

Shallow structures of the rift zone in northern Iceland

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Eruptive activity in Iceland's Northern Rift Zone is not confined to central volcanoes but can act along their accompanying fissure swarms which extend outward along the rift axis. Some of the volcanic systems may operate at two central volcanoes, one of which is dominant, with subsurface connections joining them. Work by Gudmundsson and Högnadóttir (2007) in central eastern Iceland describes gravity highs between such paired volcanoes, thought to be caused by an increased density of intrusive features.

This project is centred around the production of a Bouguer gravity map of the more active, northern part of the Icelandic rift zone, from the Vatnajökull ice cap in the south, across Askja and Upptyppingar, and north to Krafla, because of the recently identified magma movements there and the implications for future eruptive activity.

Askja has a history of both effusive and explosive behaviour. Currently in a state of deflation, recent gravity measurements at Askja have shown a mass increase, thought to result from a fresh supply of magma to the upper magma chamber (Rymer et al., 2010). Meanwhile, increased seismicity extending from Askja has been explained as magma draining from the lower reservoir, northwards along the rift (Soosalu et al., 2010), while at nearby Upptyppingar, seismic activity suggests a dyke intrusion (Jakobsdóttir et al., 2008).

It is hoped that analysis of the anomalies contained in the new gravity map can shed light on this subsurface activity, both around Askja and across the region, and that the hypothesised linkages between volcanoes can be distinguished. Results of recent Bouguer gravity work and crustal modelling will be presented here.

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