



Space-time combined correlations in seismicity

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Seismicity is a complex process featuring non-trivial space-time correlations in which several forms of scale invariance have been identified. A frequently used method to detect scale-invariant features is the Correlation Integral, which leads to the definition of a correlation dimension separately in space and time. We generalize this method with the definition of a space-time combined correlation integral. This approach allows us to analyze seismicity as a point process, without any distinction among main-, after- or background shocks. The analyses performed on the catalogue of worldwide seismicity and the corresponding reshuffled version strongly suggest that earthquakes of medium-large magnitude are time or space clustered inside specific space-time regions. Moreover this approach allows a more precise delimitation of such regions and how they evolve. In this frame the influence of earthquakes magnitude is investigated. Results show how complex may be the earthquake interaction in both space and time.