



## **Earthquake activity and crustal stresses in stable plate interiors**

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Unlike plate-boundary earthquakes that are explained by plate motions and their recurrence interval inferred from the rate at which these motions are released seismically, we have a limited understanding on the triggering causes of earthquakes in stable plate interiors as well as on the mechanisms explaining their apparent episodic, clustered, and migrating nature.

An alternative model explaining those characteristics of the seismic activity in those regions where no discernable strain is building up today is that earthquakes result from the release of strain from a long-term pre-stressed lithosphere, triggered by processes weakening fault zones, like fluid circulation, or modifying applied normal stress on well oriented faults, like regional or more local erosion, water or ice loadings.

In this talk, we present examples of three complementary approaches that should permit better understanding the mechanisms of this intraplate earthquake activity. They rely on studying their possible triggering factors and regional stresses controlling their mechanism, and also on modelling the possible strain rates of geological domains in relationship to their geological history and their fabrics.

Among other things, we question whether the spatial variations of the short wavelengths gravitational potential energy associated to lateral variations of surface topography and crustal density can induce local stress perturbations explaining the complexity of the present-day tectonics in Western Europe and its possible relationship to earthquake activity.