Geophysical Research Abstracts,
Vol. 11, EGU2009-9851-2, 2009
EGU General Assembly 2009

Potential for earthquake forecasting through the hybrid zoneless approach

C.-H. Chan, G. Grünthal, M. B. Sørensen, A. Hakimhashemi, O. Heidbach, D. Stromeyer, and Ch. Bosse
GFZ German Research Centre for Geosciences, Section of Seismic Hazard and Stress Field, Potsdam, Germany

We developed the hybrid zoneless approach for probabilistic seismic hazard assessment (PSHA), but it has also potential for forecasting locations as well as magnitudes of future earthquakes. In the hybrid zoneless approach, the treatment of earthquake occurrence probability follows the standard zoneless approach for PSHA. We use a bandwidth function as a smoothing Kernel function in the neighboring region of earthquakes. Due to variation of seismic density and completeness times in the study region, we introduced large-scale zones that are based solely on the large-scale geological architecture and give a different bandwidth function for each zone. To improve the reliability of the forecasting based on this hybrid zoneless approach, we also incorporate time-dependency of earthquake. This is accomplished with considering aftershock sequences or fault interaction through Coulomb stress changes. The stress change imparted by each earthquake in the study region can be associated with a change of earthquake occurrence probability as a function of time, which can be estimated through the concept of rate-and-state stress transfer. We will show the impact of such updates and present example of their implementation. Because of the few model assumptions, the method allows to automatically calculate forecasts in regular time steps, accounting for updated earthquake catalogues, in the future.