



## **Analysis of triggering factors of composite landslide near Rampac Grande, Peru**

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A detailed account of the landslide that took place between 09.00 and 10.00 am on April 25th, 2009 near the village of Rampac Grande in northern Peru (department of Ancash) is presented. Seven houses were completely destroyed, two more damaged and 5 people died during the event. Archive information, remotely sensed data and detailed field investigations including sampling were applied to describe the event. Archive information revealed long term landslide activity of the described area dated back as far as to the 19th century. The landslide is a deep-seated composite rotational-translational earth slide - earth flow. Comparison of series of satellite images allowed for landslide kinematics description showing large differences in material mobility. Field evidences suggest fast movement of its material in the transportation zone.

The affected community was highly suspicious that a mining company had triggered the slope movement during illegal geological survey for metal extraction. No evidence proved the anthropogenic activity as triggering factor. The landslide was likely caused by the considerable amount of cumulative precipitation during the 2008/2009 rainy season, which was well above average precipitation amount calculated for 1955 - 2009. Several possible sources of future landslide reactivation have been identified. Namely, there are several rock blocks detached from the massif by cracks which toe is undercut by the transported landslide material. These blocks are in a temporarily stable state. We suggest that during rainy seasons with average or below average cumulative precipitation only a small amount of material, if any, might be reactivated. Nevertheless, if similar cumulative rainfalls of the 2008/2009 rainy season occur again, then reactivation of a large portion of the composite landslide may be expected.

The affected community and local authorities have only limited possibilities for managing the landslide hazard and risk, and thus the first step to proper handling of this problem is to admit the natural causes of the landslide occurrence. For this reason, a poster has been produced for the local community. It provides basic information about the event, preceding landslide occurrences and risk which the landslide imposes on nearby houses. Understandable and easy to implement measures are proposed to outline basic strategy for management of the potential future landslide hazard and to minimize losses. The poster was prepared in Spanish and distributed to the local authorities and state agencies responsible for natural disaster mitigation. We hoped that this simple method of knowledge dissemination will provide a fundamental bridge between the efforts of research scientists and the needs of the local community.