New aspect on the hydrothermal alteration system beneath ocean ridges: Significance of chloritite rocks from the Oman ophiolite

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Black rock body (chloritite) with abnormal bulk compositions occurs in the Oman ophiolite as reported by Neo et al. (2004 JPGU meeting). At that time, we believed that the black body intruded into the host gabbros and dolerite, and argued the several possible geneses of the black body. However, we could not confirm the probable origin. Then we have resurveyed of the black body and found a clear evidence showing that a hydrothermal alteration process produced the black body. Also two black bodies with same characteristics were found from two localities, north-branch of Wadi Suhayli and north-branch of Wadi Bani-Umar. Original textures are completely obliterated except for a remnant of the primary grain-size. The black rocks from the three localities are mainly composed of iron-rich chlorite with accessory amount of epidote, titanite, and iron oxide. It is noted that these three bodies occur at the same stratigraphic position, i.e., uppermost horizon of the upper gabbro unit. Furthermore, sharp but gradual contacts between the black bodies and host rocks (mainly varitextured gabbro and dolerite dikes in places) again confirm that the black bodies were not intrusives but altered products from the host rocks. The fact that they occur at the same stratigraphic horizon indicates strongly that the genesis of the black bodies is fundamentally controlled by a stratigraphic control. Bulk rock compositions of the black bodies show that they suffered very intensive compositional change during the hydrothermal alteration. That is, highly removal in SiO2, CaO and LIL elements, and highly enrichment in FeO characterize the black bodies. Such types of the alteration is not known from the hydrothermal system beneath ocean ridges, and we believe that the black bodies found in the Oman ophiolite may give a new aspect on the hydrothermal system.