

# Oxygen isotope composition of basalts from the 2021 Fagradalsfjall eruption, Iceland

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The basalts of the 2021 Fagradalsfjall eruption were the first erupted on the Reykjanes Peninsula in 781 years and offer a unique opportunity to determine the composition of the mantle underlying Iceland, in particular its oxygen isotope composition ( $\delta^{18}\text{O}$  values). The Fagradalsfjall basalts show compositional variations in Zr/Y, Nb/Zr and Nb/Y values that span roughly half of the previously described range for Icelandic basaltic magmas and signal involvement of Icelandic plume (OIB) and Enriched Mid-Ocean Ridge Basalt (EMORB) in magma genesis. We show that Fagradalsfjall  $\delta^{18}\text{O}$  values are invariable (mean  $\delta^{18}\text{O} = 5.4 \pm 0.3\text{‰}$  2 SD,  $N = 47$ ) and indistinguishable from “normal” upper mantle, in contrast to significantly lower  $\delta^{18}\text{O}$  values reported for erupted materials elsewhere in Iceland (e.g., the 2014–2015 eruption at Holuhraun, Central Iceland). Thus, despite differing trace element characteristics, the melts that supplied the Fagradalsfjall eruption show no evidence for  $^{18}\text{O}$ -depleted mantle or interaction with low- $\delta^{18}\text{O}$  crust and may therefore represent a useful mantle reference value in this part of the Icelandic plume system (see Bindeman et al. 2022).

## Reference

Bindeman, I. N., Deegan, F. M., Troll, V. R., Thordarson, T., Höskuldsson, Á., Moreland, W. M., Zorn, E. U., Shevchenko, A. V., & Walter, T. R., 2022: Diverse mantle components with invariant oxygen isotopes in the 2021 Fagradalsfjall eruption, Iceland. *Nature Communications* 13, 3737.