Session 07

Advances in statistical seismology: from earthquake occurrence to risk assessment

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The occurrence of earthquakes is characterized by great variability, both in space and time, arising from complex interactions between not directly observable processes that evolve in the Earth's interior. During the past decades significant progress has been made towards a better understanding of scaling laws, seismicity patterns and spatio-temporal earthquake clustering.
A large amount of reliable and high-quality data, collected in recent years at different space-time scales and the increased computational capabilities offer an unprecedented opportunity for the development of new statistical and physical models, model testing, and validation. At the same time, they also represent a major challenge towards the design of novel and effective data-driven tools for the adequate characterization of earthquake occurrence.
Widespread applications of new tools for data analysis (ranging from statistical data analysis to machine learning and artificial intelligence methods), and the development of new models provide new insights in the field of statistical seismology, which have a direct effect on time-dependent seismic hazard and risk assessment. Statistical methods for quantifying earthquake related hazards (e.g. tsunami and landslides), as well as methods for multi-peril risk assessment are of special interest.

Particular emphasis will be placed on:
- statistical models for earthquake occurrence;
- analysis of earthquake clustering
- data analysis and requirements for model testing
- quantitative testing of earthquake occurrence models
- implications for time-dependent hazard assessment
- models for multi-hazard and cascading effects
- statistical data analysis for risk assessment.