Retrospective forecasting test of a statistical physics model for earthquakes in Sichuan-Yunnan region of Southwest China

Z. L. Wu (1,2), **C. S. Jiang** (1)

(1) Institute of Geophysics, China Earthquake Administration, Beijing 100081, China, (2) College of Earth Science, Graduate University of Chinese Academy of Sciences, Beijing 100049, China(wuzhl@gucas.ac.cn / Fax: +86-10-68473387 / Phone: +86-10-68729228)

Pattern informatics (PI) model is one of the recently developed predictive models of earthquake physics based on the statistical mechanics of complex systems. To test the validity of this model to continental earthquakes, we conduct a retrospective forecast test for the earthquakes in Sichuan-Yunnan region since 1988. Regional earthquake catalogue down to $M_L 3.0$ from 1970 to 2007 was used. The 'target magnitude' for the forecast test was $M_S 5.5$. Fifteen-year long 'sliding time window' was used in the PI calculation, with 'anomaly training time window' being 5 years and 'forecast time window' being 5 years, respectively. Receiver operating characteristic (ROC) test was conducted for the evaluation of the forecast result, showing that the PI forecast outperforms not only random forecast but also the simple number counting approach based on the clustering hypothesis of earthquakes (the RI forecast). Considering the needs of annual consultation meeting on the likelihood of earthquakes conducted in China, we also explored the possibility to use this model for a one year time window of forecast. What we found shows that if the 'forecast time window' was shortened to 3 years and 1 year, respectively, the forecast capability of the PI model decreased significantly, albeit outperformed random forecast. For the one year 'forecast time window', the PI result was almost comparable to the RI result, indicating that clustering properties play a more important role at this time scale.