

The observation using small UAV and SfM for landslide site

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Abstract. Recently, the study of using the Structure from Motion (SfM) from unstructured aerial images taken by some commercial optical sensors with small Unmanned Aerial Vehicle (UAV) has been increasing in several research fields. This new technique is used also in the study field of physical geography. The conventional methods for topographic measurement are aerial photogrammetry, laser scanning with manned flight and ground laser scanning however those methods are expensive and necessary for much time to prepare and practice for research. Therefore it is difficult for us to use those devices frequently. On the other hand, the new technique is inexpensive and not necessary so much time for preparing and practicing for research, and that provides point clouds, high resolution 3D modellings, Digital Surface Models (DSM) and orthophotographs. The study area is the landslide site by East-West Highway through Cameron Highland in Malaysia. Firstly, several photographs which were shot from sky using the commercial digital camera with the small UAV were obtained. Next, point clouds, high-resolutional 3D modelling, DSM, orthophotograph were generated by the calculation of those photographs data on the commercial SfM software in our work station. As a result, several detail information of the landslide site such as concrete surface data, las data, slope degree information and contour image could be obtained. Also, two seasonal (September and December 2014) data were obtained by two field surveys. Therefore, it was successful to compare with some landslide data of different times. In conclusion, the utility of SfM technique using small UAV, commercial optical sensor and commercial photogrammetric software in landslide sites was shown.

Keywords. UAV, SfM, landslide, point clouds, 3D modeling, DSM, orthophotograph