



Seismicity revealed in the Snaefellsnes Volcanic Zone, Iceland

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The intense volcanic and seismic activity of Iceland is driven by the interaction of the Mid-Atlantic Ridge and the Icelandic Plume. The Snaefellsnes Volcanic Zone (SNVZ) in Western Iceland is considered a paleo-ridge and it is characterized by volcanic centers distributed in an en echelon structure with the inferred faults striking approximately NNE-SSW. The Snaefellsjökull volcano is located in the westernmost part of the peninsula and is the only central volcano of this region.

A right-lateral E-W oriented transform zone is believed to exist along the SNVZ. We performed a three-months seismic survey on the Snaefellsnes to shed light on seismic activity across the peninsula - in particular around the Snaefellsjökull volcano - and determine how seismic events are distributed (i.e. aligned along the en echelon structure, the transform fault or volcanic complexes). Five broadband seismometers have been deployed in the Snaefellsnes area in the summer of 2011. Four broadband stations were distributed in the vicinity of the Snaefellsjökull volcano and one was deployed approximately 20 km NW of Ljósufjöll, which is the volcanic center that last erupted in the SNVZ in 960 AD.

First results reveal formerly unknown seismic activity in the SNVZ and across the fjord between the Snaefellsnes and the Reykjanes peninsula. Measured events show Richter magnitudes spanning from 0.5 to 1.5 and originate from hypocentral depths ranging from 9 km to about 26 km. They are located in an area that stretches from right underneath the Snaefellsjökull volcano up to 15 km S-SE and generally show frequencies ranging from 1-10 Hz centered around 4-5 Hz. However, seismicity around the Snaefellsjökull volcano does not show up on the records of the station near Ljósufjöll, and viceversa.

The recorded events indicate the occurrence of seismic activity underneath the Snaefellsjökull volcano, mainly located in the southern part of the volcanic complex. In addition, our data points out the existence of more than one seismically active region across the SNVZ.