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## The Mw4.9 Le Teil surface-rupturing earthquake in southern France: New insight on seismic hazard assessment in stable continental regions

Jean-François Ritz<sup>1</sup>, Stéphane Baize<sup>2</sup>, **Matthieu Ferry**<sup>1</sup>, Christophe Larroque<sup>3</sup>, Laurence Audin<sup>4</sup>, Bertrand Delouis<sup>3</sup>, and Emmanuel Mathot<sup>5</sup>

<sup>1</sup>CNRS, Geosciences Montpellier, Montpellier, France (jean-francois.ritz@gm.univ-montp2.fr)

<sup>2</sup>Institute of Radiological protection and Nuclear Safety (IRSN), Fontenay-aux-roses, France

<sup>3</sup>Géoazur, CNRS-IRD-OCA, Université de Nice Sophia Antipolis, Valbonne, France

<sup>4</sup>ISTerre, IRD-CNRS-Université Grenoble Alpes, Grenoble, France

<sup>5</sup>Terradue Srl, Rome, Italy

On November 11th 2019, a Mw 4.9 earthquake shook the Rhone River Valley in southern France, a rather densely populated area with many industrial facilities including several nuclear power plants. The “Le Teil” earthquake was felt as far as Montpellier and Grenoble, 120 km from the epicenter. Seismological data promptly showed that the earthquake corresponded to a reverse faulting event along a NE-SW trending fault with a focus at a very shallow depth (~1 km). In parallel, satellite-based radar observations (InSAR) showed the uplift of the SE compartment (up to 10 centimeters) along a sharp NE-SW trending ~4.5-km-long discontinuity. Field investigations conducted in the following days and weeks in the epicentral area uncovered several evidences of surface ruptures across roads and paths where the InSAR discontinuity is mapped. We also carried out airborne LiDAR surveys to map the rupture below the dense forest cover. Characteristics of surface deformations are fully consistent with InSAR and seismological data, and allow concluding to the reactivation of an Oligocene normal fault segment (i.e. La Rouvière fault) that belongs to the Cévennes fault system, a 120 km long polyphased system bounding the southern rim of the Massif Central. The absence of clear cumulative compressional deformation along the fault rupture, which on the contrary displays inherited extensional deformation (most likely Oligocene in age), suggests that the fault has not moved significantly since millions of years. These observations relaunch the question of seismic hazard assessment in stable continental regions such as continental France and most of Western Europe, where strain rates are very low.