Geophysical Research Abstracts
Vol. 17, EGU2015-10712, 2015
EGU General Assembly 2015

Rapid delineation of alluvial fans using IfSAR-derived DEM for selected provinces in the Philippines

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Alluvial fans are fan-shaped geomorphic features formed when sediments from a watershed are transported and deposited downstream via tributaries flowing out from the sudden break of a slope. Hazards usually associated with alluvial fans are flooding and debris flows. In this study, we used an Interferometric Synthetic Aperture Radar-derived digital elevation model of Pangasinan and Nueva Ecija Provinces in the Philippines to identify and delineate alluvial fans. Primary parameters considered include the geomorphic characteristics of the catchment area, stream network and slopes ranging from 0.11 to 8 degrees.
Using this method, 12 alluvial fans were identified in Pangasinan and 16 in Nueva Ecija with areas ranging from 0.35 to 80 sq. km. The largest fan identified is the Mangatarem-Aguilar fan in Pangaisnan with a total area of 80.87 sq km while the Gabaldon fan in Nueva Ecija with total area of 48.11 sq km. We observed from the results that some alluvial fans have multiple feeder streams, and others have overlapping lateral extents with adjacent fans. These overlapping fans are called bajadas. In addition, the general location of fans and their apices in the two provinces appear to coincide with segments of the Philippines Fault System. There are about people 1.4 million living within these alluvial fans. Mapping and characterizing and identifying their associated hazards is crucial in the disaster preparedness efforts of the exposed population.