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Sub-Seafloor Hydrothermal Alteration of Oceanic Crust of the Cyprus and Oman Ophiolites — Interaction with Global Environment During the Mid-Cretaceous —

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The chemical changes in oceanic crustal rocks during hydrothermal alteration were investigated in the Troodos ophiolite, Cyprus and the Oman ophiolite in order to evaluate seawater-rock interaction through the oceanic crust, including Layer 3.87Sr/86Sr ratios of bulk rocks, reflectingoriginal rock composition and its modification, showed that the abundant seawater penetrated into the lower part of oceanic crust in the Troodos and Oman ophiolites at high temperature. The degree of alteration was assessed by 87Sr/86Sr ratios of rocks and the abundance of secondary minerals. Alteration temperature in sheeted dike complex, plagiogranite, and upper part of gabbroic sequence in the Oman corresponds to greenschist facies alteration while the lower part of gabbroic sequence showed amphibolite facies alteration. In contrast, oceanic crust between sheeted dike complex and lower part of gabbroic sequence showed greenschist facies alteration in Cyprus. The analysis of the depth-profile of 20 elements and their correlation showed the elements were classified into 6 groups: Group 1 (Ca, P, Al), Group 2 (Mg, Ni, Co, Cr), Group 3 (Fe, Ti, Na, Mn, Zn, Y), Group 4 (K, Rb, Ba), Group 5 (Li, Cd) and Group 6 (other elements such as Sr, Cu). In addition to much leaching from the lower part of sheeted dike complex, heavy metals, forming ore deposits, were contributed from the lower oceanic crust of the Troodos and Oman ophiolites at higher temperature.