Rare gas study of off-axis volcanism of the Hawaiian hotspot chain

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Rare gas isotopes of off-axis volcanism of the Hawaiian hotspot chain are presented. The samples are collected by submersibles of JAMSTEC and MBARI. 3He/4He of alkali basalts from North Arch, Oahu-Kauai Channel and West Molokai is around 8 Ra, which is similar to the ratio of MORBs and post-alkali and rejuvenated stage rocks of Hawaiian volcanoes, demonstrating that these basalts are unrelated to the mantle plume, but are produced by melting of the MORB source. This idea is consistent with Neon isotopic evidence. In contrast, 3He/4He of South Arch (18 Ra) and Southwest Oahu Volcano (11 Ra) is higher than that of MORBs, clearly showing that the mantle plume feeds melt to these off-axis volcanisms.