Detection of low-frequency aftershocks of the 2019 Ridgecrest earthquake sequence

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Low-frequency earthquakes generally have relatively stronger spectral components in the lower frequency range, compared to what is expected based on their magnitude. This type of earthquakes has been considered to be generated in some specific environments, such as volcanic regions and subduction zones that are also generating slow slip events and tremors. They usually occur in deeper regions below ~15km; however, some recent studies show that they can also be observed among aftershocks of large inland earthquakes in Japan (i.e., Niigata in 2004, Iwate-Miyagi in 2008, Kumamoto in 2016) with very shallow depth (~5km). Here, we attempt to detect such ‘low frequency aftershocks’ associated with a very recent earthquake sequence that occurred in Ridgecrest in California in 2019 on the source of waveform data from Plate Boundary Observatory Borehole Networks and nearby instruments archived at NCEDC, SCEDC and IRIS. We are considering The Frequency Index (FI) as a way to identify candidate events. FI is defined as: FI = log10(AH/AL), where AH and AL represent the mean spectral amplitude within the high-frequency band (e.g., 10-15 Hz) and low-frequency band (e.g., 2-5 Hz), respectively. We will discuss our results and the methods used to identify low frequency aftershocks from their spectra.

Keywords: Low-frequency earthquakes, aftershocks

