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# Understanding triggers and dynamics of wood-laden flash floods in mountain catchments: examples from the Zulg River (Switzerland)

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Mountain rivers are prone to flash floods, and in forested basins, large quantities of wood can be moved and transported long distances downstream during such events. Under certain circumstances, congested transport of wood may result in wood-laden flows in which a large number of logs form a mass moving together with the flow and thus alter its dynamics. This process could significantly increase the flood hazard and risk, however, the knowledge about the formation of these wood-laden flows is still very limited. The Zulg River (23 km long and 89 $km^2$ drainage area) is located in the Swiss Prealps in the canton of Bern (Switzerland). In the Zulg catchment, heavy local precipitation usually leads to a fast reaction of the water level downstream and very often flash floods are transporting significant volume of wood. There are several bridges crossing the river at the area of Steffisburg and downstream of this town the Zulg flows into the Aare River that crosses the city of Bern few kilometres downstream. Therefore, a better understanding of these processes will help to improve the flood risk management of the region. In this work we are analysing four recent floods (i.e. 2012, 2013, 2015 and 2016) with significant wood transport and the goal is to decipher the triggering and formation of the wood-laden flash floods. We collected aerial pictures from before and after each flood to map the pre- and post-flood conditions and mapped riverscape units, landslides and the wood logs and jams already deposited along the river channel. The forest stand volumes recruited during the events is analysed based on the land use maps available and provided by the Cantonal Forest Service. We also analysed movies taken by witnesses during these flash flood events, which may potentially provide highly valuable information (i.e. the amount and type of wood in motion or what was roughly the velocity and direction of the water) to quantify wood fluxes. However, the usage of these home movies is challenging and we are applying different techniques to extract as much information as possible from these kind of videos. Results will shed light into the dynamics of the wood-laden flows estimating wood fluxes and volumes in the Zulg River, but they will also contribute to better understand these processes in mountain rivers in general.

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