

Volcano disaster management for local community based on clinical environmental studies

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From 2015 to 2017, we have carried out the project "Development of problem-solution methods in volcano disaster management as a methodological application of clinical environmental studies (clinical volcano disaster management)"* (1-4). In this presentation, we will present the outline and results, and the subsequent efforts.

Clinical environmental studies are proposed mainly by researchers at Nagoya University as an ideal way of environmental science in collaboration with society (5). In order to deal with complex problems such as environmental problems and sustainability, it is necessary to build a system that consistently performs all "clinical" process from "diagnosis" to "treatment", and inter-disciplinary collaboration. In addition, in order to "treat" for problem-solution, it is necessary to collaborate with various stakeholders in the local community, and trans-disciplinary (social cooperation) practice is required. They proposed "Clinical environmental studies" in which researchers are consistently involved in society from "diagnosis" to "treatment".

The clinical volcano disaster management project is an application of clinical environmental studies to volcanic disaster management. Volcano eruptions are less frequent than other natural disasters and the damage is limited. In addition, each volcano has various characters, for example the potential eruption damage and eruption frequency. With the eruption of Mt. Ontake on September 27, 2014, which killed a large number of climbers at volcanoes with relatively low activity, disaster management is reviewed by the government.

The project targets Mt. Ontake, Mt. Yake-dake (Gifu / Nagano Prefecture border), and Mt. Haku-san (Gifu / Ishikawa Prefecture border) volcano area. Core-members of the project are from Crisis Management Policy Division of Gifu prefecture, Nagano prefecture and Ishikawa prefecture, researchers in Nagoya University, Kyoto University, and Kanazawa University. The Volcanic Disaster Prevention Council, which is responsible for volcanic disaster prevention in volcanic areas, is related to many institutions. It is difficult for many of participants to have sufficient discussions at formal meetings. In the project, with the aim of creating a "Ba (a shared time and space for emerging relationships among individuals and groups to create knowledge)" for the development of volcanic disaster management, we held study meetings and workshops with core-members and participants in Volcanic Disaster management Councils and stakeholders such as tourist operators and residents. The themes of the study meeting are the eruption history of each volcano, tourism and disaster management, etc., reflecting interests of core-members. Different from the official meeting, the workshop was held in a group work format of 7-8 people to facilitate dialogue.

As a result of verifying the effects of these meetings and workshops at the end of the project, participants in workshop can exchange opinions frankly from an individual standpoint and build a face-to-face relationship. Even after the project is completed, the Gifu Prefecture Crisis Management Policy Division plays a central role in holding discussion meetings with core members and on-site inspections of other

areas once a year. At Mt. Ontake area, Kiso Ontake Volcano Observatory, Nagoya University was established to meet the need to strengthen the observation system on Mt. Ontake, and the Volcano Meister System was established to meet the need for a leader in volcanic disaster management education. At Mt Yake-dake area, Gifu Prefecture Crisis Management Policy Division held a workshop for local residents. At Mt. Haku-san area, researchers in Kanazawa University lectures volcanic disaster management for elementary school students in local area.

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