



Seismicity patterns: Sporadic or precursory?

Vladimir G. Kossobokov(1,2)

(1) International Institute of Earthquake Prediction Theory and Mathematical Geophysics, Russian Academy of Sciences, Moscow, Russian Federation; (2) Institute de Physique du Globe de Paris, Paris, France (E-mails: volodya@mitp.ru; volodya@ipgp.jussieu.fr/ Fax Nr. +74953107032)

Sequences of seismic events, including those preceding the catastrophic earthquakes, are far from being a Poisson process and follow fractal, far from uniform distribution in space. Evidently, such a situation complicates search and definition of precursory behaviors to be used for forecasts/predictions and creates numerous sources to controversies in earthquake forecast/prediction research. Making forecast/prediction claims quantitatively probabilistic in the frames of the most popular objectivists' viewpoint on probability requires a long series of "yes/no" forecast/prediction outcomes, which cannot be obtained without an extended rigorous test of the "black box" version of a candidate to "precursory pattern". The set of errors ("success/failure" scores and space-time measure of alarm) and other information obtained in such a test supplies us with data necessary to judge the performance of the candidate and its potential as a forecast/prediction tool. This is to be done in comparison against random guessing, which results an estimate of confidence. The basics of systematic verification are illustrated with examples from the existing earthquake forecast/prediction methodologies. Specifically, the solicited paper by Gerstenberger et al. (Nature 435, 19 May 2005) started the public web site with forecasts of ground shaking for 'tomorrow' despite the critical evidence, i.e., the 15 years of the recent best-documented seismic record, which suggests rejecting (with confidence above 97%) "the generic California clustering model" used in automatic computer riding. As a result of the inverted verification, the United States Geological Survey website delivers to the public, emergency planners and the media, a forecast product, which is based on wrong assumptions that violate the best-documented earthquake statistics in California, which accuracy was not investigated, and which forecasts were not tested in a rigorous way.