The scaling relationships between the duration of deep low-frequency tremors and their amplitude in the Tokai region

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Recent enhancement of seismic networks in Japan reveals occurrence of low-frequency continuous tremors of a beltlike distribution beneath a nonvolcanic region in the southwest Japan. The epicenters of tremors are distributed along the strike of the subducting Philippine Sea plate. The average depth of the tremors is about 30 kilometers, near the Mohorovicic discontinuity. The long duration of the phenomenon indicates the existence of fluid relating to the generation of the tremor.

Most phenomena in nature show systematic relationships between their numbers and their sizes. So, it’s very helpful to know the measurement and modeling of the scaling or frequency of occurrence versus size distribution to understand the source process underlying a phenomenon.

In this study we investigate the scaling relationships between the duration of deep-low frequency tremors and their amplitude in the Tokai region by following the procedure of Benoit et al. (2003).

We find that the exponential distribution is superior to the power law distibution for the duration-amplitude distribution of deep low-frequency tremors in the Tokai region. We, thus, conclude that the source process of deep low-frequency tremors involves a unique length scale.