

Tsunami and the effect of landforms on the coastal plains in Sumatra and Southern Thailand

Masatomo Umitsu[1]

[1] Nagoya Univ.

The objective of this research is to clarify the relationship between tsunami flow and the landforms of the coastal lowlands in relation to the tsunami which occurred on December 26, 2004.

The target areas of the research are the Nam Khem Plain in the Andaman Sea Coast of Thailand and the plain of Banda Aceh in the Sumatra Island, Indonesia.

The geomorphological features of the Nam Khem Plain, with the width about 2-3 km and the length about 12-13 km, are characterized by the rows of beach ridges, and the artificial mounds and ponds which were formed due to the tin mining.

Tsunami flow spread out the whole area of the Nam Khem lowland and the average depth of the flow is approximately 4-5 m over the ground. The direction of up tsunami flow is almost vertical to the coast line, and that of down flow relates to the topography of the area.

Micro landforms of the plain related to the distribution of the thickness of tsunami deposits. The existence of the swales between beach ridges corresponds well with the distribution of the thick tsunami deposits. Coastal erosion of the plain occurred because of direct attack of tsunami waves and the lower reaches of small rivers were eroded by strong down flow (back flow) and wedge-shaped channels were formed in most of the lower parts of the rivers.

On the other hand, landforms of Banda Aceh coastal plain are characterized as the deltaic lowland in the western and beach ridges in the eastern parts.

The tsunami waves invaded to the area about 3-4 km from the coast. Strong tsunami flow remarkably changed the landforms of the coastal zone but the micro landforms except coastal dunes in the had almost no effect for protection because of the very strong tsunami flow. In the area near the end of tsunami intrusion, however, the micro-landforms as beach ridges and natural levees prevented flow of the tsunami from going ahead.