

Volume loss due to the catastrophic sector-collapse causing the Okinajima debris avalanche of Bandai volcano, Japan

YOSHIDA, Hidetsugu^{1*}

¹Kanto Gakuin Univ.

This research discusses the volumetric magnitude of the catastrophic sector-collapse of Bandai volcano occurred in the late Pleistocene. The collapse produced the huge-scale rockslide-debris avalanche deposits named as the Okinajima debris avalanche. The collapse had occurred at the southwestern part of the volcano, and the Okinajima debris avalanche went down into the Inawashiro and Aizu basins and deposited there. Along with the conspicuous hummocky landforms observed, we can recognize the horseshow caldera on the southwestern sector of volcanic edifice. Some previous researches indicate that the collapse volume (or depositional volume) reaches more than 4 cubic kilometer (km^3). In regard to the catastrophic collapse volume at the Bandai volcano, the author has once examined another event occurred in 1888 A.D., the smaller one. By focusing on the size-distance distribution pattern of debris avalanche hummocks, Yoshida (2012) evaluated the appropriateness for the volume estimation of the 1888 collapse (ca. 0.49 km^3) by Yonechi et al. (1988) and Yonechi and Chiba (1989). Based on this result, it is made a fresh review of the collapse volume of the Okinajima event. The investigation offers new insights as follows;

1) Collapse volume is not likely to exceed beyond ca. 3.2 km^3 , calculated from the dimensions of the volcanic body and the source area (scar).

2) Scar size is approximately five times larger than that of the 1888 collapse, which amounts to the collapse volume of the Okinajima event of ca. 2.5 km^3 at a maximum, referred to ca. 0.5 km^3 of the 1888 event. The Okinajima's value is comparable to that observed at Mt. St. Helens in 1980 A.D.

3) According to the empirical relationship shown by the author's previous results and the distribution pattern of the Okinajima's hummocks, the loss volume by collapse is expected as ca. $1.8\text{-}1.9 \text{ km}^3$. This is kept within the error (Yoshida et al., 2012) from the above mentioned observed value ($< 2.5 \text{ km}^3$).

Keywords: catastrophic sector-collapse, volume, hummocky landforms, Okinajima debris avalanche, Bandai volcano