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High resolution survey results for the inundation limit and height of the 2011 Tohoku earthquake tsunami

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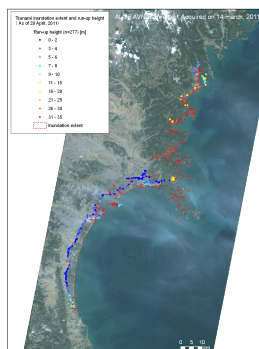
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An earthquake of magnitude 9.0 occurred off the Pacific coast of Tohoku, Japan, on March 11, 2011. The tsunami devastated the northeast coasts of the Tohoku district and the maximum run-up height was measured nearly 39 m at Sanriku area. The remarkable feature of this tsunami was the range of inundation areas. In fact, on the Sendai plain, the tsunami inundated more than 5 km inland. Emergency field surveys were conducted by many Japanese groups in the devastated area and they measured the inundation depths or building damages near the shore. Satellite and aerial photographs were studied by multiple societies, universities and companies, and inundation limit was estimated from such photographs immediately after the tsunami. We also measured the inundation limit of the northeast coast of the Tohoku district by the analysis of the ALOS AVNIR2 image that was taken on 14th March.

In order to validate the results of the satellite image analysis and to confirm the maximum inundation limit in the wide area, we organized a research group and conducted high-resolution surveys of the inundation limit and height in the few-centimeter accuracy by using GPS measurement system (Promark3) in Miyagi, Iwate, and Aomori prefectures. The horizontal measurement interval is ranging from approx. 500 m to few kilometers and we measured nearly 300 sites until the end of April.

We preliminarily confirmed that the inundation limit estimated from the satellite image is well consistent with the field measurement results at most places, although there are some exceptions that might have not been interpreted from the satellite images. We still continue our survey to cover whole devastated area before the tsunami watermarks were removed or washed away in the rainy season.

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Keywords: The 2011 Tohoku tsunami, Field survey, Tsunami inundation extent, GPS measurement