

Comparison of measurement accuracy for DSM and orthomosaic between 2013 and 2016 UAV flights at Midori fault scarp, Neodani fault

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Purpose of this study is to compare measurement accuracy of digital surface model (DSM) and orthomosaic taken in 2013 and 2016, which are measured at Midori fault scarp in Neodani fault by Unmanned Aerial Vehicle (UAV). Resolution of aerial photograph was 3cm (in 2013) and 1cm (in 2016), and the number of aerial photographs covering the study area was 109 (in 2013) and 498 (in 2016), respectively. DSM and orthomosaic were produced from a dense point cloud, processed by Structure from Motion (SfM). Since real time kinematic-Global Navigation Satellite System (RTK-GNSS) survey gave 3-D coordinates (easting, northing, elevation) on 4 ground control points (GCPs) and evaluation points (EPs), the both productions were geo-referenced using GCPs. Then, horizontal coordinates and elevation of the EPs were measured on the orthomosaic and DSM, and finally, difference was calculated by subtracting GNSS-surveyed result from measurement result. It was found that horizontal root mean square error (RMSE) was 0.45m (in 2013) and 0.05m (in 2016), and vertical RMSE was 0.32m (in 2013) and 0.02m (in 2016), respectively. This result shows that 2016 observation gives 9 times (horizontal) and 16 times (vertical) better accuracy than 2013 observation.

Keywords: UAV, SfM, accuracy