

Volume and Tsunami Origin of the 1741 Oshima-Oshima Eruption and Sector Collapse

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On Oshima-Oshima, a small volcanic island southwest off Hokkaido, a violent eruption and sector collapse occurred on August 29, 1741. Very destructive tsunami was also documented. The volume of collapse estimated from island topography was about 0.4 km³, too small to generate such a devastating tsunami. We estimated the volume change from recently-obtained bathymetry and topography data. The collapsed volume is estimated to be about 3 km³, whereas the total volume of debris deposits is about 4-5 km³. The estimated volume is about an order of magnitude larger by including ocean bottom. Preliminary tsunami calculations show that the tsunami heights are about 10 m along the Hokkaido coast, consistent with the observations, if the volume change occurred in several minutes.