Earthquake Forecasting Methodology Catalogue - A collection and comparison of the state-of-the-art in earthquake forecasting and prediction methodologies

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Earthquake forecasting and prediction has been one of the key struggles of modern geosciences for the last few decades. A large number of approaches for various time periods have been developed for different locations around the world. A categorization and review of more than 20 of new and old methods was undertaken to develop a state-of-the-art catalogue in forecasting algorithms and methodologies.

The different methods have been categorised into time-independent, time-dependent and hybrid methods, from which the last group represents methods where additional data than just historical earthquake statistics have been used. It is necessary to categorize in such a way between pure statistical approaches where historical earthquake data represents the only direct data source and also between algorithms which incorporate further information e.g. spatial data of fault distributions or which incorporate physical models like static triggering to indicate future earthquakes. Furthermore, the location of application has been taken into account to identify methods which can be applied e.g. in active tectonic regions like California or in less active continental regions. In general, most of the methods cover well-known high-seismicity regions like Italy, Japan or California. Many more elements have been reviewed, including the application of established theories and methods e.g. for the determination of the completeness magnitude or whether the modified Omori law was used or not. Target temporal scales are identified as well as the publication history.

All these different aspects have been reviewed and catalogued to provide an easy-to-use tool for the development of earthquake forecasting algorithms and to get an overview in the state-of-the-art.