S13F-0495 - Self-similarity of low-frequency earthquakes

Monday, 9 December 2019

13:40 - 18:00

Moscone South - Poster Hall

Abstract

Low-frequency earthquakes (LFEs) are a component of slow earthquakes, composed by seismic events which are depleted in high-frequencies with respect to regular earthquakes of the same size. LFEs are instrumental to understand the mechanical properties of the brittle-ductile transition zone. Yet, their physics still remains poorly understood, the main difficulty owing to the low signal-to-noise ratio.

In this study, we characterize the source of ~10000 LFEs occurred from 2012 to 2016 in western Shikoku, Japan. 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. We find evidence of self-similar rupture process for LFEs, with corner frequency scaling with seismic moment as widely observed for regular earthquakes.

Using the analytic circular crack model of Sato and Hirasawa (1973), we provide a framework for exploring the relation between corner frequency, rupture size and static stress drop as a function of the LFE rupture velocity. Rupture velocities lower than 40 % of shear-wave velocity, and higher than 5 %, are consistent with LFEs activity modulation by tides and teleseisms.

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Triggered normal faulting earthquakes by swarm of very-low-frequency earthquakes in the central Ryukyu Trench

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Focal Mechanisms of Volcanic Deep Low Frequency Earthquakes in Northeast Japan

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Detection of low frequency earthquakes in broadband random time sequences: Are they independent events?

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