

## Monitoring the sediment movement in deep-seated landslides in Nara Prefecture utilizing UAV

SAKAGAMI, Masayuki<sup>1\*</sup> ; KANAI, Hiromichi<sup>1</sup> ; SHIMIZU, Mikiteru<sup>1</sup> ; HORI, Daiichiro<sup>1</sup>

<sup>1</sup>Kokusai Kogyo Co., Ltd.

By the great floods in Kii Peninsula in September, 2011 large-scale of slope failure occurred frequently in the wide area of the southern part of Nara Prefecture, and gave serious damage to many houses as well as human lives. In the area of deep-seated landslides in 2011, the heavy rain subsequent to the typhoons caused a secondary sediment movement. It is, therefore, very important to perform continuous monitoring in this area. In this presentation, we examined the possibility of monitoring sediment transport using UAV. Among 60 locations of large-scale collapse by the great floods in Kii Peninsula, 11 places were selected and survey using UAV was conducted in order to investigate sediment transportation around the landslide.

The field survey was carried out on the 11th and 12th of November, 2014. Flight speed was set between 20 and 45km/h. The longest flight with automatic navigation was about 14km (one way 7km). The flight of UAV with rotary wings in steep terrain may be the first trial in the world. We have investigated both of the photographs taken by the UAV and the ones by airplanes or helicopters in the previous research, and detected the change of terrain and vegetation. We also calculated with deference analysis the amount of the sediment movement on the slope where measurement data of laser survey were obtained immediately after the landslide. As the result we could detect the change of the followings,

- Topographic change of terrain such as erosion of cliff, flow channel of small rivers, development of gully.
- Change of vegetation such as outflow of fallen trees and elimination of woods.
- Amount of sediment erosion at the lower part of the landslide within one or two year.

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