



2020 Annual Meeting

Albuquerque, New Mexico
27–30 April

Event Size Distribution and Moment-Duration Scaling of Low-Frequency Earthquakes in the Nankai Trough, Japan

Session: From Aseismic Deformation to Seismic Transient Detection, Location and Characterization

Type: Oral

Date: 4/29/2020

Time: 05:00 PM

Room: 230 + 235

Description:

Tectonic low-frequency earthquakes (LFEs) are a seismic component of slow earthquakes characterized by dominant frequencies in the 1 – 10 Hz band and extremely low signal-to-noise ratio, although exhibiting distinct P- or S- phases. Source characterization is of fundamental importance to understand physical processes behind these phenomena.

In this study, we characterize the source of ~30,000 of LFEs occurred from 2013 to 2016 in Western Shikoku, Japan. The events have been detected and located automatically by exploiting the coherency of the wavefield characteristics (Poiata et al., 2016, 2018) across the Hi-net stations using 4 years of continuous records.

Using the probabilistic method of Supino et. al (2019), we estimate the joint probability density function of the source parameters seismic moment, corner frequency and high-frequency fall-off exponent, from the inversion of displacement spectra.

We find that corner frequency scales with seismic moment and a scaling exponent of -3 is highly likely, as expected for regular earthquake. We observe similar results analyzing LFEs manually detected and located by the Japanese Meteorological Agency (JMA) in the same region and time interval explored by the main catalog.

When investigating the event size distribution of the analyzed LFEs, we observe G-R distribution with b -value = 1 in a limited seismic-moment domain (half-decade). Moreover, left and right corner moments - which might reflect scale limits of the phenomena - emerge from the distribution.

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