Scaling properties in earthquake networks

Mirela Suteanu

Saint Mary's University, Mathematics and Computing Science, Halifax, Canada (mirela.suteanu@gmail.com)

This paper proposes a network-based method for the assessment of earthquake relationships in space-time-magnitude patterns. It is shown that networks with minimum edge weight values in the middle to the upper range of the spectrum of the edge weight enjoy strong scaling properties, as opposed to networks with low values for the minimum edge weight, which exhibit weak or no such properties. The scaling behaviour along the spectrum of the weight values, in conjunction with the robustness regarding parameter variations, endorse the idea that a relationship exists between fundamental properties of seismicity and the scaling properties of the earthquake networks. Results of this method are further applied for the study of temporal changes in volcanic seismicity patterns.