Geophysical Research Abstracts
Vol. 16, EGU2014-14858, 2014
EGU General Assembly 2014


# Debris Flow Hazard Map Simulation using FLO-2D For Selected Areas in the Philippines

Peter Khallil Ferrer (1,2), Francesca Llanes (1,2), Marvee dela Resma (1,2), Victoriano II Realino (1), Julius Obrique (1), Iris Jill Ortiz (1,2), Dakila Aquino (1), Rodrigo Narod Eco (1,2), Alfredo Mahar Francisco Lagmay (1,2)

(1) Nationwide Operational Assessment of Hazards, Department of Science and Technology, Philippines, (2) National Institute of Geological Sciences, University of the Philippines, Diliman, Quezon City, Philippines

On December 4, 2012, Super Typhoon Bopha wreaked havoc in the southern region of Mindanao, leaving 1,067 people dead and causing USD 800 million worth of damage. Classified as a Category 5 typhoon by the Joint Typhoon Warning Center (JTWC), Bopha brought intense rainfall and strong winds that triggered landslides and debris flows, particularly in Barangay (village) Andap, New Bataan municipality, in the southern Philippine province of Compostela Valley. The debris flow destroyed school buildings and covered courts and an evacuation center. Compostela Valley also suffered the most casualties of any province: 612 out of a total of 1,067. In light of the disaster in Compostela, measures were immediately devised to improve available geohazard maps to raise public awareness about landslides and debris flows. A debris flow is a very rapid to extremely rapid flow of saturated non-plastic debris in a steep channel. They are generated when heavy rainfall saturates sediments, causing them to flow down river channels within an alluvial fan situated at the base of the slope of a mountain drainage network. Many rural communities in the Philippines, such as Barangay Andap, are situated at the apex of alluvial fans and in the path of potential debris flows. In this study, we conducted simulations of debris flows to assess the risks in inhabited areas throughout the Philippines and validated the results in the field, focusing on the provinces of Pangasinan and Aurora as primary examples. Watersheds that drain in an alluvial fan using a 10-m resolution Synthetic Aperture Radar (SAR)-derived Digital Elevation Model (DEM) was first delineated, and then a 1 in 100-year rain return rainfall scenario for the watershed was used to simulate debris flows using FLO-2D, a flood-routing software. The resulting simulations were used to generate debris flow hazard maps which are consistent with danger zones in alluvial fans delineated previously from satellite imagery and available DEMs. The simulation was further verified with field assessment. Results show that a total of 135 barangays with 252,405 people in Pangasinan and 25 barangays with 34,495 people in Aurora are at risk of flood and debris flows.