

OFAI: 3D block tracking for a real-size rockfall experiment in the weathered volcanic context of Tahiti, French Polynesia

Thomas Dewez, Aude Nachbaur, Christian Mathon, Olivier Sedan, Frédéric Berger, Emmanuel Des Garets

▶ To cite this version:

Thomas Dewez, Aude Nachbaur, Christian Mathon, Olivier Sedan, Frédéric Berger, et al. OFAI: 3D block tracking for a real-size rockfall experiment in the weathered volcanic context of Tahiti, French Polynesia. EGU General Assembly 2010, May 2010, Vienne, Austria. pp.4104. hal-00533887

HAL Id: hal-00533887 https://brgm.hal.science/hal-00533887

Submitted on 8 Nov 2010

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. Geophysical Research Abstracts Vol. 12, EGU2010-4104, 2010 EGU General Assembly 2010 © Author(s) 2010



OFAI: 3D block tracking for a real-size rockfall experiment in the weathered volcanic context of Tahiti, French Polynesia

Thomas Dewez (1), Aude Nachbaur (1), Christian Mathon (1), Olivier Sedan (1), Frédéric Berger (2), and Emmanuel Des Garets (3)

(1) BRGM, Natural Risks Department, Orleans, France (t.dewez@brgm.fr), (2) CEMAGREF, Grenoble, France, (3) Land Management Authority, Papeete, French Polynesia

The Land Management Authority of French Polynesia contracted BRGM to run a real-size rockfall experiment name-coded OFAI in September 2009. The purposes of the experiment are two fold: first observe real-size rock trajectories in a context of variably weathered volcanic rock slopes; and second, use observed rockfall trajectories to calibrate block propagation numerical models (see Mathon et al., EGU 2010, this session). 90 basalt blocks were dropped down a 150-m-long slope made of hard basalt veins, lenses of colluvium and erosion channels covered in blocks of various sizes. Parameters of the experiment concerned the shape (from nearly perfect sphere to elongated cubes) and mass of the blocks (from 300 kg to >5000 kg), and the launching point, in order to bounce the blocks both off stiff basalt veins and colluvium lenses.

The presentation addresses the monitoring technique developed to measure block trajectories in 3D and the variables extracted from them. A set of two 50-frame-per-second digital reflex cameras (Panasonic GH1) were installed on two prominent vantage points in order to record block motion in stereoscopy. A series of ground control points, surveyed with centimetre accuracy, served to orient pairs of images in the local topographic reference frame. This enabled the computation of block position at 50 Hz along a section of ca. 30-m-long slope, constrained by the cameras field of view. These results were then processed to extract parameters, such as velocity (horizontal, vertical, rotational, incident and reflected), number of impacts, and height of rebounds in relation with ground cover properties.