



Research on a New Method of Estimating the Potential Depth of Slope Failure Using the Airborne Electromagnetic Survey

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In Japan, at Ontake volcano in 1984 and Kurikoma volcano in 2008, parts of the volcanoes collapsed and large-scale sediment-related disasters occurred. These disasters were unrelated to volcanic eruption directly. We conducted the case studies by using the airborne electromagnetic surveys to investigate the slopes likely to induce landslides on such volcanoes.

The airborne electromagnetic surveys are the effective exploration tool when we investigate in extreme environments that person can't enter and it's necessary to investigate with wide range by a short time. The surveys were conducted by using a helicopter carrying the survey instruments; this method of non-contact investigation acquires resistivity data by the electromagnetic induction. In Japan, the surveys were conducted of 15 active volcanoes where volcanic disasters could have serious social implications. These cases focused on the seeking for the possible slopes that landslides would occur. However, the depth of the slope failure was not evaluated. Therefore in the study, we proposed a new method to determine the potential depth of slope failure.

First, we categorized the three characteristics as the cap rock type, the extended collapse type, and the landslide type on the basis of collapsed cases and paid attention to the slope of the cap rock type and also defined the collapse range based on the topography and geological properties. Second, we analyzed resistivity structure about collapsed cases with the differential filter and made clear that collapse occurred in the depth which resistivity suddenly changes. In other volcanoes, we could estimate failure depth by extracting the part which resistivity suddenly changes. In the study, we use the three volcanoes as the main cases, Hokkaido Komagatake, Asama Volcano, and Ontake volcano.