[EE] Evening Poster | S (Solid Earth Sciences) | S-SS Seismology

[S-SS06]CSEP, earthquake forecast testing, and the role of SSE in earthquake occurrence.

convener:Danijel Schorlemmer(GFZ German Research Centre for Geosciences), Naoshi Hirata(Earthquake Research Institute, the University of Tokyo), Matt Gerstenberger(共同), Hiroshi Tsuruoka(Earthquake Research Institute, Tokyo Univ.)
Mon. May 21, 2018 5:15 PM - 6:30 PM Poster Hall (International Exhibition Hall7, Makuhari Messe)
The Collaboratory for the Study of Earthquake Predictability (CSEP) has expanded over the years to many different testing areas hosted at multiple testing centers. One of which is the Japan testing center at the University of Tokyo, operated in collaboration with GFZ Potsdam. Hundreds of earthquake forecast models have been submitted to CSEP and are being tested. New testing metrics were developed and implemented and a lot of progress was made to establish CSEP as an institution that cannot be ignored when issuing earthquake forecasts. Its rigor and independence became the standard in evaluating earthquake forecasts and in reporting on the results.

Although the tests CSEP has conducted have been successful and well-received, they have also shown the limitations of the CSEP approach. What is a sufficient testing period for models? Are time-invarying models really describing the long-term seismic activity? Are long-term models testable at all? Do short-term models provide significant information for the forecasting problem or do they only model aftershock sequences? What other signals should be included in forecasting models to improve them? Do improvements in forecasting models translate into improvements of hazard models? Many aspects of seismic hazard or earthquake forecasting remain inherently untestable if only the model forecasts are tested and not the model ingredients. We propose to create new areas of activity for CSEP, namely targeted experiments that cannot be conducted with the current CSEP software system.

We solicit contributions addressing forecasting models, forecast testing problems, new ideas for CSEP experiments, possibilities of further CSEP developments, ways of expanding CSEP into the hazard and risk domain, and more general views on the forecasting problem. This is aimed at fostering the discussion in the community about further goals of earthquake forecasting experiments.

[SSS06-P04]Simple physical model for the probability of a subduction-zone earthquake following slow slip events: Application to the Hikurangi megathrust, New Zealand

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Slow slip events have been widely documented in subduction zones worldwide, yet their implications for the occurrence of future large earthquakes are not well understood. In this study, we develop a relatively simple, simulation-based method for estimating the probability of a large subduction-zone earthquake following slow slip events in places where there are insufficient records of the timing and size of past large earthquakes. The method has been applied to a locked portion of the southern Hikurangi subduction megathrust, New Zealand, which is surrounded on all sides by the 2016 M7.8 Kaikoura earthquake source region, its afterslip, and triggered slow slip events further north. Our models accounting for uncertainties in the input parameters indicate that annual probability of a M>7.8

subduction earthquake over one year after the Kaikoura earthquake increases by 1.3 - 18 times relative to the pre-Kaikoura probability, while the absolute probability remains fairly low (0.6 - 7%). The annual probability decays to the pre-Kaikoura level once the slow slip events terminate. We find that probabilities of a large subduction earthquake are mainly controlled by the ratio of the total stressing rate to the mean stress drop of large earthquakes. The developed approach can be applied to evaluate the potential for triggering of a large earthquake following slow slip events in other subduction zones.