

Landform change detected from the airborne laser survey before and after the 2014 Eruption of Ontake Volcano, central Japan

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Reconstruction of landform change before and after the eruption is significant in evaluating influence around the volcano. However, it is commonly impossible to survey the landform change directly just after the beginning of the eruption by difficulties in access to the area close to the crater. So is the case of the 2014 Eruption of the Ontake Volcano, central Japan. This study aims to clarify the following landform changes by the airborne laser survey conducted in 2005, 2014 (after the eruption) and Sept. 5, 2015, such as fall-out of volcanic ashes, volcanic blocks, landform change around crater, and erosion/ deposition caused by volcanic mud flows.

Positive changes in altitude (Ridge of west Kenga-mine: +0.3-+0.6 m: Near the main craters: +10 m) are concordant of thickness of fall-out ashes shown by previous reports, indicating positive changes in altitude were caused by deposition of ashes. Deposition of ashes with a thickness of +8-+10 m along the valleys just in south slope of west Kenga-mine (Upper reach of Jigoku-dani) suggests passing the pyroclastic flow. This is first quantitative estimation of thickness in this area. This thick sediment filling the valley has disappeared by Sept. 2015, showing occurrence of erosion and transportation. Moreover, this erosion is not only removal of deposited ashes at the eruption but also deeper undercutting for former valley bed with a depth of -4--6 m, resulting a tendency of erosion in a long term.

On the west slope of Ichino-ike, an uplifted area with 190 m x 35 m stretching WNW-ESE existed just after the eruption. This was most likely formed associated with W1 Crater of the eruption, and is partly composed of mud flow deposit with a thickness of 2-1 m to the maximum. However, it was disappeared by Sept. 2015, probably by the formation of a gully with EW direction.

The most prominent landform change between 2014 and 2015 are erosion/ deposition along valleys (Upper reaches of Shaku-nanzo, Shira, Aka-Jigokudani, Minami-mata, and Yu Rivers) in a wide area. Depth of erosion are -1--6 m. Beside, positive changes in altitude less than 10 m were recognized in segments with 100 to 500 m long along the Shira and Yu Rivers, indicating depositions. These erosion and deposition are evident in comparison of airborne laser survey data collected in 2015 and 2005, resulting in over undercutting for former valley bed or depositional tendencies in a long term.

We attempted to clarify the distribution of volcanic blocks ejected at the 2014 eruption. However, it was difficult due to precision of data.

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