



## **Assessing a 3D smoothed seismicity model of induced earthquakes**

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As more energy exploration and extraction efforts cause earthquakes, it becomes increasingly important to control induced seismicity. Risk management schemes must be improved and should ultimately be based on near-real-time forecasting systems. With this goal in mind, we propose a test bench to evaluate models of induced seismicity based on metrics developed by the CSEP community. To illustrate the test bench, we consider a model based on the so-called seismogenic index and a rate decay; to produce three-dimensional forecasts, we smooth past earthquakes in space and time. We explore four variants of this model using the Basel 2006 and Soultz-sous-Forêts 2004 datasets to make short-term forecasts, test their consistency, and rank the model variants. Our results suggest that such a smoothed seismicity model is useful for forecasting induced seismicity within three days, and giving more weight to recent events improves forecast performance. Moreover, the location of the largest induced earthquake is forecast well by this model. Despite the good spatial performance, the model does not estimate the seismicity rate well: it frequently overestimates during stimulation and during the early post-stimulation period, and it systematically underestimates around shut-in. In this presentation, we also describe a robust estimate of information gain, a modification that can also benefit forecast experiments involving tectonic earthquakes.