

Mapping active faults by using small unmanned aerial vehicle and structure from motion: a case study on Midori fault

UCHIYAMA, Shoichiro^{1*} ; NAKATA, Takashi² ; INOUE, Hiroshi¹ ; KUMAHARA, Yasuhiro² ; SUGITA, Satoru³ ; GOTO, Hideaki² ; IZUTSU, Jun³ ; FUKUI, Hiromichi³ ; SUZUKI, Hinako¹ ; TANIGUCHI, Kaoru⁴

¹National Research Institute for Earth Science and Disaster Prevention, ²Hiroshima University, ³Chubu University, ⁴National Institute of Advanced Industrial Science and Technology

We photographed the geomorphometry of the Midori fault scarp formed by the 1891 Nobi earthquake in Motosu city, Gifu Prefecture (Japan) by using a multirotor radio control helicopter as a small unmanned aerial vehicle (sUAV), and we analysed these images. A digital surface model (DSM) of 0.09 m mesh and an orthophoto with a resolution of 0.03 m were generated from these images by PhotoScan software produced by structure from motion (SfM). A topographic map with 1 m interval contours and a cross-section profile were processed using a DSM produced by ArcGIS. We expect that the new technology will be applied to tectonic landform survey and geomorphology research. In addition, our results should help to ensure flight safety and compliance with the law.

Keywords: structure from motion (SfM), small unmanned aerial vehicle (sUAV), digital surface model (DSM), orthophoto, geomorphometry, midori fault scarp

