

Grasp of the detailed dynamics of hikers in Fuji

*Ryo Honda¹, Mitsuhiro Yoshimoto¹, Kawaminami Yui¹, Yosuke Miyagi², Tomohiro Kubo²,
Yoshiro Tanaka³

1. Mount Fuji Research Institute, Yamanashi Prefectural Government, 2. National Research Institute for Earth Science and Disaster Resilience, 3. Nippon Koei Co., Ltd.

Many hikers were sacrificed at the eruption of Mt. Ontake on 27th September 2014. In this eruption rescue activities were extremely difficult because of the difficulty of grasping the dynamics of hikers. In recent years, with the spread of mobile communication networks it has become possible to ask for aid even from the top of the mountain. In the case of volcanic disasters, however, it can be considered that situations where it is not possible to ask for rescue themselves by serious injury. For the rescue team, it is difficult to know how many and where the extent of rescue targets are. On January 23, 2018, one skier was killed and many others were injured by the eruption of Mt. Motoshirane. Although it was able to grasp the approximate number of ski visitors, it is still not grasping the exact position of every skiers. So it is difficult to promptly terminate rescue and search activities despite the dangerous crater Mt. Fuji is an active volcano and it is said that the number of mountaineers during the year is 200 to 300 thousand people. In order to prepare for the eruption of Mt. Fuji, grasping the dynamics of these hikers in detail is important but also a difficult task. At the "Fujisan Challenge Project" started with volunteers inspired by the eruption of Mt. Ontake, we are doing various efforts to solve the problem of grasping climbers dynamics and also to enjoy safe and secure mountaineering.

Since 2015, The Fujisan Challenge Project is repeating the demonstration experiment of grasping climbers dynamics by beacon distribution. Through the experiment, we are trying to construct a system to trace the current position of each hiker within a certain range, with a coin sized transmitter using Bluetooth. We distribute this small transmitter with identification information to hikers and ask them to keep it during the mountain trip. Receivers are installed at certain places of the mountain trail, and when the hiker approaches, it is detected and recognized that it gets away when leaving from the hiker, and the information is transmitted to the server and aggregated. It is possible to grasp the detailed position of the mountaineer in real time as much as the installation interval of the receivers becomes dense.

We also ask a cooperation in a simple questionnaire at the monitor registration. The tendency was figured out that the 54% people is hiked Mt. Fuji for the first time, at the same time, 40% is a beginner hiker. In addition, the result of the climbing notification submission rate and the climbing insurance participation rate falling below 30% made the impression that it is difficult to grasp the mountaineers by the climbing notification. From the tracking by the beacon, various data such as the proportion of the summit stayers during the time period of the sunrise, the average course time of the hikers, the section time, the climbing rate, etc. are obtained. Such data can be expected to be utilized for purposes other than disaster prevention, such as eliminating congestion on the mountain path. The average beacon detection rate was about 75%. There is a markedly poor detection rate in some points, which is considered to be due to the equipment trouble being on the receiver side. As for the receiver which is operating properly, 100% detection rate can not be realized due to beacon failure etc. So from now on it is necessary to aim for 100% detection by installing the receivers in proper design and improving the function of the whole hardware. In this experiment, the monitor collaborators provided a service that allows users to browse information such as the current position and the congestion status of the climbing road on their mobile terminal, and also provided weather information. Mt. Fuji is a volcano where the location of the crater is

not known until just before eruption. By using such a real-time information provision system, it is also possible to send an appropriate evacuation route instruction in accordance with the position of the climber tracked by the beacon. In order to grasp the dynamics of mountaineers at Mt. Fuji there are still many remaining tasks, but we will continue to promote this Fujisan Challenge Project.

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