



Session 24

Analysis of spatiotemporal evolution of seismicity using physical and statistical models, machine learning, and laboratory experiments

Conveners:

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Seismicity can display great spatial and temporal variations, dominated either by background activity or by different types of earthquake clusters (from swarm-like to burst-like). In regions with complex fault systems, many clusters are characterised by multiple mainshock-aftershock sequences, with large aftershocks potentially following each mainshock. Persistent behaviours of seismicity and clustering properties have been observed in some seismotectonic areas.

In recent years, many different 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 regarding source parameters, wave propagation and earthquake triggering by static or dynamic stresses.

In this session, we invite researchers to present their latest findings on the spatiotemporal evolution of seismicity, namely on: physical and statistical models of earthquake occurrence; analysis of earthquake clusters; spatial, temporal and magnitude properties of earthquake statistics; quantitative testing of models of earthquake occurrence; reliability and improvement of earthquake catalogues; time-dependent hazard assessment; methods and software for earthquake forecasting; data analysis and requirements for testing models; machine learning applied to seismic data; methods for quantifying uncertainties in pattern recognition and machine learning. New findings assessing variations in seismicity in relation to geological and tectonic conditions are strongly encouraged.

