

Stratigraphy and radiolarian age of Late Cretaceous pelagic sediments in the Wadi Hilti area of the Oman Ophiolite

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The Oman Ophiolite consists of mantle peridotites, gabbros, a sheeted dyke complex, and basaltic lavas overlain by pelagic sediments. The extrusive rocks have been subdivided into three volcanic units; the V1 lava was formed on a spreading ridge, the V2 lava was formed by juvenile arc magmatism, and the V3 lava generated by intraplate volcanism (Ernewein et al., 1988; Kusano et al., 2014; Umino, 2013). The V2 and V3 lavas are widely distributed in the Wadi Hilti area, about 25 km south west of Sohar, northern Oman. Pelagic sediments are about 50 m thick at a maximum, overlie the V2 lava and are covered by the V3 lava. The sediments also occur on and within the V3 lava. However, their stratigraphy in the Wadi Hilti area has not been studied in detail. On the other hand, litho- and biostratigraphic studies have been conducted in the Wadi Jizzi area, about 25 km north of Wadi Hilti area. Thick pelagic sediments on the V1 lava in the Wadi Jizzi area are subdivided into the Suhaylah and Zabyat formations; the former is composed of metalliferous and fine-grained pelagic sediments of Cenomanian – Santonian(?) age, and the latter consists of conglomerate derived mainly from a collapsed oceanic crust during the thrusting stage (Fleet and Robertson, 1980; Tippit et al., 1981; Woodcock and Robertson, 1982; Robertson and Woodcock, 1983). Recently, the radiolarian biostratigraphy of the Suhaylah Formation has been reexamined by Hara and Kurihara (2013). They reported Cenomanian - Turonian radiolarians from fine-grained pelagic sediments.

Based on our field examination for several sections in the Wadi Hilti area, the stratigraphy of the pelagic sediments on the V2 lava consists of metalliferous sediments, V2 lava (boninite), fine-grained pelagic sediments, conglomerate, V3 lava, and siliceous mudstone, in ascending order. We first found conglomerate containing gravels of lavas and pelagic cherts from this area. From fine-grained pelagic sediments on the V2 and V3 lavas, we obtained *Rhopalosyringium scissum* O'Dogherty and *Hemicryptocapsa polyhedra* Dumitrica that can be assigned to a Turonian age (O'Dogherty, 1994). In addition, *Rhopalosyringium petilum* (Foreman) and *Guttacapsa biacta* (Squinabol) were recovered from a block of siliceous mudstone

probably within the conglomerate. According to O'Dogherty (1994), the co-occurrence of these species is restricted to be middle to late Cenomanian.

Based on these age assignments, the fine-grained pelagic sediments on the V2 lava (metalliferous sediments, micritic limestone, and red mudstone) in the Wadi Hilti area can be correlated with the Turonian part of the Suhaylah Formation in the Wadi Jizzi area. This reveals that the activity of the V2 lava was terminated in Turonian. The conglomerate and the siliceous mudstone on the V3 lava are correlated with the Zabyat Formation, indicating that the eruption of the V3 lava occurred in Turonian. These age constraints for basaltic extrusive rocks imply that the tectonic setting from subduction to oceanic-thrusting changed rapidly in a short period of Turonian time.

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