

Preface

This special issue of *Earth, Planets and Space*, published in two parts, contains 19 contributed papers related to an earthquake forecast testing experiment in Japan, launched on 1 November 2009.

The experiment is carried out as the Japanese node of an international project “Collaboratory for the Study of Earthquake Predictability (CSEP).” The CSEP conducts rigorous and truly prospective forecast experiments for different tectonic environments; forecasts are issued for a future period and also tested only against future observations to avoid any possible bias. To date, CSEP forecast models are implemented in California, Europe, and New Zealand. The CSEP was introduced to Japan in the summer 2008. The main feature is to make full use of this location, one of the most seismically active and well-instrumented regions in the world. A total of 91 models were submitted from the USA, Switzerland, Italy, New Zealand, and Japan before the launch of the experiment. The models are currently under test in 12 categories, with 3 testing regions (so-called “All Japan,” “Mainland,” and “Kanto”) and 4 testing classes of different time spans (1 day, 3 months, 1 year, and 3 years). We realize that assessment of forecast capabilities of the individual models based on a single trial alone is insufficient. In the future, we plan to release comprehensive reports on multiple trials conducted under the same controlled environment, which will allow us to understand universal features of each model and to look for the intrinsic predictability of earthquake rupture processes. This CSEP effort is expected to provide a clue to developing more sophisticated systems for providing quantitative and probabilistic forecasts of future earthquakes in a verifiable way, one of the objectives newly introduced in the “Observation and Research Program for the Prediction of Earthquakes and Volcanic Eruptions (Fiscal 2009–2013).”

The first paper in this special issue gives a summary of the experiment. The highlights are eight papers, included in the first part of the issue, describing most of the registered earthquake forecast models in detail. There is another highlight paper, published in the second part, on the Japanese testing center as a (cyber-) infrastructure to host the experiment. Nine more papers, issued across both parts, deal with more general questions of model development and improvement of different hypotheses on earthquake generation as well as implications for the current activity of the CSEP. We believe that these papers are useful for understanding the ongoing experiment and future directions of research, not only for people involved in the CSEP but also for anybody interested. This special issue is also expected to play a crucial role in the interpretation of experimental results to be published in the future.

We wish to thank all the participants of the experiment. We also gratefully acknowledge the authors and reviewers for their efforts in publishing this special issue. Finally, we present words of gratitude to Prof. K. Yomogida (Editor-in-Chief) and the editorial staff of EPS for their gracious help.

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