

Micro-topographic survey on the block slope using UAV-SfM method: a case study on the west face of Mount Higashi-Nupukaushi, Shikaribetsu volcanic group, Hokkaido, Japan

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In the topographical analysis, it is definitely effective to employ the conventional methods such as total station combined with transit and laser ranger, for their systematized procedures with a high degree of precision. However, in hardly accessible areas, it is often difficult to survey using such above equipment. Instead, aerial photogrammetry and laser scanning with manned flight are normally used for surveying. But this method is too costly for independent researches to implement. In the last few years, SfM (Structure from Motion) based on photographs taken from UAV (Unmanned Aerial Vehicle) has attracted an interest for the creation of DSM (Digital Surface Model) and other morphometric products, as a much less labored and less expensive method than the above. There are a number of reports to testify the method in various environmental settings, showing enough accuracy to be discussed from a viewpoint of micro-topography. This presentation shows a result to have surveyed the block slope on the west face of Mount Higashi-Nupukaushi, Shikaribetsu volcanic group, using UAV-SfM method. Although it is conventionally considered that block slope has been formed under periglacial conditions, there are circumstances when it makes sense to understand the involvement of rapid mass movements in some cases. Anyway, detailed surveying has not been carried out in almost all block slopes on the steep mountain slopes. In a survey conducted by the authors in September 2015, 1124 airphotos were obtained by a UAV (Phantom3, DJI), producing DSM (Digital Surface Model) and an ortho-image for a detailed, high-definition topographic mapping of characteristic landforms.

Keywords: UAV-SfM method, block slope, Shikaribetsu volcanic group