

Landform Evolution of Budokubo Area, Niigata Prefecture, Japan

*Kosuke Sasamori¹, Mamoru Koarai¹

1. Department of Earth Sciences, College of Science, Ibaraki University

Shinano River basin was considered an active folding area in Niigata prefecture by 1940's study (Ikebe, 1942, etc.). Then, many studies of tectonic geomorphology have been researched by the field of geology, geomorphology and geodesy. Also, river terraces spread in this area. It reported that some of these river terraces are deformed by active folding. Budokubo region (Study area) is located north of the junction of Shinano River and Uono River. River terraces formed after 26-29ka also spread in this region. Although it was already reported about classification of the river terraces and landform evolution, the theory is controversial. Furthermore, there is an epicenter of the 2004 Mid-Niigata Prefecture Earthquake near this area. For that reason, it is meaningful of disaster prevention to discuss landform evolution of this area. In this study, aerial photograph interpretation, field surveys, and terrain analysis using GIS were carried out to discuss it.

As a result of aerial photograph interpretation and terrain analysis, comparison with previous studies, the river terraces in this area were classified 10 (M1~M3, L1~L7). Cross-section figure (northeast-southwest direction) by using 1m grid DEM by LiDAR data shows that most of the terraces decline from northeast to southwest or horizontality distribution. L1 terrace has incline from northeast to Southwest due to uplift. In addition, microtopographic map and the slope direction map. These maps clearly show the terrace cliff and tilting on L1 terrace. Also, the slope direction map shows a meandering counterclockwise of old Shinano River while this river was flowing into this area.

Based on the distribution of the terrace in the riverbed profile and comparison with previous studies, it is considered that the terraces in this area were formed by the Shinano River after merging with the Uono River. Based on the above results, it was considered that the landform evolution of this area associated with the transition of the Shinano River. First, after the AT descent period, the Shinano River flowed into this area with NE-SW direction components. After the forming and deforming of the L1 terrace by uplift, the Shinano River meandered to surround the area counterclockwise, and the L2 and L3 terraces sequentially formed. After the L3 terrace formed, the inflow of the main flow of the Shinano River was cut off, and the meandering part became an abandoned river. The abandoned river was accompanied by forming L4 and L5 terraces. At the same time, the main flow changed its flow again in the NE-SW direction, and it was accompanied by forming L5 terraces. After that, the L6 and L7 terraces formed sequentially, suggesting that they formed the current terrain.

Keywords: Budokubo, Shinano River, River terrace, Landform Evolution, Digital Elevation Model