

Relation between fan geomorphology and fluvial pattern at the northeastern part of Niigata Plain

Yukiko Hiramatsu[1], # Keiko Sakai[2], Tsuyoshi Uda[3]

[1] Environmental Science, Niigata Univ, [2] Environmental Sci, Niigata Univ, [3] Environmental Sci., Niigata Univ.

The Niigata Plain consists of two contrastive parts reflecting of not only geomorphological characteristics but also formative age. The five late Pleistocene fans are developed at the northeastern part of this Plain, and the rivers of Ara, Tainai, Kaji, and Agano flow into the Japan Sea across the Plain, while the Shinano river flows in a wide Holocene lowland at the southwestern part of the Plain. The Haide river joins the Agano river at the south side of the Agano fan. The lagoons of Fukushima-gata and Shiunji-gata were formed by closing of the areas between late Pleistocene fans and sand dune strand which had formed after the Jomon transgression. Many efforts were expended for land reclamation by drainage, so that a large cultivated field of rice has presented.

The late Pleistocene fans divided into two groups. The fans made by the rivers of Tainai, Kaji, and Haide belong to a group with a marked morph of concentric contour arc, and are piled up by three plains, respectively, i.e. from older I plain to younger III one. The Tainai fan has an aspect ratio of 0.5 and an interlimb angle of 120degrees. The oldest TN I plain remains only at the right side of this fan. The central part of older TN II plain was so dissected by many braided channel that there are patched with small pieces of this plain. The younger TN III plain is wide-developed and is overlapped by sand dune. There found three old stream courses and radial braided channel on this plain. The main stream and its branches have been continuously controlled by the Ijimino Hills which is made of Cretaceous granites and situates on the central part of the Kaji fan. The KJ I plain remains only at the right side of this fan, and compares with the TN I. The KJ II plain distributes from the top of fan to the southeastern side of the Ijimino Hills. The main stream had taken a northern detour of the Hills at the time of forming of KJ II plain, then changed a course to the break between the Ijimino and the Sasagami Hills at the time of KJ III plain. The uplifting of HD I plain by the movement of Muramatsu active fault had hindered the development of the HD II plain on the Haide fan. There, moreover, develops fine braided channel on the HD III plain which was formed by erosion of the center of HD II.

Another group of fans are these formed by Ara and Agano rivers, and are characterized by an obscure morph with an irregular concentricity of contour arc. It is difficult to distinguish a piling plain on these fans because that the younger meandering channels superimposing upon the older braided ones dissected thoroughly.

Since 15th century any number of times of bending and twisting of the Agano river on its way downstream made an attractive view of meandering loop scars. As the braided flowage on the HD III plain had given a strong influence to the course of main stream of Agano river, the meandering channel migrated gradually towards northeast in the range from the top of fan to midfan. While another meandering channel from midfan to end of fan migrated towards west so as to respond to the migration of its upstream. Though the main stream flowed northward by this time, a new sand dune strand, which formed simultaneously, stood in a way downstream, and then the main stream curved westward and joined with the Shinano river. It is considered that a large-scale of flood due to melting snow happened repeatedly resulting these migration of meandering channels. These phenomena have occurred during the Little Ice Age.