

Elevation change in a river park flooded by the typhoon Hagibis in 2019

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The typhoon Hagibis, which landed in Japan in October 2019, caused severe damage in a wide area of eastern Japan, including Fukushima Prefecture. In the Niida River basin, which drains into the coastal area of Fukushima Prefecture, heavy rains of over 300 mm were observed between Oct. 11 and 12. As a result, a river park near the confluence of the Niida River and its tributary, the Kitagawa River, was severely damaged by large-scale erosion and sedimentation. In this study, we aimed to evaluate the elevation change due to the flood event based on the detailed DSM obtained by photogrammetry using UAV. Five hundred and eighty three photo images were obtained with a UAV (Phantom 4 ver.2, DJI) flying at a height of 50 m on November 28, 2019. In addition, the latitude & longitude and the altitude of eleven ground-control-points (GCPs) were measured with a differential GPS receiver (GIR1600, Sokkia) and an auto level (AP-8, Nikon), respectively. Using the above data, a 50 cm-digital surface model (DSM) was created with a MfS software, Agisoft photoscan 1.4.5.

Five survey lines were set in the observation area, and comparison was conducted between the cross sections of the 50 cm-DSM obtained in the present study and a 1 m-digital elevation model (DEM) based on the laser survey performed by Geographical Survey Institute in 2012. At the left bank of the Niida River, the edge of the river park was greatly eroded up to 26 m horizontally, while new gravels were deposited near the right bank.

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