SESSION 16- Advances in Spatiotemporal Seismicity Analysis with Machine Learning, Physical Modeling and Laboratory Experiments

Conveners
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Session Description

Seismicity exhibits significant spatial and temporal variability, influenced either by background activity or by various types of earthquake clusters, ranging from swarm-like to burst-like patterns. In regions with complex fault systems, many clusters are characterised by multiple mainshock-aftershock sequences, with large aftershocks potentially occurring. Persistent behaviours of seismicity and clustering properties have been observed in several seismotectonic areas, reflecting the underlying geological complexities.

In recent years, various approaches have been applied to the large amount of available data. Physical and statistical models as well as machine learning methods are needed to benefit from this wealth of information and to unravel complex and non-linear relationships in the data. Multidisciplinary data recorded by both ground and satellite instruments, such as geodetic deformation, geological and geochemical data, fluid content analyses and laboratory experiments, can better constrain the models, in addition to seismological analysis of source parameters, wave propagation, and earthquake triggering by static or dynamic stresses.

In this session, we invite researchers to present their latest advances in the spatiotemporal analysis of seismicity. Contributions may include innovative physical and statistical models of earthquake occurrence, advanced analysis of earthquake clusters, detailed examination of spatial, temporal and magnitude characteristics of seismicity, quantitative evaluation and testing of earthquake occurrence models, improvements in earthquake catalogues and developments in time-dependent hazard assessment. We particularly encourage presentations on novel methods and software for earthquake forecasting; data analysis techniques including machine learning applications and

methods for quantifying uncertainties in pattern recognition and machine learning. New findings assessing seismicity variations in relation to geological and tectonic conditions, including applications to understudied regions (e.g., Africa, Southeast Asia), are strongly encouraged.