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## Origin of the Caroline mantle plume and its interaction with the Caroline basin

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The Caroline Rise has played an important role in the tectonic frame of the western Pacific, however, the nature and origin of the Caroline Rise has long been unclear. The boundary between the Pacific plate and the Caroline plate has long been unclear, thus, it unclear which plate is underneath the Caroline Rise. In this study, we confirmed that the Caroline Rise represents an oceanic plateau formed as a large igneous province based on seafloor sampling. In this study, we have age-dated and analyzed the whole-rock major and trace elements and Sr-Nd-Pb-Hf isotopes of the basalt samples from the Caroline Plateau. The basalt samples are classified into two groups, the alkali group and the tholeiite group. The results of age-dating indicate older ages for the tholeiite group than the alkali group. The tholeiite group basalts are apparently older than the Caroline Islands and are close to the basalts of Ontong Java Plateau in trace element compositions. We suggest that the tholeiite group basalts represent the main stage volcanism and the alkali group basalts represent the late stage volcanism of the Caroline Plateau. The alkali group basalts show trace element and isotope compositions similar to those of the Caroline Islands to the east. The tholeiite group basalts have involved significant amount of depleted asthenosphere components, which suggests interactions of the Caroline plume with the Caroline basin spreading center. The MORB-like depleted geochemical nature of the Caroline tholeiite group basalts indicates formation of the Caroline Plateau under the young and thin Caroline plate lithosphere. Our results of age and geochemistry of the Caroline Plateau/Seamount system could be explained by the activities of the Caroline hotspot. This work was financially supported by the National Natural Science Foundation of China (91858206, 41876040).