



## **Three volcanoes triggered: Dynamic stress interaction of the 2002 Palermo earthquake, Stromboli eruption, Panarea hydrothermal activity and Mount Etna eruption**

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In September 2002 a series of tectonic earthquakes occurred offshore north of Palermo, Sicily, and were followed by a sequence of volcanic activity. In October 2002 Mount Etna commenced a large eruption. In November, fumarolic activity occurred submarine near Panarea Island. In December, Stromboli Island erupted, culminating shortly afterwards in a landslide and tsunami that was recorded across the sea. A causal link between these events was often suspected, but also doubted since these events are located at distances exceeding 100 kilometres. To investigate this interaction we designed a number of numerical simulations. First, we perform static model calculations of the events that show negligible stress changes induced by the earthquake. Second, we set up models that simulate the generation and propagation of seismic waves and associated dynamic stress changes at the volcanic systems. Amplitudes of stress variations exceed values typical for stress triggering, and also exceed manifold the values of annual tectonic stresses. Thus a dynamic link appears to be likely and may explain the events clustered in time and space.