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## Maps of the Area hit by the Tsunami of 11 March 2011, Northeast Japan - Southern area between Tagajo and Asahi

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A giant tsunami caused by the Great East Japan Earthquake inundated Pacific Ocean coasts especially from the Tohoku to Kanto regions. Disaster headquarters of the Association of Japanese Geographers started a work team that examines the tsunami damage. The team made the tsunami inundation map with a scale of 1 to 25,000 by interpreting aerial photographs and published the map through the Internet on March 29, 2011. The purposes of this work are to provide data and information useful for quick understanding of the damaged area, relief efforts, and developing a reconstruction plan and to offer the base map for field investigation into tsunami run-up and inundation and clarifying the regional characteristics of the damage.

Approximately 3,000 aerial photographs taken by the Geospatial Information Authority of Japan after the earthquake were used to construct the map. We hypostatized the photographs, cross-checked interpretation each other, fixed the final draft, and computerized it. Single image on Google Earth was interpreted for a part of Fukushima Prefecture in which the aerial photographs were not taken. Tsunami inundation area and heavily damaged residential area were shown on the map. Additionally, the distribution chart of tsunami run-up height was made by combining the map and 10mDEM. This paper reports the regional characteristics of the damage between Tagajo City, Miyagi Prefecture and Asahi City, Chiba Prefecture.

Natural levees are distributed along the Nanakita, Natori, and Abukuma rivers and three beach-ridge sets develop almost parallel to the coasts in the Sendai coastal Plain (Matsumoto, 1977). Intervals between the beach ridges are small in areas south of Abukuma River where the width of the plain becomes small. Tsunami inundated several kilometers and reached even or immediately before the most landward beach-ridge set. Especially, settlements located on the most seaward beach-ridge set had received catastrophic damage. Rice straw distributed on the rice field around the limit of tsunami inundation was often swept in the corner of the field. Moreover, there was a settlement that had escaped flooding probably because it is located on natural levee and defended by the embankment in the Abukuma River.

In the Hamadori district, hills, fluvial terraces, and Holocene alluvial lowland occur in the east-west direction along rivers, which originate in the Abukuma Mountain and empty into the Pacific coast (Suzuki, 2005). Marine terraces are also found along the coast. Holocene alluvial lowland and valley plains dissecting the hills and terraces were severe flooded by the tsunami. Inundation area was small along the coasts of Ibaraki Prefecture relative to the Sendai coastal Plain and Hamadori district.

Run-up elevation of the study area tends to be smaller than that of the Sanriku coast. Moreover, the elevation is below 5 m asl in the Sendai coastal Plain characterized by the beach-ridge plains with several kilometers wide. On the other hand, the elevation reached 10 m asl or more at the Hamadori district where the lowlands extend in a direction perpendicular to the coast. Therefore, it is necessary to clarify the relationship between the run-up elevation and geographical features in detail.

We are indebted to students of Nagoya University and Nara University for the arrangement of the aerial photographs and the work of the computerization. The map is open to the public on the following web sites.

<http://danso.env.nagoya-u.ac.jp/20110311/index.html>

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