

$^{40}\text{Ar}/^{39}\text{Ar}$ dating basaltic melt segregations in Reykjanes Peninsula, SW Iceland

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The Reykjanes Peninsula in southwest Iceland is a subaerial part of Mid-Atlantic Ridge. Its surface geology is dominated by móberg ridges and pāhoehoe lavas erupted during the Brunhes normal polarity chron. Ages of the postglacial extrusives (age <13 ka) are reasonably well-constrained. However, despite their regional importance, the chronology of the interglacial lavas (13–781 ka) is effectively unknown. These basaltic lavas have remained undated as they are too old for radiocarbon dating and their depleted character with low K-content makes them challenging for K–Ar, $^{40}\text{Ar}/^{39}\text{Ar}$ and U–Pb geochronometers.

In order to circumvent the problem of low-K, we sampled incompatible element-enriched basaltic melt segregation from the interglacial lavas for dating by $^{40}\text{Ar}/^{39}\text{Ar}$ method. Basaltic melt segregations are cylindrical or sheetlike vesicular formations present in the lava core of pāhoehoe flow lobes. They are formed by closed system fractional crystallization of the host lava and preferentially preserved during the period between flow stagnation and solidification. These melt segregations are enriched in K, and other incompatible elements, by a factor of 1.6–4.

Basaltic melt segregations and their host lavas were sampled from four locations on the Reykjanes peninsula. Geochemical work indicates that the potassium in the samples is primarily located in interstitial glass and in the outer most rind of feldspar. At the time of writing, interpretation of the $^{40}\text{Ar}/^{39}\text{Ar}$ age data is ongoing, but initial results reveal low radiogenic Ar values, and sub-atmospheric initial $^{40}\text{Ar}/^{36}\text{Ar}$ ratios. One sample produced a conclusive plateau age: a segregation from the town of Garðabær with a preliminary age of 327 ± 51 ka (1σ). Despite the K-enrichment in segregations, ages cannot be determined for the other samples, possibly because of their young age (< 100 ka?). However, one positive result gives us hope that sampling melt segregations for dating young pāhoehoe lavas can be advantageous.