Geology, Petrology and Geochemistry of the Ontong Java Plateau Basalts from Malaita, Solomon Islands

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Mid-Cretaceous (from 125 Ma to 80 Ma) is the anomalous period that global environment has drastically changed. The cue to understand the most recent pulse era in the earth history is veiled in Western Pacific oceanic plateaus in the period. In this study, the Ontong Java Plateau (OJP) was target on because the OJP is the most voluminous oceanic plateau and has the area exposed on land in Solomon Islands. To clarify the petrogenesis of the OJP basalts, we have carried out the geological survey in central Malaita to describe the mode of occurrences of lavas and petrological and geochemical study on the systematically enormous collected samples.

Most lavas are not distinguished in major, trace and REE compositions from those reported by previous work. These are evolved tholeiite and flat REE patterns. But some lavas have high MgO contents up to 11 wt%. Here, we termed High-MgO type lavas. They have alkali basaltic features in major elements, although their REE patterns are flat. Despite their high MgO contents, they are depleted in Ni and Cr.

Compared with the high-pressure melting experiments of various source, the major compositions of High-MgO type lavas are most possible to be generated from refractory of eclogitic recycled oceanic crust extracted SiO2-rich melt. High-MgO type lavas infer that the plume generating OJP basalts include the ancient oceanic crust. Other type lavas are expected to be mixture of totally molten basalt and a partial melt of peridotite.