Japan Geoscience Union Meeting 2014
(28 April - 02 May 2014 at Pacifico YOKOHAMA, Kanagawa, Japan)

HDS28-P01 Room:Poster Time:May 1 18:15-19:30

Influence of mircotopography in lowland to tsunami disaster of 2011 Tohoku Earthquake

IKARI, Kazuya[1*] ; NARAMA, Chiyuki[2]

[1]Graduate School of Science & Technology, Niigata University, [2]Faculty of Science, Niigata University

The earthquake (magnitude 9.0) on Mar 11, 2011 in Tohoku, Japan triggered the terrible destructive tsunami, striking the eastern coastal region of Japan. Although residents in valley bottom plain of the Sanriku Coast (ria coast) have a refuge area around hills, residents in Sendai Plain (meander plain of lowland) had to go to inland in order to escape tsunami. The lowland such as Sendai Plain is very vulnerable to tsunami. However, Building damages differed among the Sendai Plain. This study evaluated the influence of landform in lowland of Sendai Plain to tsunami disaster.

The Sendai plain is meander plain of lowland (0-3m asl.), including beach ridges and inter-ridge march of ridged beach plain, and natural levees along present and mender scars.Three beach ridges are developed along the coast. Relative height of present beach ridge is 3-5m, and inner two beach ridges are 1-2m.

We classified three damage-categories (flow out, destroy, and remain) to individual buildings in tsunami inundation area of the Sendai Plain, based on interpretation of aerial-photographs on 2011 and Google Earth satellite image 2012.In addition, we made a GIS data of utility pole, flattened tide protection forest, driftwood, tsunami scratch in Sendai Plain, to know flow directions of tsunami and distribution of woods.

Building damages in the Sendai plain show >80% of buildings flowed out within 1km area from the coast. Remaining buildings are located on ridged beaches with 1-2m high. Driftwood and rubble had stopped on the near side of beach ridges and highway embankment. Tsunami flow was concentrated in the inter-ridge march or small stream channels. Around the Abukuma River, buildings under cut slope received tsunami damage, and slip-off slope side was safety. In lowland plain, we clarified microtopography with 1-2m relative height reduced tsunami damages around inland side area (>1km) from the coast.

Keywords: 2011 Tohoku Earthquake, tsunami, Sendai Pliain, lowland, mircotopography, aerial-photographs

Japan Geoscience Union Meeting 2014
(28 April - 02 May 2014 at Pacifico YOKOHAMA, Kanagawa, Japan)

HDS28-P02 Room:Poster Time:May 1 18:15-19:30

Eruptive Sequence of Rinjani Caldera, 13th Century, Lombok, Indonesia

FURUKAWA, Ryuta[1*] ; TAKADA, Akira[1] ; NASUTION, Asnawir[2] ; TAUFIQURROHMAN, Roni[3]

[1]Geological Survey of Japan, AIST, [2]Institute Technology of Bandung, [3]Center for Volcanology and Geological Hazard Mitigation

Rinjani Volcanic Complex located at northern part Lombok Island is centered by a large stratovolcano, Rinjani volcano, which is the volume of 100 km^3 and 3726m high (Nasution et al., 2003). A caldera of 6x8 km in diameter lies western side of the summit formed at mid-13th century (Nasution et al., 2010; Lavigne et al., 2013). Sequence of the caldera forming eruption is reconstructed from original stratigraphy of eruptive deposits and consists of 6 phases with no prominent time interval between them. Phase 1 is a small phreatic eruption produced thin ash fall bed only occurrs proximal of the summit. Phase 2 is large plinian eruption dipersed pumice lapilli to western side and extending to adjacent islands. Pumice lapilli become finer and lithic fragments increase upward in the fall bed. Phase 3 is defined by widely extending pyroclastic flow deposit consists of vaguely bedded unsorted ash with subordinating rounded pumice lapilli. Its thickness varies from several to 50 cm especially thickens local topographic depression and eroding underlying pumice fall bed. This deposit extends more than 50 km from the probable source and reached Gili Island isolated by ocean suggesting extremely dilute pyroclastic flow possibly caused by plinian eruption column collapse from high altitude. Phase 4 is unstable plinian eruption implied by graded pumice lapilli bed intercalated by multiple thin ash beds. Phase 5 is characterized by enormous pyroclastic flow effusion resulting thick and massive pumiceous lapilli tuffs extending more than 30 km from the source. Proximally fines depleted lithic breccia including andesite lavas and minor amount of granodiorite are interbedded with massive pumiceous lapilli tuff. Thickly stratified lapilli tuff beds exposes along the coastline suggest the pyroclastic flow caused the secondary explosions and formed littral cone at the ocean entry. Phase 6 is last plinian eruption dispersed pumice fall of limited extent which is smaller than preceding plinian phases 2 and 4. Petrological analysis shows magma composition changes between phase 3 and 4 suggesting formation of new vent or widening pre-existing vent eventually causes the caldera formation.

Keywords: volcano, caldera, pyroclastic flow, Indonesia, ash, icecore