Simulating cascading rainfall-triggered landslide hazards in the Philippines

Clàudia Abancó[1], Georgina Bennett[1], Adrian Mathews[1], Fibor Tan[2]

[1] University of East Anglia, School of Environmental Sciences
Norwich Research Park, Norwich, Norfolk, NR4 7TJ, UK
e-mail: claudia.abanco@gmail.com

[2] Mapua University
School of Civil, Environmental and Geological Engineering
Manila, Philippines

ABSTRACT

Landslides and floods driven by typhoon and monsoon rainfall cause thousands of fatalities and millions of pesos in damage to infrastructure and commerce in the Philippines each year. The Philippines accounts for 46% of rainfall-triggered landslides in SE Asia, although it represents only 6% of the land area [1].

Despite the prevalence of landslides in the Philippines and wider SE Asia region, there is limited research into the drivers of landslides and particularly their cascading hazards, such that existing landslide and flood hazard maps are limited. Even if some landslide inventories exist, they are lacking landslide magnitude, which makes it difficult both to assess their magnitude-frequency relationships (major component of hazard assessment) and to provide landslide sediment delivery to the river network (needed for better prediction of channel morphodynamics, flood risk and reservoir management).

The main goal of the SCaRP (**S**imulating **C**ascading **R**ainfall-triggered landslide hazards in the **P**hilippines) project is to characterize, model and improve prediction of cascading landslide hazards in the Philippines, with a focus on Rainfall Induced regional Landslide events or (RILs). RILs are particularly frequent in the Philippines and may occur and interact with flooding. Cascading landslide hazards that will be considered are: a) the formation of landslide dams in river channels and associated outburst flood hazard, 2) landslide-flood hazard interactions such as bulking of the flow by sediment that amplify flood erosion and inundation hazard and 3) delivery of large quantities of sediment downstream that may go on to cause problems such as reduced channel and reservoir capacity.

SCaRP is a multidisciplinary project co-led by researchers based in the UK and the Philippines. Several methodologies will be applied to meet the goals of the project. On one hand, in-situ monitoring techniques and earth observation will be applied to map and characterize landslide extension and gather sediment availability data. On the other hand, hydraulic, hydrologic and sediment transfer modeling [2], will be applied. Finally, detailed analysis of the meteorological drivers that triggered RILs will be perfomed and compared with existing rainfall thresholds for landsliding in some regions.

REFERENCES

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