Geophysical Research Abstracts
Vol. 12, EGU2010-1974, 2010
EGU General Assembly 2010


# Applications of the gambling score in evaluating earthquake predictions and forecasts

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This study presents a new method, namely the gambling score, for scoring the performance earthquake forecasts or predictions. Unlike most other scoring procedures that require a regular scheme of forecast and treat each earthquake equally, regardless their magnitude, this new scoring method compensates the risk that the forecaster has taken. Starting with a certain number of reputation points, once a forecaster makes a prediction or forecast, he is assumed to have betted some points of his reputation. The reference model, which plays the role of the house, determines how many reputation points the forecaster can gain if he succeeds, according to a fair rule, and also takes away the reputation points bet by the forecaster if he loses. This method is also extended to the continuous case of point process models, where the reputation points betted by the forecaster become a continuous mass on the space-time-magnitude range of interest.

For discrete predictions, we apply this method to evaluate performance of Shebalin's predictions made by using the Reverse Tracing of Precursors (RTP) algorithm and of the outputs of the predictions from the Annual Consultation Meeting on Earthquake Tendency held by China Earthquake Administration. For the continuous case, we use it to compare the probability forecasts of seismicity in the Abruzzo region before and after the L'aquila earthquake based on the ETAS model and the PPE model.