



## **Large earthquakes in stable continental plate interiors: the need for a new paradigm**

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The occurrence of large earthquakes in stable continental plate interiors has so far resisted our understanding. Contrary to plate boundary settings, where a balance is achieved over <1000 years between the rates at which strain accumulates and is released in large events, intraplate earthquakes occur in regions where no discernable strain is building up today. In the absence of current strain accumulation, their triggering mechanism remains elusive, as well as the mechanism by which faults having already ruptured in large events might be reloaded to permit sequences of large events, such as in the New Madrid, Central-Eastern U.S., sequence. Earthquake activity in such settings does not seem to be persistent at the location of past large historical earthquakes, which appear to be episodic, clustered and spatially migrating through time. The relationship between long-term geological structures and earthquakes is poorly understood and the ability of intraplate current producing M3-4 events to rupture in M6 and larger earthquakes is unknown. Finally, the fact that the steady-state plate boundary model – which forms the basis for seismic hazard estimation – does not seem to hold in continental interiors makes accurate seismic hazard estimation in such setting particularly challenging. We will review these issues and argue that our understanding of earthquakes in continental plate interiors requires a paradigm shift.