Geophysical Research Abstracts
Vol. 15, EGU2013-9172-1, 2013
EGU General Assembly 2013

Dynamic rock fragmentation during a landslide

Vincent Langlois
Laboratoire de Géologie de Lyon, Université Lyon 1 / ENS Lyon / CNRS, Lyon, France (vincent.langlois@univ-lyon1.fr)

We present a numerical simulation of the failure, collapse and spreading of a brittle granular mass. While many computational studies have modeled the collapse in order to understand the runout distance of a debris avalanche, they are mostly restricted to cohesionless monodisperse granular materials, where no segregation occurs.

We used a two-dimensional discrete element method with Molecular Dynamics techniques to study the dynamics of an assembly of grains that are initially held together by a cohesive force. This granular column is let to collapse on a horizontal or slightly sub-horizontal surface, under the influence of gravity. During the subsequent flow, cohesive bonds are irreversibly broken, leading to the fragmentation of the initial mass into smaller and smaller blocks.

We first investigate the location of the successive slip surfaces that appear in the granular column and show that the run-out distance of the flow is always inferior to that of a cohesionless column. We then study the comminution of rocks during the flow and characterize the final distribution of the different block sizes in the deposit.