

Evaluation of suspended sediment sources at the basin scale: a case study of coastal basin, Hokkaido, northern Japan

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In Japan, coastal erosion has been a problem throughout the country since the 1950s, and comprehensive sediment management of sediment transport through rivers from mountains to coasts is required. Understanding the source of sediment is an important and fundamental issue. In order to understand the connectivity of sediment from the mountainous area to the sea, this study conducted sediment hydrology observations on the Saru River basin in Hokkaido, and fingerprinting sources of suspended sediment using natural radionuclides as tracers. To evaluate the source of suspended sediment quantitatively, the rating curve for each lithological source group was developed. The annual amount of suspended sediment from the Saru River to the sea area was 150,000 t/yr on average from 2011 to 2014, but it was more than 17 times as large as 2.6 million ton in 2016 due to heavy rainfall. The main source areas of suspended sediment were found to be sedimentary rocks and metamorphic rocks, which widely distributed in the middle and lower reaches, during 2011-2014. This result seems to reflect the weathering characteristics of rocks. During the heavy rainfall events in August 2016, the main source areas were metamorphic rocks and sedimentary rocks in the first half, and the accretionary matrix and accretionary basalt blocks in the latter half, which were distributed in the upstream area. These results indicate that the sediment yield and major sediment production sources differ depending on the geological composition and rainfall distribution of the basin.

Keywords: source to sink, fingerprinting, radionuclide tracers, extreme rainfall events