Minicolloque n° MMM11 ☒ **Oral** □ **Poster**

Dilation dynamics in a continuous granular fault

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We analyze the dilation of the system in a cylindrical granular fault consisting of one single layer of disks submitted to both normal pressure and continuous and slow shear, which results in intermittent and sudden energy release events that reproduce the main laws of seismicity. The dilation of the system can be separated into two parts: a smooth increase of dilation, plus sudden changes both contracting and dilating the medium, which are correlated to abrupt jumps -both positive and negative- in the measured resisting torque. We explain the four possible (and existing) general scenarios combining those two variables: dilation jumps and torque jumps, thanks to the assumption of an optimal local angle in the direction of force chains, and each reorganization of the structure as a replacement of the force chain holding most of the applied stress. The average rate of increase of global dilation varies monotonically with the size of the energy release event, making dilation a plausible candidate to predict catastrophic events in such earthquake-like systems.

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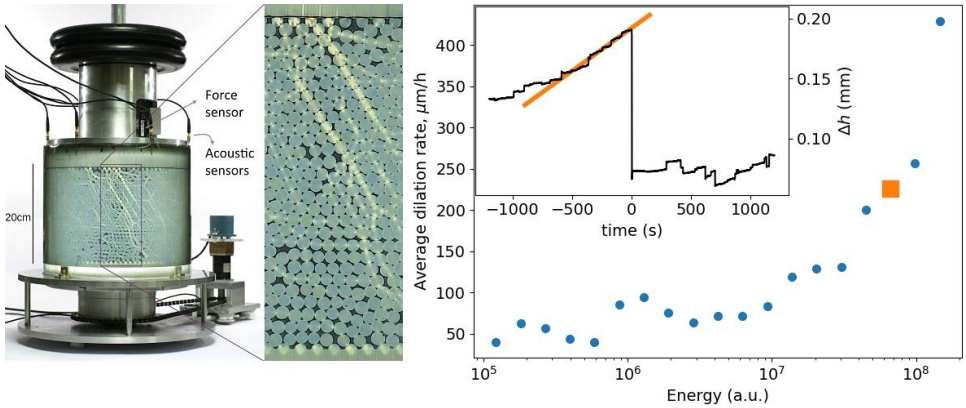

Figure 1 : Left: our shearing setup, with a zoom on the granular medium showing force chains. Right: average dilation rate prior to events based on their energy.