Session 04

Advances in models, observations and verification towards operational earthquake forecasting

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Significant steps have been made towards assessing space-time earthquake correlations, clustering features, and other seismicity patterns, showing the potential for reproducible and testable earthquake forecasting. However, seismicity is only one manifestation of Earth's complex dynamics preceding strong earthquakes. Besides the identification of patterns and probabilistic models of earthquake occurrence, a large amount of newly available data provides nowadays opportunities for systematic analysis and model testing. A variety of physical observables, ranging from ground-related deformation patterns (GPS, SAR, etc.) to pre-earthquake changes, such as geochemical, electromagnetic, hydrogeological, thermodynamic and others, may be related to stress variations in the lithosphere prior to a strong earthquake.
A challenging issue in the effort for real-time earthquake forecasting, at any time before the main rupture, is the incomplete knowledge of the seismic process. Which are the physical phenomena that take place in the Earth's crust before the earthquake nucleates? How can we observe, describe and model them statistically and physically? Approaches dealing with these issues are mostly welcomed regardless the standpoint of examination, e.g., geophysical, mathematical, artificial intelligence techniques.

With this session, we intend to better understand the feasibility and operational relevance of earthquake forecasting methods. Contributions addressing the following theoretical and practical issues are welcome:

- State-of-the-art and novel observations from ground-based or satellite-based techniques;
- Systematic analysis, physical interpretation and modeling of pre-earthquake processes;
- Models validation and statistical assessment of the various physical-based precursors proposed;
- Earthquake forecasting experiments for real-time model testing at global scale and in specific test areas;
- Time-dependent seismic hazard assessment, based on reproducible earthquake forecast;
- Dissemination and use of earthquake forecasting information.

Cases of monitoring and evaluation of precursors for the real-time earthquake forecasting are of particular interest to this session.