

Surge Deposits and Disaster Record induced by Mt. Bandai 1888 Eruption.

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Mt. Bandai is an active volcano in Fukushima Prefecture, famous for the large-scale collapse of a volcanic edifice triggered by a phreatic eruption on July 15, 1888. The phreatic eruption produced a pyroclastic surge, and which hit villages and spas around Mt. Bandai. Previous studies have focused on the surge deposit, and have showed the characteristics of the pyroclastic surge and yielded an eruption model. However, there are many paradoxes between the models arrived at and the disaster records. For example, there are the paradoxes of the timing of the generation, the number of flow units, and the depositional area of the pyroclastic surge. In this study, we compare the surge deposits with disaster records, and discuss the pyroclastic surges of the 1888 eruption.

The surge deposit of the 1888 eruption is made up of fragment of pre-existing rock, and contains no amount of fresh magma. The deposit tends to distribute more thickly on the topographically low region. There are considerable amount of clay in the deposit, and sometimes accretionary lapilli are observed. And the deposit consists of some flow units: a massive, coarse, unsorted unit and cross laminated or massive, fine, sorted units. The character of deposit and the pattern of the size distribution of the deposit are in good agreement with those of a typical surge deposit. We found the surge deposit on the debris avalanche deposit, which gave us new evidence for understanding the past. Microscopic and X-ray diffraction investigations indicate that some layers in the deposit have different components, including the fresh fragments of basement granite. Based on this evidence, we concluded that the 1888 surge had plural flow units with different origins.

Since many inhabitants survived the disaster of the surge, many testimonies and records have been accumulated. According to these; (1) there were earthquake before starting of the eruption; (2) after the sound of the eruption, it took several dozen seconds for the surge to reach the foot of the mountain which was about 5km distant; (3) some victims were overcome two times by the surges; (4) on the mountain foot, damages by the surge becomes small as distance from the 1888 crater increases (5) some victims were burnt, but no one killed by burn; (6) no one had watched the collapse of the edifice.

Based on the character of the surge deposit and the summary of the victims' testimony regarding the timing, it was concluded that a surge was generated at least twice; before and after the collapse of the volcanic edifice.