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## Viscous heating triggers strain localization: Experimental evidence

**Claudio Madonna**<sup>1</sup>, Yury Podladchikov<sup>2</sup>, and Jean-Pierre Burg<sup>3</sup>

<sup>1</sup>Structural Geology and Tectonics Group, Geological Institute, Department of Earth Sciences, ETH Zurich, Zurich, Switzerland. (claudio.madonna@erdw.ethz.ch)

<sup>2</sup>Earth Sciences, University of Lausanne, Switzerland

<sup>3</sup>Geological Institute, Department of Earth Sciences, ETH Zurich, Zurich, Switzerland.

Strain localization is a natural deformation process that has been variously attributed to brittle, chemical or geometrical precursors. Despite some theoretical consideration, experimental evidence for temperature softening was lacking. We report thermally-activated strain localization in prismatic samples of homogenous and isotropic glassy polymer. Uniaxial compression was performed at room temperature and at different but constant displacement rates while the temperature was captured with an infrared camera. Results show temperature increase due to viscous heating along planar zones before any rupture along these zones. We validated the experimental results with a thermo-mechanical numerical model. This experimental investigation extrapolated to geological conditions shows that viscous heating can induce strain localization in all levels of deforming lithosphere.