

Channel migration processes observed in 2013 in the upper reaches of the Azusa River, central Japan

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The upper reaches of the River Azusa in central Japan is a braided gravel-bed river running down Japan Alps. They are characterized by frequent landform changes occurring in the riverbed. This area is located in the high conservation area in the Chubu-Sangaku national park and thus physical processes of river are preserved. This study is the first step to clarify the fluvial processes of a braided gravel-bed river during a flood event.

The geomorphological maps of the observation site were made by the Research Group for Natural History in Kamikochi in every summer from 1994. These maps recorded annual landform changes of the riverbed. Sediment transport and/or major landform changes, such as channel migration, occurred once or twice in several years in severe heavy rain events more than 120 millimeters per day during the snowmelt flooding season in late May and/or the rainy season in June and July.

Interval shooting cameras were set up in 2011. These have taken the images of the riverbed and recorded the condition in every 15 or 20 minutes since 3 July 2011, only in the daylight and twilight. Channel migration in the observation area during the flood event was recorded on 19 June 2013, 166 millimeters of daily rainfall. The rain event began at night of 18 June. Water level began to rise early in the morning of 19 June. The heavy rainfall more than 13 millimeters per hour was recorded from 3 a.m. to 5 a.m. and from 7 a.m. to 9 a.m. The river was above bank-full stage at 12:00 a.m. and this condition continued until night. Highest water level was recorded at 16:15. Although water overflowed on gravel bars and shallow branching channels were formed before the bank-full stage, the landform of the main channel was still in the same condition. Changes of patterns of the water surface and movement of woody debris flowing downstream show that during the bank-full stage the channel landform changed and the main channel was migrated. The channel migration was not caused by lateral shifting with lateral erosion. Channels were buried and new channels were excavated tracing the shallow branching channels.

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