

Lithostratigraphy and radiolarian age of pelagic sediments in the Wadi Hilti area of the Oman Ophiolite: age constraint for eruption of the V2 lava

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The Oman Ophiolite is the most complete preserved section of upper mantle to oceanic crust worldwide (e.g., Lippard et al., 1986). The ophiolite forms a huge thrust sheet that crops out for a length of 500 km and a width of approximately 80 km in the Oman Mountains. Ernewein et al. (1988) summarized the subdivision of volcanic rocks and recognized that V1, which has a normal MORB (N-MORB)-like signature, was erupted around a spreading ridge and that V2 formed by intra-oceanic arc volcanism. In addition, thick lava flows of V3, ascribed to intra-plate volcanism, were emplaced onto pelagic sediments (Umino, 2012).

The V2 and V3 lavas are widely distributed in the Wadi Hilti area, about 25 km west of Sohar, northern Oman Mountains. Recently, Kusano et al. (2014) reexamined the volcano-stratigraphy of the V2 lava in this area, consisting of lower LV2 (IAT) and upper UV2 (boninite) units, based on their geochemical composition and stratigraphic relationship. The eruption and emplacement mechanism of the V3 lava were studied by Umino (2012). Metalliferous and pelagic sediments overlie the UV2 lava and are covered by the V3 lava. Based on our field examination for several sections in the Wadi Hilti area, the stratigraphy of the sediments on the UV2 lava consists of metalliferous sediments, red mudstone and micritic limestone, in ascending order. We obtained *Guttacapsa gutta* and *Thanarla pulchra* from red mudstone. According to O'Dogherty (1994), the co-occurrence of these species is restricted to be middle to late Cenomanian. From red mudstone and micritic limestone, *Rhopalosyringium scissum* and *Hemicryptocapsa polyhedra* were recovered, which can be assigned to a Turonian age (O'Dogherty, 1994).

Very recently, high-precision U-Pb zircon datings were conducted by Rioux et al. (2012, 2013, 2014) on gabbros, tonalites, and trondhjemites. According to them, the rocks fall into two groups in terms of their structural positions, dates, and isotopic composition: the older group, dated at ca. 96.5–95.5 Ma, is attributed to ridge magmatism (V1 lava), whereas the younger group (ca. 95.5–95.0 Ma) is related to post-ridge magmatism (V2 lava). Hara and Kurihara (2015) reported the maximum age of sediments on the V1 lava to middle-late Cenomanian. In the present study, the sediments on the UV2 lava can be correlated with the middle to late Cenomanian. These findings reveal that the activity from the V1 to UV2 lavas was terminated in late Cenomanian. In addition, these radiolarian ages are consistent with the high-precision U-Pb zircon ages of crustal rocks formed by ridge and post-ridge magmatisms. These age constraints imply that the change of tectonic setting progressed rapidly in a short period of middle-late Cenomanian.

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