

Modelling the behaviour of a large landslide at Reunion Island (Grand Ilet)

Séverine Bernardie, Bertrand Aunay

▶ To cite this version:

Séverine Bernardie, Bertrand Aunay. Modelling the behaviour of a large landslide at Reunion Island (Grand Ilet). EGU General Assembly 2012, Apr 2012, Vienne, Austria. hal-00678382

HAL Id: hal-00678382 https://brgm.hal.science/hal-00678382

Submitted on 12 Mar 2012

HAL is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers. L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.

Modelling the behaviour of a large landslide at Reunion Island (Grand llet)

S. Bernardie (1), B. Aunay (2)

- (1) BRGM, Orléans, France (s.bernardie@brgm.fr),
- (2) BRGM, Regional Geologic Service of Languedoc-Roussillon- Montpellier, France

One of the main challenges in active landslide monitoring concerns the prediction of slope's movements in the near future. Understanding the initiation mechanisms of the mass movement is a key towards predicting its evolution.

This study concerns a large landslide in the Reunion Island (Grand Ilet), where the extreme climatic conditions (cyclonic activity) produce large deformations within the active landslide, resulting in displacements large as 3 cm per 12 hours. The surficial moving layers are constituted two layers: the first one is characterised by heterogeneous volcanic terrains; the upper layer is constituted of breccia materials resulting from ancient debris avalanche. The thickness of the surficial moving layers is high, ranging from 80m to 200m.

The objective of the study is to understand the mechanisms leading to the evolution of the mass movements. For that, characterization of the site, monitoring of the movement, and modelling the hydromechanical processes are necessary. Moreover, different hypotheses of the initiation of the landslide have to be tested. In particular, the evolution of the water level correlated to the precipitations, as well as the erosion of the toe of the landslide, are analyzed.

Characterization of the landslide is performed through different *in situ* measurements, such as electrical tomography. It permits to assess both the geometrical and geomechanical characteristics of the unstable mass. *In situ* mechanical tests have also been realized to obtain geomechanical parameters useful for the hydromechanical model. All the measured geometry and parameters of layers are then included in a 2D finite element model. The computations are performed using a finite element code with an infinitesimal strain and two-phase formulation assumptions. Preliminary geomechanical simulations are realized, permitting to highlight the hydraulic conditions changes on the mechanical behavior of the landslide. The computed displacements are then compared to the recorded data. The results are analyzed and discussed.