Japan Geoscience Union Meeting 2011
(May 22-27 2011 at Makuhari, Chiba, Japan)

MIS036-P141 Room:Convention Hall Time:May 27 14:15-16:15

Tsunami inundation, inundation height, and run-up elevation between southern part of the Sanriku and the Sendai Plain

Satoshi Ishiguro[1*], Kazuaki Hori[1], Masatomo Umitsu[2], Nobuhisa Matsuta[1], Nobuhiko Sugito[1], Toyohiko Miyagi[3], Kenya Tamura[2]

[1]Nagoya University, [2]Nara University, [3]Tohoku Gakuin University

A huge tsunami generated by the 2011 off the Pacific coast of Tohoku Earthquake brought a large-scale flood to the Pacific Ocean coast especially from the Tohoku to Kanto regions. Because the damage extended the large area, maps of tsunami inundation area were made and published based on the satellite image analysis or air photograph interpretation by the Geospatial Information Authority of Japan, academic societies, and spatial information consultancies immediately after the earthquake. Moreover, the tsunami heights along the coasts have been reported based on field investigation by many researchers. We conducted a field survey about inundation area, inundation height, and run-up elevation between the southern part of Sanriku coast and Sendai coastal Plain by using the tsunami inundation map published by the Tsunami Disaster Mapping Team, Association of Japanese Geographers.

Field survey was conducted at the Sendai and Ishinomaki coastal plains characterized by low-lying coasts and Onagwa Town located along the Rias coastline of the southern Sanriku coast between April 22th and 24th, 2011. We established transects almost perpendicular to the coastline, confirmed the tsunami trace, and obtained the inundation height. Because the damage was especially large in the south of the Hiyoriyama, which is a very low mountain located near the mouth of the right bank of the Old Kitakami River, we also surveyed the lowland surrounding this mountain. Moreover, the limit of tsunami inundation that had been shown in the map was confirmed by observation and interviews with local people.

The tsunami reached approximately 4 km from the coastline around Arahama in the Sedndai coastal Plain. The limit of tsunami inundation was relatively correlated well with that of the map. Inundation heights between Arahama and the Sendai Toubu Highway were about 10 m at the coast, 5 to 6 m behind the coast, and decrease to 4 m near the highway.

It was flooded to the vicinity of the JR Senseki Line that runs 2 to 3 km inland from the coast on the western side of the Ishinomaki Port in the Ishinomaki Plain. Inundation height was ca. 7 m near the coast. The inundation heights were 3 to 4 m between ca. 1 and 3 km inland from the coast. The inundation height reached more than 7 m in the south of the Hiyoriyama where severe damage had occurred. On the other hand, the height tends to decrease landward.

East side of Onagawa Town faces the sea, and the most part of the settlements mainly located in three valley plains received catastrophic damage from the tsunami. According to the map, the distribution of the severe damaged settlements roughly corresponds to the inundation area. Inundation heights exceeded 15m near the coastline. The heights approximately 15 to 18 m were also recorded along the valley plain. Therefore, tsunami inundation occurred partially even on uplands.

There is a possibility of causing a large margin of error when we estimate the run-up elevation at the valley plains where both sides face to steep slope like Onagawa by using the computerized map, because the map represents the limit of the run-up by the polygon. The accuracy would be checked by comparing the map with empirical field data.

Keywords: Tsunami, Inundation, Run-up height, GPS, GIS