

Magmatic plumbing dynamics along the Northern Rift Zone, NE Iceland

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Previous pressure studies of Icelandic magmas have shown that most basalts crystallise at a wide range of depths within the crust (e.g. [1]). In addition [2] have shown that most central volcanoes have discreet multiple stacked chambers of crystallisation. The majority of these studies, however, either have very small data sets or focus on specific locations.

In this study crystallisation pressures have been calculated using the method of [3] from an extensive collection of 121 post, inter- and intra- glacial basalts from the Krafla, Fremri-Namur, Askja and Kverkfjöll central volcanoes as well as a section of Plio-Tertiary lavas from the surrounding area. This has enabled the location and depth of significant bodies of crystallisation under the length of the Northern Rift Zone (NRZ) to be resolved.

The identification of these bodies as well as comparisons between volcanic centres over time can provide clues into the structure of the Icelandic crust. It is clear that minimal change has occurred within the last 0.7 Ma with lavas crystallising at similar pressures over this time period. Furthermore it is apparent that the shield central volcanoes of Fremri-Namur and Theistareykir have much more complicated plumbing, lacking the presence of stacked bodies that is seen under all other volcanic centres in the NRZ.

The detailed understanding of crustal structure is critical when assessing the role of processes such as magma mixing or assimilation that are occurring within the crust. Many authors have noted that individual lava flows can have complex crystal cargos (e.g. [2]; [4]); in addition to the plumbing dynamics along the NRZ we present olivine data from selected flows that will allow the assessment of the crustal processes that contribute to these complex cargos over time.

[1] Maclennan *et al.* (2001) *Earth & Planetary Science Letters*, **191**, 295–310. [2] Kelly & Barton (2008) *Journal of Petrology* **49**, 465–492. [3] Yang *et al.* (1996) *Contributions to Mineral Petrology* **124**, 1–18. [4] Maclennan (2008) *Journal of Petrology* **49**, 1931–1953.

Discovery and description with scintillometric and geochemistry of gossans above amethyst deposits in altered volcanic rocks of the Paraná province, South America

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We discovered a large number (probably thousands) of gossans in the intraplate volcanic rocks of the Paraná volcanic province, South America, based on observations of satellite images and field work associated with geochemistry and geophysics. We thus define a straightforward prospecting guide for agate and amethyst deposits. The study area is located on the border between Brazil and Uruguay, covering the Los Catalanes geological district and the Quaraí mining district. Anomalies in Google Earth satellite images were identified above six underground mines in the Los Catalanes geological district, characterized in the pampas of the region as irregular structures of intense green color and sometimes with brownish, rough texture. The vegetation, scintillometric and geochemical anomalies occur at several stratigraphic levels in the volcanic group. Three scintillometric profiles performed on the Mauricio Mine in the Los Catalanes geological district indicate low emission rates near 55 cps (sd = 4.7) in the gossan compared with the regional average of colada Cordillera (63 cps). Whole rock geochemical analyses of three samples collected within the underground mine indicate high loss on ignition (4.5, 3.4, 4.5 wt.%). LOI higher than 2% is considered a strong indicator of intense hydrothermal alteration in the gossan. In the Quaraí mining district, gossans were studied in five areas, two in colada Catalán, two in colada Muralha, and one in colada Cordillera. The world-class deposits of amethyst and agate geodes are in coladas Catalán and Cordillera. Negative radiometric anomalies (higher than one standard deviation) occur in these gossans. The detailed study of one gossan included a geophysical grid spacing of 50 x 50 m (K, U, Th and total emission rate) and whole rock geochemical analyses (ACME, Canadá). The whole rock geochemical analyses of 17 samples collected within and outside the gossan classify the rocks as basaltic andesites, low-Ti, Gramado chemical type. The samples inside the gossan display high values of loss on ignition (2.3, 2.8, 2.9, 2.8, 2.9, 2.4, 2.6, 2.6, 2.3 and 2.3 wt.%), while outside the gossan the values are lower (0.8, 2.3, 0.5, 0.5, 1.6, 0.5, 0.6, 0.7, 1.1, 1.3 and 1.9 wt.%). SiO₂, K₂O and Rb show strong negative correlation with loss on ignition, while MgO has a slight enrichment. Were identified by electron microprobe analysis clinoptilolite associated with smectite, as products of hydrothermal alteration in the samples of Gossan.