Laboratory granular landslides.

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A main objective in landslide research is to predict how far they will travel. A well-known feature for natural systems is the positive correlation between landslide volume and landslide runout [1] , so that larger landslides can travel manytimes further than one can naively predict using the energy balance between initial potential energy and frictional dissipation. However a complete description of landslide runout requires in principle accounting for numerous and complex parameters.

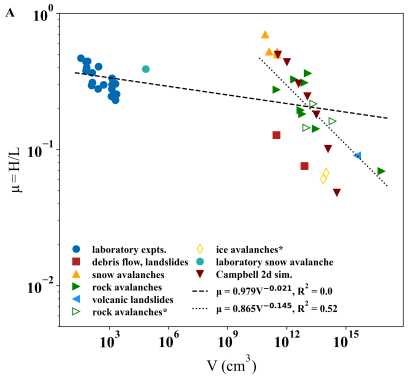

Figure 1. Comparison of experiments with field data using the usual normalized runout (the ratio between the travel distance and the initial height of the mass) showing the scale separation in the landslide size.

Here we performed miniature granular landslides in the laboratory using a simplified geometry and focused on the maximum travel distance, the landslide runout. Despite the apparent scale separation, we first managed to reproduce the decrease in friction with the landslide size observed for natural systems [2] (cf. Fig.1). Then by taking part of the relative simplicity of our set-up, we quantified the influence of grain size, fall height, landslide volume and surface roughness on runout distance [3]. We found that correctly accounting for the fall height and the grain size distribution not only yields an improved correlation of normalized runout, but also quantitatively unites laboratory and field data, bringing together many kinds of mass movements that are often treated differently.

Références

1. A.Heim, *Bergsturz und menschenleben*, , 20 ((Fretz & Wasmuth, 1932).
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