Geophysical Research Abstracts
Vol. 21, EGU2019-1660-1, 2019
EGU General Assembly 2019

A moment tensor catalog for the pre and post 2014 eruption earthquakes in Bárðarbunga volcano.

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A milestone caldera collapse took place in the Bárðarbunga volcano between August 2014 and February 2015. Almost 2.0 km3 of basaltic magma erupted while the 77km2 caldera had a maximum subsidence of 70 m at the center. Such outstanding measurements were reflected also in the seismicity: more than 6000 earthquakes in and nearby of Bárðarbunga including 79 with magnitudes larger than 5.0, were detected by the Icelandic Meteorological Office (IMO) seismic network.

The observed seismicity is divided into two main categories: (1) earthquakes in the ring fault of the caldera, related to the downward slipping of the caldera collapse; and (2) migrating seismicity outside of the caldera, related to a 45 km magma movement from the chamber to where the eruption took place (Holuhraun).

Moment tensors (MT's) have been reported for some of the largest events (Mw > 5.0)
(Global CMT project, Henchs et al., 2015). The focal mechanisms have exhibited a large CLVD component, creating an ongoing debate about the origin of such component: a geometric effect due to the ring-shape of the fault (Nettles and Ekström, 1998) or a pure DC shallow faulting plus a deep closing crack (Kanamori, et al., 1993 ; Riel et al., 2014).

Obtaining MT's for smaller earthquakes can provide a deeper insight into the driven mechanisms that underlie the seismic sources of Bárðarbunga. We have more than 400 MT's for earthquakes occurred between 2014 and 2015 in Bárðarbunga with magnitudes larger than 4.0. We used a 1D velocity model for calculating Green Functions using a frequency waveform integration method (Dunkin J.W., 1965 ; Haskell N.A., 1964) and inverted the regional observed waveforms using a time domain moment tensor inversion method (Dreger, 2002).

After the caldera collapse, there has been seismicity up to Mw. 4.8 in Bárðarbunga and its vicinity in the Vatnajökull glacier. Some MT's from these earthquakes are already reported (Global CMT project) but we have inverted MT's for smaller earthquakes (almost 30 events).

The comparison between the current waveforms and inverted MT's (reverse focal mechanisms) with the ones during the caldera collapse (normal focal mechanisms), allowed us to track the cyclic behavior of Bárðarbunga and to infer that after the eruption, the volcano is currently in an inflating cycle and its ring fault is slipping mostly through the same part (Jónsdóttir et al., 2019 . To be submitted).

As far as we know, this MT catalog is the most complete for the seismicity in Bárðarbunga during and
after de 2014-2015 eruption and will be an important reference source since this volcano belongs to the most seismically active region in Iceland.