

Spatial distribution in sediment yield within watershed: fingerprinting source of suspended sediment from mountain to coast

*Shigeru Mizugaki¹, Junichi Otsuka¹, Masami Ohashi¹, Mayumi Kubo¹, Atsushi Tanise¹, Yasuyuki Hirai¹, Takashi Gomi²

1.Civil Engineering Research Institute for cold region, PWRI, 2.Tokyo University of Agriculture and Technology

Information of source and runoff process of suspended sediment is crucial for better sediment management at not only the watershed scale but also the "source to sink" system from mountain to coast. To understand the dynamics of water and suspended sediment at the watershed scale, we conducted the hydrological observation, fingerprinting source of suspended sediment using natural radionuclides as tracers, and GIS analysis in the Mukawa River (1270 km²) and the Saru River (1350 km²), Hokkaido, northern Japan. From the results of fingerprinting, dominant source areas discriminated by lithology could be found to be different among the suspended sediment, dam deposit and coastal sediment. Suspended sediment, composed of silt and clay size particles, was found to originate mainly from sedimentary rock and metamorphic rock, which are lying in the mid- to down-stream area within the watersheds. Meanwhile coastal sediment, composed of fine sand, was found to be originated from plutonic rock and melange matrix of accretionary complex, which are lying in the upstream area. Suspended sediment yield for 4 years (2011-2014) was also quantitatively evaluated by hydrological observation and fingerprinting technique, showing the positive correlation with landslide density along the stream side, but not with shallow landslide scars mainly occurred by the catastrophic typhoon event in August 2003. These results were supported by field survey and exposure weathering test, indicating that the lithology underlying the watershed was dominant factor controlling recent suspended sediment yield.

Keywords: suspended sediment, landslide, watershed scale