



Band-limited power-laws in statistical seismology

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Spatio-temporal properties of earthquakes are known to produce power-law distributions and a considerable amount of work is underway to evaluate and compare power-law exponents in different geophysical contexts. Nevertheless, deviations from scale-free behaviors have been also reported and further research is needed to determine whether they can be ascribed to fundamental physical mechanisms or structural heterogeneities. In this purpose, the characteristic scales associated with the limits of the power-law regimes can be a unique source of information. Here, we concentrate on the earthquake-size distribution and the aftershock decay rate to show that band-limited power-law statistics can be related to the mode of deformation or the state of stress. Thus, we evaluate specific length and time scales and their variations along active fault zones to provide additional constraints on the underlying brittle processes.