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Variations in $\Delta^{14}\text{C}$ values of POM in the Ishikari River

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Particulate organic matter (POM) is the terrigenous component directly incorporated into continental margin sediments. For better understanding the origin, forms, and fate of POM, it is important to study the characteristics of riverine POM because of its heterogeneous mixtures of organic matter. Information on characteristics of POM in river basins is required to quantify the role of rivers in global biogeochemical cycles.

We have been investigated at the Ishikari River system, which is 268 km long from the source to mouth and a drainage basin of 14330 km², in northern Japan. The Ishikari River has two peaks of water discharge at spring snowmelt and autumn rain events. In this study, water samples were collected four times at three stations (Osamunai, Sorachi, and Iwamizawa-Ohashi) from April to October in 2006. The Osamunai and Iwamizawa-Ohashi are located at the upstream and downstream of Ishikari River, respectively. The Sorachi is located at the downstream of Sorachi River, which is the largest tributary of the Ishikari River. We discussed the dynamics of POM within the Ishikari River basin on the basis of $\Delta^{14}\text{C}$ and $\delta^{13}\text{C}$ values of POM.

The variations in $\Delta^{14}\text{C}$ values of riverine POM are different from each station. In the Iwamizawa-Ohashi, the $\Delta^{14}\text{C}$ values were -273‰ for the spring snowmelt season, and $-210 \sim -130\text{‰}$ for the normal flow condition. In the Sorachi, the $\Delta^{14}\text{C}$ values were -369‰ for the spring snowmelt season, $-150 \sim -41\text{‰}$ for the normal flow condition and -447‰ for the heavy rain event in autumn. On the other hand, POC of the Osamunai shows opposite variation trend. The POM had $\Delta^{14}\text{C}$ of $-95 \pm 89\text{‰}$ and $-145 \pm 10\text{‰}$ at high and low water discharge, respectively. These results suggest that the sources and supply processes of POM from watershed are different from the upstream and downstream. The variations in $\Delta^{14}\text{C}$ values also appear to be correlation with water discharge.