

The Development of Tenjogawa (the Raised Bed River) and Human Impacts in the Lower Reach of Kizugawa River

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I Introduction

Tenjogawa in Japanese means a raised bed river that has higher bed than the surrounded plain. Tenjogawa often has developed in Japan along artificially fixed river with embankments because of the convergence and deposition of sediment on the river bed.

II Background and Objective

Development of Tenjogawa relates to flood process, environmental changes in historical age and civil engineering techniques in the past. Understanding Tenjogawa contributes to river improvement in the future and studies on development of alluvial lowland. Therefore, studies on Tenjogawa are important because in Japan so many natural disasters occur and most of people live on alluvial lowland. However, there are few geomorphologic studies on Tenjogawa because it develops under artificial conditions. It is not clear that why the deposition of sediment occurs and when Tenjogawa was formed and where it is located on alluvial lowland.

There are some studies on the reason of the development of Tenjogawa. For example, extension of river(Saito and Ikeda 1998) or lower water level (Ishihara et al. 1962) caused the sedimentation. There are a few studies on the form age of Tenjogawa by analysis of sediment and their age is around 1300(Togo et al. 2002, Nakatsuka et al. 2010). And Ohya (2006) classified Tenjogawa in 4 but he did not discuss the development of Tenjogawa. There are few studies on the relation between development of Tenjogawa and alluvial lowland.

This study aims to clarify the development of Tenjogawa discussing the changes of the amount of sediment, climate changes, human impacts and the relation between the alluvial lowland and Tenjogawa.

III Target Areas and Methods

We will focus on several rivers including the Kizugawa River located the south of Kyoto Prefecture in Japan. Many Tenjogawa concentrate along the tributaries of the Kizugawa River and there are so many engineering data and research results.

We will measure geomorphic parameters of rivers, such as catchment area, length, width and long profiles, and analyze sediment including radioactive dating.

We made a geomorphological map using aerial photographs, topographical maps, DEMs, and drilling core data. And we sampled at Bogagawa River that is tributary of Kizugawa River and under destruction, and are measuring date of a chip of wood in the river bed of Tenjogawa.

IV Results and Discussions

The geomorphological map shows the tributaries of Kizugawa River became Tenjogawa after construction of artificial levee and fixing channel along with the mainstream of Kizugawa River. And it shows that there are Tenjogawa that has no alluvial fans and that has valley plain. These results differ those of Mizukami(2003). On the right bank of Kizugawa River, there are terraces that were formed by tributaries of Kizugawa River(Ikeda and Uemura 1980) and most of the rivers become Tenjogawa from the top of the alluvial fan. Most of the little high parts along Tenjogawa are large. On the other hand, on the left bank of Kizugawa River most of the little high parts along Tenjogawa are small without Susutanigawa River, and some rivers become Tenjogawa from the middle or bottom of the alluvial fan. These differences may depend on the amount of sediment in the upper stream of tributaries of Kizugawa River. We will present our results at the meeting of The Association of Japanese Geographers in March.

V Future Plans

And we will make long profiles of tributaries with the method of Ohmori(1991) To make the long profiles, we will use ArcGIS and 5m mesh DEM data of Geospatial Information Authority of Japan. And discuss the development of the tributaries with the approximation functions of the long profiles and separated segments at each landforms.

Keywords: raised bed river, civil engineering history, environmental changes, development of landform history, human activities, embankment