



New data of Cretaceous Pacific MORB from accretionary complexes in Kamchatka: Implications for the origin of depleted component in the Hawaiian hotspot lavas

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The oldest (>70 Ma) seamounts in the Emperor Ridge (Meiji and Detroit) comprise lavas with trace element and isotope compositions that approach depleted MORB, unlike the younger (<70 Ma) lavas related to the Hawaiian hotspot. However, the depleted MORB-like component involved in Cretaceous Hawaiian plume magmatism appears different from present-day Pacific MORB. Whether this depleted component originates from shallow asthenospheric mantle or is intrinsic to the mantle plume is currently a heavily debated topic. Here we report new data of oceanic basalts from accretionary complexes in eastern Kamchatka, which are believed to represent ocean crust that formed in the former Kula-Pacific spreading centre in the vicinity and at the time of volcanism at Meiji and Detroit seamounts. The samples are olivine-plagioclase basalts, dikes and gabbros that formed ~95 Ma according to $^{39}\text{Ar}/^{40}\text{Ar}$ age data. The rocks have MORB-like LREE depleted patterns and initial $^{87}\text{Sr}/^{86}\text{Sr}=0.70240$ (least altered sample), $^{143}\text{Nd}/^{144}\text{Nd}=0.51302-0.51311$, $^{206}\text{Pb}/^{204}\text{Pb}=17.62-17.92$, $^{207}\text{Pb}/^{204}\text{Pb}=15.38-15.41$ and $^{208}\text{Pb}/^{204}\text{Pb}=37.20-37.52$. The Pb isotope ratios are somewhat unradiogenic compared to typical Pacific MORB but closely match the inferred depleted component sampled by the Meiji and Detroit lavas. The studied lavas are similar to common Pacific MORB with respect to major and trace elements and thus likely originate through melting of asthenospheric mantle at a mid-ocean ridge. If the studied lavas sampled common Cretaceous asthenospheric mantle then the depleted Hawaiian component could also originate from the shallow asthenosphere that was entrained by the mantle plume near the spreading centre. Alternatively, the stud-

ied lavas could originate through the Hawaiian plume magmatism. In this case, the depleted plume component is fairly similar to the depleted MORB mantle (DMM).