



Urbanized areas, natural hazard and risk in Rwanda.

Emmanuel Nduwayezu (1), Michel Jaboyedoff (1), Marc-Henri Derron (1), Antoine Guerin (1), François Noël (1), Jean-Baptiste Nsengiyumva (2), and Emmanuel Twarabamenye (3)

(1) University of Lausanne, Institute of Earth Science, Lausanne, Switzerland (emmanuel.nduwayezu@unil.ch), (2) Ministry of Disaster Management, Kigali Rwanda, (3) University of Rwanda. College of Science and Technology

Landslides and inundations are considered as one of the most relevant damaging processes in Rwanda. The rapid urbanization in a country with a disrupted habitat culture has led to a congestion of capital, which concentrates all services. This has, among other things, a particular form of nature and impacts of natural hazards. For example the effect of the torrential rain on 23 February 2013 which killed 3 people in their car.

After an overview on the natural hazards of Rwanda, we will talk about the problems of the natural hazards due to rains in a watershed of Kigali (natural hazards analysis database and GIS data problematics). Then we will proceed with some debris flows / landslides modelling, including source areas identification and potential propagations zones, with regard to the built-up areas and available maps. We will discuss aspects of conceptual multi-hazards and complex natural systems for a city; and how to communicate for sustainable solutions.

References:

Horton, P., Jaboyedoff, M., Rudaz, B., and Zimmermann, M.: Flow-R, a model for susceptibility mapping of debris flows and other gravitational hazards at a regional scale, *Nat. Hazards Earth Syst. Sci.*, 13, 869-885, doi:10.5194/nhess-13-869-2013, 2013.

Jaboyedoff M. et alii; "Preliminary mass movement susceptibility mapping using DEM and Lidar DEM" In B. PRADHAN and BUCHROITNER (eds), *Terrigenous Mass Movements*. DOI: 10.1007/978-3-25495-6_5, Springer-Verlag, Berlin Heidelberg, 2012 pp.109-170.

MIDIMAR, National Risk atlas of Rwanda. Kigali 2015.