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Scaled models of the subduction interplate seismic cycle

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The majority of large and devastating earthquakes occur on the subduction-overriding plate interface. Unfortunately, the absence of directs observables and a short (i.e. limited to the last century) instrumental seismic record disadvantages the understanding of the process.
Here, supported by a preliminary study of rheological and tribological (i.e. study of interacting surfaces in relative motion) properties of a gelatin-on-sandpaper system, we present a novel analog model of subduction interplate seismicity which is one of the task of an interdisciplinary study realized in the framework of the ESF (European Science Foundation) - EURYI project 'Convergent margins and seismogenesis: defining the risk of great earthquakes by using statistical data and modeling'. The model, which includes realistic tectonic loading, viscoelastic rheological response of the forearc as well as rate- and state-dependent friction of the interplate surface, is able to generate deformation time series comparable to subduction interplate seismic cycle.
Preliminary results demonstrate that this model could provide a robust tool for overcoming the limited observational time span. Moreover, it give us the opportunity to explore systematically the plate tectonic setting (e.g. dip of the subducting plate and subduction velocity) influence on maximum size and recurrence intervals of great earthquakes at subduction zones and also possible cause-effect relationship. Finally, using the Feature Tracking image analysis technique we provide insights on the experimental rupture mode.