

The shield-to-rejuvenated volcanism transition in the Hawaiian plume: Nd-Hf isotope systematics

P. BÉGUELIN¹, M. BIZIMIS¹, E. C. MCINTOSH¹, B. COUSENS², D. CLAGUE³

¹SEOE, Univ. of South Carolina, Columbia, SC 29208, USA
(*correspondence: pbeguelin@geol.sc.edu)

²Carleton University, Ottawa, ON K1S 5B6, Canada

³MBARI, Moss Landing, CA 95039, USA

We present new Hf isotope data on 46 previously characterized [1] shield, post-shield and rejuvenated stage lavas from the islands of Kauai and Niihau, and the North Arch volcanic field. These samples trace the shield to rejuvenated stage transition in both Niihau and Kauai.

In ϵNd - ϵHf space all Kauai lavas form a continuous array between KEA type and rejuvenated lava compositions akin to North Arch. Conversely, some Niihau rejuvenated lavas are offset towards higher ϵHf for a given ϵNd than their shield stage, which overlaps with the Kauai shield. The most radiogenic Kauai, Niihau and North Arch lavas overlap, suggesting the presence of a common depleted component along 500km across the Hawaiian island chain.

The data reveal two distinct shield-to-rejuvenated stage evolutionary paths: a continuum in compositions at the plume center (Kauai) and discontinuous compositions at the periphery (Niihau). The change in expression of the enriched rejuvenated endmember may result from changes in plume structure with distance from its center. Alternatively, the Niihau rejuvenated source may contain an aged carbonatitic component, consistent with their elevated Lu/Hf [2].

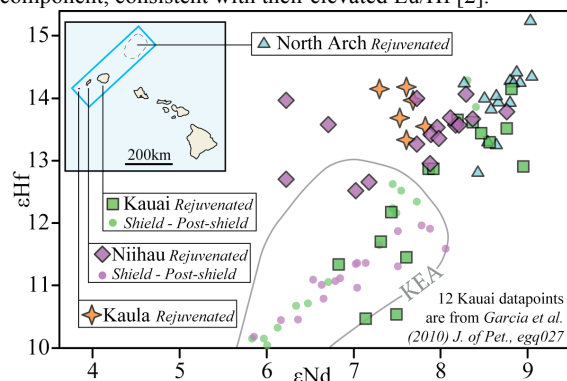


Figure 1 ϵNd - ϵHf plot of discussed lavas with transect map.

[1] Cousens & Clague (2015) *J. of Pet.*, egv045.

[2] Dixon et al. (2008) *G³*, Q09005.