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Carbon isotopes of POC in a small river in Bekanbeushi moor, northern Japan

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An important part of global organic carbon cycle is the flux of terrestrial organic carbon from the continents to the oceans. Small rivers and streams have potential significance in the transport of sediments and organic matter, and its export flux is estimated as ~40% of riverine global organic carbon. Knowledge of organic carbon dynamics in river basins is required to study the role of rivers in global biogeochemical cycles and organic carbon flux. For better understanding the transport of organic carbon, carbon isotopes of particulate organic carbon (POC) are useful tools as tracers of the sources and behavior.

The objective of this study is to understand the transport behavior of POC from terrestrial region to ocean. We selected a small river, lower turbidity in a year except for spring snowmelt period, in Bekanbeushi moor located in Hokkaido, northern Japan. Water sampling was carried out at a fixed point from summer in 2004 to April 2008. Suspended solids samples were concentrated from 45-90 L of river waters by a single-bowl flow continuous centrifuge technique. We used carbon isotopes ($\Delta^{14}\text{C}$ and $\delta^{13}\text{C}$ values) and lignin composition of POC.

The $\Delta^{14}\text{C}$ values of Bekanbeushi POC range from -12‰ to $+9.7\text{‰}$ at summer and winter season and -164‰ at snowmelt season. The $\delta^{13}\text{C}$ values have a very narrow range of -29.1‰ to -28.7‰ . The C/N ratio is 10.9-12.4. The paired $\Delta^{14}\text{C}$ vs. $\delta^{13}\text{C}$ distributions are different from the Tokachi and Zengjiang Rivers (Nagao et al., 2005, Gao et al., 2007). The Bekanbeushi $\Delta^{14}\text{C}$ and $\delta^{13}\text{C}$ values show younger and lighter than the others. These results suggest that freshly produced organic matter is supplied from the moor to the small river except for snowmelt period.