

Relationships between annual landform changes of the riverbed and vegetation dynamics during recent 10 years in the upper Asusa River in Kamikochi valley in the Japan Alps

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The Azusa river is originated from Mt. Yarigatake and runs through the Kamikochi valley, which has the wide valley bottom instead of the mountain region. The Azusa river forms multi bar with gravelbed braided channel in the Kamikochi valley. There are patchy willow communities of *Salix arbutifolia* and *Salix rorida* in the riverbed. Kamikochi Natural History Research Group has made geomorphological maps more than 25 years, recorded annual landform changes and dynamics of vegetation. This paper discusses the relationships between landform changes and germination and destruction of willow communities.

After 2008 major channel pattern changes occurred in 2009, 2010, 2011, 2013, 2017 and 2018. Except 2009 there were heavy rain event whose daily rain fall was over 110mm in the Baiu rainy season (from June to July). In July 2009 rain observed 29 days and maximum 3 days rainfall was excess 170mm. Based on the overview images taken by interval shooting cameras placed in the study area between July 2011 and October 2016, one or two hours after beginning of rain water level rises and in heave rainfall events occurred not in the Baiu maximum water level was not high as in the event in the Baiu.

Observation of surveyed cross sections of the riverbed and distribution of vegetated area on the gravel bars shows that the channels do not move laterally. Former channels were buried by transported sediments and new channels were excavated. Although the most bars were covered with water and sediments, their surfaces were not eroded. Thus, most vegetation on the bars survived the food event. By slight lateral erosion patchy communities of willow were gradually destructed and reduction of the area. During recent ten years a new willow community germinated in a shallow ditch continues growing. The Height of the community reaches 3 meters. Another willow community germinated in 1998 and more than 20m in height continues growing, reducing its area by lateral erosion in several flood events. Isolated willow trees on the bar in the center of the riverbed survived more than 20 years impact of yearly flood flows. But some of them were washed away in the 2017 and 2018 flood events.

The landform of the riverbed of the Azusa River in Kamikochi region considerably changed by burying former channels and excavating new channels, which occurred in once in several years during heavy rainfall events in the Baiu season. After these flood events *Salix arbutifolia* germinated and form new patchy communities. Although these communities were destructed partly, they have continued growing and some of them form communities of isolated large trees. These processes form the peculiar alpine river landscape in Kamikochi area.

Keywords: riverbed, landform change, vegetation dynamics, braided channel, Azusa river, Japan Alps