

Floodplain dynamics and flood history in the upper Azusa river, central Japan

Hiroshi Shimazu[1]

[1] Geography, Rissho Univ.

The upper Azusa River, a gravel bed mountain river originated from the Northern Japanese Alps, has 500m wide floodplains covered with dense riparian forests dominated by pioneer plants. The forests have experienced the destructions caused by several times of channel migrations of the Azusa River and by sediment floods into the forests. This study aims to clarify river channel dynamics in the wide valley floor, to reconstruct flood history after the channel settled on the present position, and to discuss floodplain dynamics in relation to vegetation dynamics.

Analysis of landform structure of small alluvial fans and forest types on the floodplain and their establish ages were used for recognizing the channel migrations. Cross section surveying, mapping of micro landforms, dendrochronological analysis of the trees in riparian forest, and analysis of surface deposits and ecesis layer of the trees were used for flood history reconstruction.

Major lateral shifts of the Azusa river channel occurred at intervals of hundreds of years. The bank erosion by the channel formed terraces on the alluvial fans. In the last 500 years twice of the Azusa River channel migration formed the two forest types in different succession stages which are the elm-fir forest and the larch and pioneer forest. The last major lateral shift of the channel, which occurred in about 1910, caused the establishment of the younger larch and pioneer forest on the former channel course.

There are several continuous dry shallow channels on the floodplain. Younger birch, elm, willow, larch, and pine trees are found along the dry channels. The roots of these trees are buried with sandy or gravely sediments whose form is like debris flow lobe. The establish age of these trees can be summarized into mid-1930's and mid-1940's. The scars caused on 1970's were also found on trees along one of the dry channels. There are many clear lobes along the present channel of the Azusa River. These show the following flood history and floodplain dynamics. After 1910 flood sediments were deposited on the floodplain forming small gravel lobes in severe flood events. Some of these ran down through the dry shallow channels, which are the abandoned former channels, and were deposited along the channels on the floodplain. Destruction of the forest along the channel caused the germination of the younger pioneer trees. The events occurred on mid-1930's, mid-1940's and 1970's. Its occurrence interval is estimated at about 20 years. These geomorphological processes have developed a complex mosaic of floodplain vegetation units.