

Development of an optical remote sensing technique for volcanic surface phenomena observation to estimate hyperspectral data from multispectral data

*Tetsuya Jitsufuchi¹

1. National Research Institute for Earth Science and Disaster Resilience

Under the “Promotion Project for Next Generation Volcano Research B2:Development of remote sensing techniques for volcano observation, subtopic 2-2: Development of remote sensing techniques for surface phenomena of volcano”, the National Research Institute for Earth Science and Disaster Resilience (NIED) have been conducting a development of a visible multiband camera system to estimate hyperspectral data from multispectral data. This system consists of a 6 bands multi-band camera system and a spectrum estimation software that estimates dense spectrum information from sparse spectrum information from multi-band camera system. Modeling the relationship between hyperspectral data and multispectral data of igneous rock using multivariate analysis method, we have developed a spectrum estimation algorithm to estimate hyperspectral data from multispectral data for igneous rock sample. In this study, multiple regression analysis was applied to the hyperspectral and multispectral image data obtained by experiments of the volcanic rock samples, and we found this method can be used to estimate three hundred or more bands hyperspectral data from six bands multispectral data. We also develop the six band (six eyes) multi camera system for prototype of multi-band camera system for measuring the multispectral data required from our spectrum estimation algorithm. In this presentation, we describe multivariate analysis results of hyperspectral and multispectral image data of six species volcanic rock samples for realizing a spectrum estimation algorithm and demonstrate hardware of six band (six eyes) camera system for our prototype of multi-bands camera system.

Keywords: hyperspectral image, multispectral image, multiple regression analysis, visible remote sensing, igneous rock