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Does the seismic cycle slip toward randomness?

Zakaria Ghazoui^{1,2,3}, Jean-Robert Grasso³, Arnaud Watlet⁴, Corentin Caudron³, Abror Karimov³, Sebastien Bertrand², Yusuke Yokoyama⁵, and Peter van der Beek³

¹GFZ German Research Centre for Geosciences, Potsdam, Germany (ghazouiz@gfz-potsdam.de)

²Department of Geology, Ghent University, Ghent, Belgium

³Université Grenoble Alpes, CNRS, ISTERRE (Institut des Sciences de la Terre), Grenoble, France

⁴British Geological Survey, Environmental Science Centre, Nottingham, United-Kingdom

⁵Atmosphere and Ocean Research Institute, The University of Tokyo, Chiba, Japan

Seismology and paleoseismology seem to be two distant sisters when we address earthquake time-interval distributions. One observation stands out; an apparent discrepancy in time-interval models, i.e. periodic to cluster, within similar tectonic context. As a departure point, we will use the Himalayan context where according to instrumental or paleoseismic catalogues, time-interval distributions are presented as Poisson to periodic. We report on a new 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, 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 models. Throughout this presentation, we will compare the Himalayan results with paleoseismic catalogues from three distinct tectonic settings (Indonesia, New-Zealand and Jordan). Each of them displays a close to Poisson distribution, in consonance with instrumental catalogues results. Our results imply that the occurrence of major seismic events is as uncertain as smaller events on any time scale, increasing drastically previous estimate of the seismic hazard.