



Subglacial Tremor Burst during the Bardarbunga Eruption, Iceland: Flood or Magma?

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Bardarbunga volcano in Iceland is one of the active volcanoes beneath Vatnajökull glacier. During the Bardarbunga eruption in Iceland 2014/15 a dyke propagated 47 km towards the north before a fissure eruption started for about 6 months only a few kilometers north of the edges of Dyngjufjökull glacier tongue. We recorded the dyke formation/eruption from August 30th with a seismic array but focussed on a stronger tremor burst that occurred on September 3rd. This tremor pulse is not related to the ongoing eruption. Thus we aim to understand the location and generation of the tremor and determine if we can find characteristics which can discriminate between flood or magma. We combine the results from array processing, an amplitude-based location method, a total wavefield and tremor simulation and compare it to glaciological, hydrologic, geodetic and other seismic observations. The tremor source could be located in a region beneath the Dyngjufjökull glacier tongue where cauldrons had formed and deepened during the whole eruption. Our results enable us not only to exclude water or ice as tremor source but also to characterize the magmatic tremor source and its depth. Furthermore we develop a model for tremor generation which points to a specific process in magma migration. This tremor analysis could play an important role in early warning as its 'fingerprint' is process specific.