



## **What Generated the Eruptive Tremor During the Bardarbunga Eruption, Iceland?**

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The Bárðarbunga eruption in Iceland 2014/15 led to the formation of a 85 km<sup>2</sup> big lavafield and the extrusion of ~1.5 km<sup>3</sup> of magma. The eruption initially started for 4 hours on August 29th. It stopped but restarted on the same fissure on August 31st. We installed a seismic array on August 30th. Harmonic tremor was seen on August 31st consistent with the visual opening of the fissure and continued through February 2015. The harmonic tremor with most energy from 0.8-1.5 Hz is remarkably stable over 6 months but 3 characteristic features occur from time to time:

- (i) Stronger harmonic tremor bursts in the same frequency range,
- (ii) Stronger non-harmonic bursts with energy up to 5 Hz and
- (iii) Step like increases or decreases in the tremor amplitude.

Seemingly uncorrelated the array results show

- (iv) three very stable tremor directions until mid October and
- (v) tremor sources moving by up to 9 km in 4 days.

We compare these five seismic observations with the features of the growing lavafield and discuss the relative importance of possible tremor sources such as: a resonating conduit, boiling magma in the vent, a resonating lavafield, interactions at the edges of the lavafield and inflation of the lavafield.