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Space-time relations of earthquakes in volcanic and tectonic settings compared to acoustic emissions in rock samples.

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Scale invariant properties of seismicity argue for the presence of complex spatio-temporal organization. A new method, based on the space-time combined generalization of the correlation integral, that leads to a self-consistent visualization and analysis of both spatial and temporal correlations has been applied to global medium-high seismicity and compared to seismicity in volcanic areas. Results show that volcanic areas with different eruptive style such as St. Helens and Kilauea show peculiar properties which are different to earthquakes from global catalogue that are correlated in time within defined spatial ranges varying over elapsed time. We also applied the same methodology on the study of acoustic emissions generated during rock deformation laboratory experiments performed at simulated ‘in situ’ conditions to compare the space-time relations at different scales.