

Mitigation system of volcanic disasters in Japan - Scheme of volcanic alert level and some case studies

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In Japan, the Japan Meteorological Agency (JMA) is responsible for monitoring volcanic activity and issuing volcanic warning for disaster mitigation. JMA monitor data 24 hours a day telemetered from equipments installed close to 47 active volcanoes selected by the Coordinating Committee for Prediction of Volcanic Eruptions. The basic idea of the volcanic warning released by the JMA links to Volcanic Alert Levels.

The Volcanic Alert Levels are divided into five stages depending on "areas that must be warned" and "responses that should be taken" for the volcano's current state of unrest: Level 1 signifies that no particular response or action is required; Levels 2-3 indicate that, while residential areas are not threatened, the volcano is off limits for hiking or climbing; Levels 4-5 reveal that residential areas are starting to be threatened by the danger of eruptions. Levels 2 and 3 are differentiated by the degree to which hiking and climbing are prohibited in hazardous areas, with the exact definitions decided in advance through consultation among local relevant organizations. Level 4 is the stage where people in need of aid during disasters are evacuated and other local residents prepare to evacuate, and at Level 5, all local residents are subject to mandatory evacuation from threatened areas. Each Volcanic Alert Level is associated with specific keywords - "5: evacuation", "4: prepare for evacuation", "3: do not approach the volcano", "2: do not approach the crater", and "1: normal". This helps ensure response compliance of local residents, mountain climbers, sightseers, and so on. The Volcanic Alert Level scheme has been put into effect for 29 volcanoes in present.

Essentially, the scheme works as follows. Before a volcanic anomaly occurs, relevant organizations share projections based on the volcano's past history of volcanic unrest (eruption scenario) and hazardous areas (volcanic hazard maps) and come to agreement on what criteria to use in deciding when to start evacuating people, when to prohibit people from hiking or climbing in the area, and other disaster responses. Because these procedures have to be done in the stage when the volcanic activity is calm, "Volcanic Disaster Mitigation Council" has to be established among relevant organizations at each volcano.

The Volcanic Alert Level framework was outlined in the Basic Plan for Disaster Prevention of Japanese government in 2011. The scheme has been further elaborated through linkage to evacuation plans drawn up through collaboration among members of the Volcanic Disaster Mitigation Councils made up of all interested bodies and stakeholders in the prefecture including prefectural authorities, municipalities, JMA's observatories, erosion control (Sabo) departments, and volcanologists.

In my presentation, the basic scheme of the volcanic alert level of Japan and some case studies in recent years will be introduced.