



Random occurrence of large collisional earthquakes in the Himalaya

Ghazoui Zakaria (1,2), Grasso Jean-Robert (1), Watlet Arnaud (3,4), Caudron Corentin (1,2), Karimov Abror (1), Bertrand Sebastien (2), Yokoyama Yusuke (5), and van der Beek Peter (1)

(1) Grenoble University (iSTerre), Grenoble, France (zakaria.ghazoui@ugent.be), (2) Department of Geology, Ghent University, Ghent, Belgium., (3) Royal Observatory of Belgium, Department of Seismology and Gravimetry, Brussels, Belgium., (4) British Geological Survey, Environmental Science Centre, Keyworth, Nottingham NG12 5GG, UK, (5) Atmosphere and Ocean Research Institute, The University of Tokyo, Chiba, Japan.

Seismic hazard estimates are based on time-interval distributions between earthquakes with a reference magnitude. In the Himalaya, recurrence times are currently described by a periodic model. We report on a 6000-year lake-sediment seismic record and perform statistical analyses to show that time intervals between large ($M \geq 6.5$) earthquakes are robustly described by a Poisson distribution, i.e. random occurrence, while second-order fluctuations imply event clustering. These patterns are calibrated against an instrumental catalogue for the entire Himalaya; we show that both catalogues are inconsistent with periodic or quasi-periodic models. Our results imply that the occurrence of major seismic events is as uncertain as smaller events on any time scale, dramatically increasing estimates of seismic hazard in the Himalaya.