



## **Crustal Generation and Structure of Volcanic Systems on the Eastern Part of the Reykjanes Peninsula, Iceland, from Gravimetric Profiling**

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The Reykjanes Peninsula is the southernmost segment of the MAR exposed on land in Iceland. It is an oblique rift zone, with SW-NE trending volcanic systems spaced at 15-20 km intervals and arranged in an echelon fashion along the plate boundary. Each volcanic system is expressed by a few tens of kilometres long fissure swarm. A gravity survey of 12 profiles with 572 stations covering a 600 km<sup>2</sup> segment of the plate boundary in the eastern part of the peninsula was carried out in 2002-2004. Forward models of the profiles, constrained by logs from several drillholes, have been constructed to study the structure of the uppermost part of the crust. The results suggest that the environmental conditions of extensive ice cover during glacial periods alternating with ice-free interglacials have played a major part in the development of the volcanic strata. Apparently, well-developed volcanic systems in this part of Iceland are composed of a graben with a high concentration of hyaloclastites leading to SW-NE trending gravity lows along the systems. The grabens have active faults and usually host a geothermal area. The hyaloclastites may be up to 1.5 km thick and they broadly correlate with a complex of faulted subglacially-formed hyaloclastite mountains that rise 100-400 m over the surroundings. The large thickness of hyaloclastites suggests that the typical lifetime of a system is a few glacial cycles. On the eastern part of the Brennisteinsfjöll-Bláfjöll volcanic system (at Bláfjöll) a 1-1.5 km thick accumulation of hyaloclastite is found. However, no geothermal activity is observed and faults that can be associated with a graben are few. In contrast, on the western side (at Brennisteinsfjöll) an active graben exists with a geothermal area while the gravity profiles indicate only a minor accumulation of hyaloclastite. This suggests that the centre of activity in this volcanic system has within the last 100 thousand years jumped west-

wards by 4-5 km. Large dense subvolcanic intrusions in the upper crust that are often associated with volcanoes appear to be largely absent on the Reykjanes peninsula