



A laboratory experiment to explore ice brittle deformation

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The brittle deformation of ice has important environmental applications, mostly regarding to our understanding at the future evolution of ice sheet and sea ice. Our work aims at characterizing how a thin layer of ice deforms when subjected to a constant shear rate, over long duration. In particular, we seek how micro-fracturing takes place along a macro-rupture, how it is distributed in energy, time and space distribution, and how much this micro-fracturing contributes to the overall deformation. The experiment set-up involves a thin layer of ice formed on top of a water tank is mechanically deformed in torsion with a circular Couette-like geometry. Waves propagation is characterized and a micro-seismic monitoring of the fault is performed using accelerometers to investigate the space and time distribution of rupture events according to an imposed loading. We also observe repeating fracture events that give to us an insight on the local slip accommodated by an asperity.