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Use of in-situ radioactive 131-I to trace sediments at short time scales

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Sediment flow modeling over geological time scales requires a good understanding of the sediment transport modes occurring in rivers and on drainage basins. In this way, mean residence time of sediments within hydraulic networks and particle path lengths in response to flow events have to be determined. In this context, the in situ artificial radionuclide 131-I (8-days half-life) provides a reliable tool to better characterize the sediment transport law at the time scale of flow events. Our sediment transfer model is based on the radioactive decay of the 131-I associated with particles. A critical point is that radionuclide inputs have to be well-identified. In our case, the artificial iodine 131I source is well-known as this nuclide most likely originates from hospitals which use it in radiotherapy. Potentiality of in situ radioactive 131-I use in sediment transfer models is discussed from in situ data acquired in the drainage basin of Vilaine river (in Brittany, a French North-West region). With a 10 400 km^2 area and a maximum altitude of 300 m, the catchment is mainly made up of schist, sandstone and granite. Annual precipitations are around 800 mm and discharges up to 1 500 m3.s-1 at the outlet.