[EJ] Evening Poster | S (Solid Earth Sciences) | S-TT Technology & Techniques

# [S-TT49]Airborne surveys and monitoring of the Earth

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Airborne surveys are useful to better understand the whole and/or the detailed structures of the Earth and their variations. They can be implemented from a traditional manned and newly-developed unmanned aircraft to efficiently map very large or remote areas with difficult access. We invite studies on theory, instrumentation, processing, modeling or inversion and applications of airborne surveys.

# [STT49-P04]Three-dimensional modeling of volcanic landform using UAV photogrammetry – Impact of GCP and image overlap rate on model accuracy -

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In this study, we conducted three- dimensional modeling of volcanic landform using photogrammetry by UAV aerial photography with the aim of quickly grasp landform change. This method, which has been spread in recent years, can grasp landform change as not points but planes, and it is thought that this observation can be conducted inexpensively, quickly, and without high-risks. In this study, we investigated how some factors of UAV aerial photography influence the accuracy of 3D model created.

We conducted mission flight on November 4, 2017 at Kirishima Iwo-yama located Ebino city, Miyazaki prefecture. The UAV used on this study is DJI Mavic pro. The flying altitude was 70 m from the highest point in this area, and the resolution of the images was 2.2 cm/pix. The photographed area was about 0.26 km2, and we set frontlap: the overlap of image along flight route, to 90 %, and sidelap: the overlap of image between flight routes, to 60 %. The UAV flew 30 minutes, and we got 689 images during this flight. In addition, as Ground Control Points (GCP): the points used as standard of coordinates, we used five observation points conducted precise point positioning by the GPS of Kyushu University at Kirishima Iwo-yamasurvery.
Using Agisoft’s software Photoscan, we created a three-dimension model and Digital Elevation Model (DEM) from images taken.

After that, in order to investigate influence of some factors on the accuracy of these models, the following investigation was conducted. First, among the five points, we changed the number of points used as GCP, and confirmed how the accuracy of remaining points changed. Second, using four points as GCP, we changed the rate of overlap between images, confirmed how the accuracy of a remaining point changed.

As a result of first investigation, the more the points used as GCP increased, the better the accuracy of remaining points became. Especially, that of the point close to GCP became better. This means that when GCP is arranged unevenly, that of the modeled area where GCP doesn’t exist gets worse. As the result of second investigation, it was found that there are a little influence of the rate of overlap

between images on that of models. However, in this study, it was difficult to quantitatively evaluate how the rate of overlap tends to influence the accuracy of the models.

According the above result, in order to more investigate influence of the number and the location of GCP on the accuracy of the models, in the next time, we want to increase density by arranging additional GCP regularly, and conduct three-dimension modeling again. In addition, we also want to investigate influence of the flying altitude on the accuracy of the models.

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