to 10 corresponding to the change in sedimentation rate. The $\delta^{13}\text{C}$ and $\delta^{15}\text{N}$ and the grain size also decrease since 1980s. These changes suggest that the contribution of catchment-derived organic matter and sediment has decreased since 1980s. These results suggest that catchment environmental changes which decrease sediment erosion occurred in the Bishaguso-ike catchment.

In Shin-ike, the age of the core were estimated at about 90 years based on the ^{210}Pb method. The $\delta^{13}\text{C}$ and $\delta^{15}\text{N}$ has decreased with some fluctuations since 1960s, implying the change in organic matter sources of reservoir sediment. The sedimentation rate (five times higher than other period), C/N ratio and grain size increased during about 1970s. These results suggest that the shift of organic matter source with some erosion events has occurred in the Shin-ike catchment. These changes in organic matter in both reservoirs may be attributed to the vegetation and land use changes in Noto Peninsula from 1960s to 1980s.

Keywords: reservoir sediment, organic matter, carbon and nitrogen isotope ratios, Noto Peninsula