



## **Experimental investigation of the "levees" formation after unconfined granular flows**

S. Deboeuf (1), E. Lajeunesse (1), O. Dauchot (2) and B. Andreotti (3)

(1) Institut de Physique du Globe de Paris, Paris, Fr (2) Service de Physique de l'Etat Condense, Saclay, Fr (3) Laboratoire de Physique et Mecanique des Milieux Heterogenes, Paris, Fr

The classical "channel-levees" deposit morphology observed after natural granular flows, such as rock avalanches or pyroclastic flows, is investigated in laboratory experiments with a simple flow geometry.

Granular material is released on a rough inclined plane at a constant mass flow rate and image analyses allow to study the temporal evolution of both morphological and dynamical characteristics with respect to the values of the mass flow rate and the slope angle. Although the mass flow rate remains constant during the complete experiment, the flow morphological characteristics evolve with time : the granular flow slowly enlarges while its thickness decreases.

As a result of this non-stationary dynamics, the morphology of the deposit and the presence of levees strongly depend on the flow duration. After a short flow duration, the deposit exhibits a classical levees-channel morphology ; however the levee thickness progressively decreases when the flow duration is increased ; after a very long time duration, the levees eventually vanish. Experimental evidences reveal the early presence of levees during the flow, even before the arrest phase, in the form of a static substratum under the flowing grains.