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Highly siderophile element behavior during oceanic LIP emplacement

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Causal mechanisms and ultimate trigger for the global environmental catastrophes, such as mass extinction and oceanic anoxia events are long-standing matter of debates. Since the discovery of global Ir anomaly in Cretaceous-Tertiary boundary layer and the Chichxulub crater, the highly siderophile elements (HSEs) in sedimentary sequences have been recognized as useful geochemical tracers for identifying extraterrestrial impacts. However, an important question remains as to whether enormous supply of HSEs to the surface environment is also caused by massive volcanism leading to the formation of large igneous provinces (LIPs). This classic idea has been recently revived by the Cenozoic-Mesozoic marine Os isotope record that displays frequent negative excursions over the time intervals of LIP eruption. In this contribution, we present HSE concentration data of oceanic LIP basalts recovered from Hole U1349A on summit site of Ori massif of the Shatsky Rise. The drillcore provides an ideal opportunity to evaluate the possibility of HSE loss due to volcanic degassing and/or contrasting alteration styles because it is separated into subaerial and submarine portions from a single magma type of narrow compositional range. The results demonstrate that Os, Ir, Ru and Pt values are nearly uniform throughout the core, whereas Pd and Re values in subaerial portions are systematically lower than those in deeper submarine portion. Current dataset may therefore lend no support to the notion that degassing and alteration processes are responsible for significant release of HSEs except for Pd and Re.

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