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Variation in Drift distance of SUSPENDED POM in relation to flow regimes and channel geomorphology

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The length of nutrient spiraling in river ecosystems is expected to be changed according to flow regimes and channel geomorphology. Its measurement, however, is not easily particularly in the field streams under different flow regimes. The present paper focuses on the drift distance of suspended particulate organic matter (SPOM) as an indicator of nutrient spiraling length and aims to show the variation in its drift distance between two rivers different in channel morphology under a set of different flow regimes.

Drift distance of SPOM was estimated using planktons as tracers in the downstream reaches of two reservoir dams, Takayama Dam in the Kizu River and Amagase Dam in the Uji River, central Japan. The Kizu River is characterized by shallow braided channels with a lot of sandy bars, whereas the Uji River by a single deep channel with few bars. We collected the SPOM samples using POM net from nine sites within 47km reaches from Takayama Dam in the Kizu River and from six sites within 16km from Amagase Dam in the Uji River under low and high flow condition.

Size and source composition SPOM was quantitatively surveyed using a binocular and we found that SPOM of a size range of 0.125-0.250 mm in diameter were suitable for counting planktons from reservoir dam with the other POM. The reducing patterns of plankton fraction in the samples could be explained by an exponential function to the distance from the dam site. The drift distance estimated as a distance required for 50% and 90% reduction of plankton was 1.3 km and 4.4 km in the Kizu River under a flow of 33.6t/sec, respectively. Contrastingly, the distance for 50% and 90% reduction of plankton was 5.3 km and 17.6 km in the Uji River under a flow of 130 t/sec, respectively. In addition, we obtained similar estimates of 4.1km and 13.4 km in the Uji River under even under an increased flow of 350t/sec.

The shorter drift distance in the Kizu River than the Uji River indicate that the SPOM will trapped in the river bed within a short distance in the braided channel with sandy bar structure. A possibility of the estimated drift distance as an indicator of the length of nutrient spiraling in a river ecosystem is discussed.