

Hayate deposit of Bandai-san 1888 eruption and the documents by sufferers

kazuo kontani[1], Hiromitsu Taniguchi[2]

[1] Inst. Min. Petro. Econ. Geol., Tohoku Univ., [2] CNEAS, Tohoku Univ

Bandai-san is an active volcano in northern Fukushima Prefecture. The volcano is well known for the large-scale collapse of a volcanic edifice triggered by a phreatic eruption on July 15, 1888. The collapse and following eruption produced density currents, and the current attacked the colony of the eastern foot of Bandai-san. The density current was called as a Hayate in the official record written by Sekiya and Kikuchi (1888). In additions to the official record, many documents and eyewitness have been left. In this study, the progress of eruption deduced from the Hayate deposit will be compared with the documents, and discuss on the Hayate phenomenon in 1888 eruption.

Hayate deposit is made up of massive or cross-laminated beds with reverse or normal grading of pre-existing rock fragment of the edifice of Bandai-san, and no essential material was detected. The deposit tends to distribute more thickly on the topographically low land. Depositional structure and the pattern of size distribution of the deposit are in good agreement with those for pyroclastic surge deposit. Sometimes accretionary lapilli and piece of non-carbonizing wood were found in Hayate deposit. Microscopic and X-ray diffraction investigations indicated that some layers in the deposit contained different components of clay minerals, and one layer contained fresh fragments of basement granite.

Based on these evidences, it was concluded that Hayate was a kind of pyroclastic surge, and Hayate flowed down plural times from different craters. Some of these flows kept wet condition, and the depositional temperature of Hayate was less than 250 degree. Hayate deposit is not observed at the northern part of the 1888 amphitheater. It may indicate that the debris avalanche deposit covered the Hayate deposit.

Since many inhabitants survived the disaster by Hayate, many testimonies and records of Hayate have been remained. According to them, (1) after the sound of eruption, huge black cloud flowed down from Bandai-san; (2) The black cloud broke down many trees and houses; (3) many victims of Hayate were burnt, but no dead person by the burn; (4) some victims were attacked by black cloud twice.

Based on these records, it was concluded that Hayate was generated more than twice and the temperature was higher than that human was get burnt. Records (1) and (2) indicate that Hayate was similar to a pyroclastic surge or pyroclastic flow. Based on the summary of the victims testimony on time, it was concluded that Hayate generated twice; before and after the collapse of volcanic edifice. It agrees with the fact of no distribution of Hayate deposit on the debris avalanche deposit. It seemed that the collapse of volcanic edifice had plural stages, so the deposit might overlie or mixed with late stage debris avalanche deposit.