

Volcanic history of Unzen volcano, stratigraphic results of cores in Unzen Scientific Drilling Project

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Unzen volcano is an active composite volcano developed in the Beppu-Shimabara volcanotectonic graben. The major constituents are thick lava flows and domes, which are flanked block-and-ash flow, debris avalanche and debris flow deposits. The basement of the volcano has been subsided to 1000 m below sea level, while the volcano has grown to a height of 2400 m from the basement. In order to examine the volcanic history and internal structure of this volcano, the Unzen Science Drilling Project (USDP) has made two drillings at the northeastern and eastern flank.

Recovered cores from depths up to 1500m contain four stages of volcanic activity. The first stage (ca. 500 ka) is characterized by andesitic block-and-ash flow and debris flow deposits. Small hornblende phenocrysts are specific to the constituent andesitic clasts. The second stage (ca. 300-500 ka) is characterized dacitic pumice flow with air-fall pumice deposits and andesitic to dacitic lava flows, pyroclastic flows and lahars that constitute the major part of the volcanic fan. The third stage (ca. 150-300 ka) is characterized by dacitic pyroclastic flow and lahar deposits, which are confined mainly within the graben. Thick phreatomagmatic products, perhaps of the third stage in the eastern flank drill core suggest that subsidence of basement was accelerated at this stage. The last fourth stage (150 ka - recent) corresponds to the growth of Younger Unzen volcano on the eastern half of the previous edifice (Older Unzen volcano). Younger Unzen volcano is composed of many volcanic centers collectively named from the representative peaks: Nodake (150-70 ka), Myokendake (40-25 ka), Fugendake (25 ka - recent) and Mayuyama (4 ka).