Session 02

Sinergy in advancing the models, observations, and verification toward Operational Earthquake Forecasting

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Significant steps have been made toward 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 identifying patterns and probabilistic earthquake occurrence models, a large amount of newly available data provides opportunities for systematic analysis and model testing. Various 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 strong earthquakes.
A challenging issue in the effort for real-time earthquake forecasting, at any time before the main rupture, is the need for more knowledge of the seismic process. What 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? What is the synergetic connection between middle-term and short-term forecasting techniques based on the physical understanding of the earthquake processes? Approaches dealing with these issues are mostly welcomed regardless of the standpoint of examination, e.g., geophysical, mathematical, and artificial intelligence techniques.
With this session, we intend better to understand earthquake forecasting methods' feasibility and operational relevance. 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 the global scale and specific test areas.
- Time-dependent seismic hazard assessment based on reproducible earthquake forecast.
- Dissemination and use of earthquake forecasting information.
- Possible extension to seismic risk and loss forecasting.

Cases of monitoring and evaluating precursors for real-time earthquake forecasting are particularly interesting to this session.
***Joint ESC-SSA session**