Geophysical Research Abstracts, Vol. 7, 02480, 2005
SRef-ID: 1607-7962/gra/EGU05-A-02480

Forecasting source locations for destructive tsunamis using the Pattern Informatics method ("hotspot maps")

JB Rundle, J.B. (1), J Holliday, J.R. (2), KF Tiampo (3), DL Turcotte (4) and W Klein (5)

(1) Center for Computational Science and Engineering, University of California, Davis, CA 95616, USA (jbrundle@ucdavis.edu / Fax: 530-754-4885); (2) Center for Computational Science and Engineering, University of California, Davis, CA 95616, USA (holliday@cse.ucdavis.edu); (3) Department of Earth Sciences, Biological & Geological Sciences, University of Western Ontario, London, ON N6A 5B7, Canada, (ktiampo@uwo.ca); (4) Geology Department, University of California, Davis, CA 95616, USA (turcotte@geology.ucdavis.edu); (5) Department of Physics, Boston University, Boston, MA 02215 USA (klein@buphy.bu.edu)

We use the Pattern Informatics method (PI) to produce maps of areas in a seismogenic region ("hot spots") where earthquakes are likely to occur in a future forecast interval, typically a 10-year span. The method has been applied to California, to Japan, and on a worldwide basis. The PI method of earthquake forecasting provides a systematic, quantitative measure of variations (both increases and decreases) in seismicity and uses these variations to forecast regions likely to experience a large earthquake in the future. These maps can be improved by the use of Molchan-type and Likelihood statistics to optimize the forecast methods, as well as to provide better definitions of the geographic regions under consideration. These Molchan-type diagrams plot the fraction of large earthquakes successfully forecast as a function of the fraction of the active area presented as colored spots. The idea is to select forecast areas so as to produces the largest fraction of successful forecasts, as judged by a recent trial period, and the minimum number of false alarms. We are using these forecasts to map likely locations for large submarine earthquakes capable of producing tsunamis. With these locations, we can then estimate maximum and minimum earthquakes from the size of the hotspot. These data can then be used in codes that either compute the elastic wave field from a source originating at the hotspot location, or the tsunami wave field from the sub-oceanic hotspot location.