



## **UAV Measurement of the 2015 Large Flood Impact in Kinugawa River on Riverine Vegetation and Channel Form Changes**

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This presentation gives the results of field observation for a flood impact on riverine environment measured by using an unmanned aerial vehicle (UAV). The flood we examined occurred on September 9-10, 2015 in Kinugawa River, Japan, owing to the heavy rainfall that brought tremendous volume of water on the Kanto and Tohoku regions of Japan. In Kinugawa River, the largest record flood occurred in this time, resulting in the levee failure and the corresponding flood disaster in Joso City located in the downstream part of Kinugawa River, as well as the large flood impact on the riverine environment in the Kinugawa channel network.

In order to investigate the very initial state of the after-flood-impact throughout the channel network, 13 channel sections with 2 km in longitudinal length were chosen and observed in October 2015. Orthochromatic images of the river channel sections obtained by the UAV measurement with a geographic information system (GIS) were used for analyzing the changes in riverine vegetation distributions and channel form profiles. The results show that there exist three characteristic river segments having different impact-response states in vegetation and channel form changes. The river sections in the most upstream segment indicated severe damage of trees and herbs as well as large movement of gravel bed material, while those in the most downstream segment showed relatively small damage in vegetation distribution and small change in channel forms. Furthermore, relationships between the vegetation damage, channel deformation, channel slopes, and bed shear stresses calculated by a numerical simulation model were discussed in detail along the river network.