Estimation of variance of measured tsunami height distribution based on field survey following the 2011 Tohoku earthquake tsunami

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One important objective of a post-tsunami survey is to measure the tsunami height distribution. Measured tsunami height data are essential for the calibration and validation of tsunami models. However, tsunami height is influenced considerably by the local topographic condition. It is important to consider the uncertainty of the measured data when comparing measured and computed tsunami height distributions. To study this uncertainty, large numbers of high-density data are required. The 2011 Tohoku earthquake tsunami struck many areas along Japan's Pacific coastline. A large-scale post-tsunami survey was conducted and over 5000 measured data were obtained. Based on the survey results, this study analyzed the uncertainty of the measured data. The variance of the measured tsunami heights in the survey area was calculated for various radii, and the relationship between radius and variance was established. This relationship will be useful in the validation of tsunami numerical modeling.