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Reassessing the age of Karpathos ophiolite (Dodecanese, Greece):

consequences for Aegean correlations and Neotethys evolution.

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Supplementary material

**Appendix:**

**Pioneering studies on Karpathos**

**1. Geology**

The first geological studies of Karpathos trace as far back as the end of the 19th century. C.J. Forsyth Major started the exploration of the island in 1886, leading to a publication by de Stefani, Forsyth Major & Barbey (1895) on plants, geology and fossils. It is noteworthy that these authors reported so early the occurrence of black and red radiolarian jaspers in the central mountains of Karpathos and collected samples for radiolarian identifications. These samples were forwarded to P. Vinassa de Regny who described and illustrated one assemblage (Vinassa de Regny, 1901; see below).

On the basis of these first studies and correlations, Martelli (1916) published the first geological map of the island. Later, Christodoulou (1960) interpreted the dismembered ophiolites of Karpathos as intrusive rocks into Cretaceous and Eocene limestones, and produced an updated geological map (Christodoulou, 1968). Aubouin & Dercourt (1970) then established a more constrained interpretation of Karpathos geology, correlating the Xindothio Unit with the Pindos Zone of continental Greece and Peloponnese. Davidson-Monett (1974) re-mapped the island and greatly improved its stratigraphy, leading to a better understanding of the Xindothio Unit, including the relationships between the ophiolite and the overlying sedimentary rocks (radiolarite-pink limestone subunit). These data were, then, compared with other oceanic units of the Hellenic arc by Aubouin, Bonneau & Davidson (1976).

Later, the Karpathos ophiolites drew an increased attention due to the intermediate position of the island between Greece and Turkey. Barrier & Angelier (1982) studied neotectonics on Karpathos and their link with the subduction of the African plate, while Hatzipanagiotou (1987, 1988) made an overview of ophiolitic melanges from the Dodecanese region including Karpathos, for which he presented geological maps and the stratigraphy of selected areas. Koepke, Kreuzer & Seidel (1985), Hatzipanagiotou (1991), and Koepke, Seidel & Kreuzer (2002) then established K-Ar Late Cretaceous isotopic ages, outlining the depleted nature of the peridotites and the geochemistry of the dolerite dikes typical of supra-subduction zone ophiolites (SSZ). These authors correlated the ophiolites of Karpathos and Rhodes to the Late Cretaceous ophiolite belt of the Eastern Mediterranean and the Middle East (Turkey, Cyprus, Syria).

**2. Radiolarian micropaleontology**

Vinassa de Regny (1901) provided the first and only published study of Karpathos radiolarians until now. His short memoir describes the lithological facies of phtanites (black cherts) and argillaceous jaspers (red-maroon cherts) which were collected by de Stefani in the central part of the island. De Stefani, Forsyth Major & Barbey (1895) and Vinassa de Regny (1901) did not provide any precise locations for their chert samples. However, their descriptions of red jaspers from the Kalilimni area clearly refer to the high valley of Lastos and the radiolarite-pink limestone subunit of the Xindothio succession.

Vinassa de Regny used an optical microscope on sample surfaces to draw and describe fifty-eight radiolarian morphotypes including twenty new species: *Amphibrachium acum*, *Archicapsa lagena*, *Cenosphaera rossi*, *C. cruxequitis*, *Chitonastrum tricorne*, *Dicolocapsa globus*, *D. Kalilimnii*, *D. spinulosa*, *Dictyocephalus jonicus*, *Dorysphaera graeca*, *Dorydictyum majori*, *Ethmosphaera carpathica*, *Litapium lagena*, *Sethocapsa dolium*, *Staurosphaera insularis*, *Theocapsa tricornis*, *Tripodictya hellenica*, *Trisyringium capellinii*, *Xyphostylus De Stefanii*, and *X. Barbeyi*. Unfortunately, most of these genera are currently *nomen dubium* or not usable anymore (*Archicapsa, Cenosphaera, Chitonastrum, Dictyocephalus, Dorysphaera, Dicolocapsa, Ethmosphaera, Litapium, Sethocapsa, Staurosphaera, Theocapsa, Tripodictya*) (O’Dogherty *et al.* 2009). Only *Trisyringium* and *Xiphostylus* have been confirmed as valid (O’Dogherty *et al.* 2009). In the light of current radiolarian taxonomy, some of the forms illustrated by Vinassa de Regny are identifiable at genus level (*Archaeospongoprunum, Hiscocapsa, Paronaella, Pseudoeucyrtis, Pseudodictyomitra, Triactoma*) but are difficult to correlate to known species given the discrepancies between 1900s drawings and present-day SEM-based taxonomy. However, Vinassa de Regny (1901) suggested the fauna to be possibly Late Cretaceous in age. This age correlation was tentative, given the absence of radiolarian biozonation at this time.

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