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# Drifted Wood distribution in Asakura (Kyushu) following the 2017 rain-triggered Debris-flows and Landslides

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Typhoon, can be considered as the main trigger for landslides in Japan. In july 2017, the Nanmadol typhoon hit Kyushu Island, South Japan, triggering approximatively 1,500 landslides between the municipality of Fukuoka and Asakura, killing 37 people (Marutani et al., 2017). This region of Kyushu island is usually considered to be relatively dry, but on July 5th, 2017, an unusually warm sea surface brings rainfall exceeding 540 mm in 24 hours in the Asakura area.

The Japanese Meteorological Agency has then warned that climate change was to potentially bring more of heavy-rainfall events to Kyushu, an island which is highly susceptible to landslides and debris flows. In addition, the study area is located in a landscape where agriculture (rice paddies) and forestry practices has progressively decreased and cultivated lands have been replaced by tree plantations while forestry is important for slope erosion, forest management and maintenance, especially for dead wood that can amplify morphological hazard impact. Furthermore, these catastrophic events take place in a context of agricultural deprivation (rural population is 6 % of the national population) and an ageing population.

For instance, during the 2017 event, in the Kagetsugawa river catchment rainfalls (40 to 45 mm/h) were translated into the river stage rising from almost a dry bed to a flood of 3.35 m height, with the rising limb of the flood occurring between 14h and 19h on the 5th (Komuro and Akamatsu, 2018). The flood event associated to shallow landslides and mudflows provided a large amount of sediment and drifted wood in the valley bottom (tonnage of timber estimated to reach 200,000 for single valleys) and at the outlet of the catchment inducing serious damages to infrastructure and buildings were the populations live.

The aim of our study is to understand the logic of distribution of the transported drifted wood in the valleys using remote sensing methods to understand in which way it can amplify the impact the natural hazard event.

The first step of our study is to propose an exhaustive inventory and typology of the mass movements that have occurred in order to define the specific context of their occurrence, especially in which type of forest management. The second step focuses on the drifted wood transportation (number of trees, deposit location, distance covered. . . ) to correlate it to the type of mass movement.

We actually focused on a 500km$^2$ study area, in the upstream part of the tributary catchments. The results show that according to the landslide type, trees were transported and deposed in various manners. Most of them were transported through the torrential system and deposed to the main valley, highly facilitated by a strong hillslope-channel connectivity. In turn the location of the drifted wood is conditioned by the timing of the mass movement. Mass movements that occurred after the peak flow occur can be trapped on the surface of fans without remobilization from the main river, while timber brought into the river system before the peak flood have been removed and redistributed along the river.