

Tsunami flow on the Sendai and Ishinomaki plains in relation to their landforms and geoenvironment

UMITSU, Masatomo^{1*}, KITAMURA Kyouhei¹, KOARAI Mamoru²

¹Nara University, ²The Geospatial Information Authority of Japan

Landforms of the Sendai and the Ishinomaki plains in northern Japan, which are strongly affected by the tsunami disaster on March 11, 2011, are characterized as the strand plain with several rows of beach ridges. Mapping on aerial photos taken just after the tsunami disaster shows characteristics of tsunami flow on the two coastal plains. The run-up tsunami invaded into the plains about 4.5 km from the coast and showed several flow types. Concentration, diversion and confluence can be seen according to the characteristics of the topography, distribution of buildings and vegetation on the plains. Direction of the back wash flow in southern part of the Sendai plain is almost towards the coast and perpendicular to the coastline. But the directions of the back wash flow in the central and northern part of the Sendai plain were various, whereas the run-up flow direction was almost perpendicular to the coastline. These characteristics of the back wash flow were controlled by the topography, building and vegetation on the plains. Lower reaches of small rivers were eroded by strong backwash flow. Wedge-shaped channel pattern in the lowest reaches of the streams were formed due to the concentration of backwash flow.

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