Abstract of Presentation

Presentation Title:

Forecasting scale of eruption based on magma accumulation rate

Abstract :

   Here, I propose a comparative study on forecasting scales of eruptions among three countries; Japan, Indonesia and Philippine. A number of large eruptions and tremendous volcanic disaster were recorded in the historic time. Most of such disaster concentrates in Asia. In 1792 Unzen eruption in Japan, 15,000 people were killed by collapse of the volcano and tsunami. Similar disaster occurred at Krakatau in the Sunda Straight in Indonesia. The eruption in 1991 at Pinatubo, Philippine was the largest in the world in the 20th century. By the latest eruption in 2010 at Merapi, Indonesia, more than 300 people were killed by pyroclastic flow and 41 thousand evacuated from the risk zone within 20 km from the summit. Recently, event tree is utilized to show general probability of various kinds of phenomena; however countermeasure against volcanic hazard requires deterministic information, especially for evacuation. The scale of eruption is the primary factor to evaluate disaster and to estimate hazard.

   The size of eruption depends on volume of accumulated magma and intrusion rate immediately before eruptions. Inflation of Shinomoe-dake volcano, Kirishima volcano complex was detected by continuous GPS for 1 year before the eruption in 2011. The inflation volume is comparable to the volume of ejecta by the eruption. Continuous GPS observation show accumulation of 100 million cubic meter of magma beneath the Aira caldera, north of Sakurajima and recharge of magma into the Merapi volcano immediately after termination of the 2010 eruption.

   The followings are strategy; 1) Estimation of magma accumulation rate by ground deformation observation (mainly GPS). 2) Establishment chronology of volcanic eruption by geological survey and dating. 3) Making eruption scenarios considering magma accumulation rate, eruption rate and chronology of volcanic eruption. 4) Comparison among volcanoes; Sakurajima, Aso (Japan), Merapi, Papandayan (Indonesia) and Mayon, Taal (Philippine). Sakurajima, Merapi and Mayon are representative of magmatic type and Aso, Papandayan and Taal for phreatic type.