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Middle Triassic radiolarites: Key rocks for Triassic-Jurassic geodynamic and palaeogeographic reconstructions of the western Tethyan realm? Derivation from lost oceanic domains and/or indicating ALCAPA or Dinaride/Hellenide provenance? New data from the Hallstatt Mélange (Northern Calcareous Alps, Austria)

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Triassic radiolarites are crucial sedimentary rocks for palaeogeographic and geodynamic reconstructions of the Tethyan realm. They were deposited on the Neo-tethys passive margin and as sedimentary cover of the Neotethys oceanic crust, which evolved since the late Anisian. Radiolarites, occasionally associated with volcanic, are typical of the late Anisian-Ladinian successions in the Dinaride-Hellenide mountain chain. They, however, have not been reported from the Triassic sedimentary successions of the Alpine-Carpathian mountain belt (ALCAPA). Their occurrence therefore is widely used for the reconstruction of the provenance of "exotic" tectonic units, either of Alpine-Carpathian or Dinaride-Hellenide derivation. This also resulted in contrasting palaeogeographic settings for Triassic times: e.g. an independent Meliata Ocean between the Alpine-Carpathian realm and tectonic units in the Pannonian realm or the Eastern Alps/Pannonian realm and Southern Alps/Dinarides, or in between the Dinarides. Alternatively, the radiolarite facies is used as an argument to interpret the palaeogeographic provenance of the "Pelso Composite Terrane" in the Southern Alps/Dinarides area, later displaced by strike-slip movements. In the ALCAPA region the Triassic radiolarites, occurring in the form of pebbles in Jurassic mélanges, are interpreted as remnants of the sedimentary cover of (Meliata) oceanic crust.

We present the microfacies and biostratigraphy of radiolarite and limestone components in mass-flow deposits from the upper Middle to lower Upper Jurassic Hallstatt Mélange. These radiolarites are late Anisian to early late Ladinian in age. The multi-colored limestones belong to the Late Triassic Hallstatt pelagics. All components are interpreted to be derived from the continental slope towards the Neotethys Ocean (Meliata facies zone). A comparison with preserved successions from the Carpathians, Pannonian realm, and Dinarides strengthens the above interpretation. Reworked oceanic crust is missing in mass-flow deposits. The Middle-Upper Triassic sedimentary succession indicates the existence of Triassic radiolarites in the distal passive margin setting of the Eastern Alps. Following conclusions can be drawn:

1. The Middle Triassic radiolarites are not an exclusive element of the Dinarides/Hellenides and thus cannot be used for palaeogeographic reconstructions. They also occur in the Eastern Alps and Western Carpathians, and their occurrence therefore cannot be used to attribute tectonically isolated units in the entire Circum-Pannonian realm to show either Alpine-Carpathian or Dinaride-Hellenide provenance.
2. Neotethys oceanic break-up started in late Anisian. The middle Anisian shallow-water carbonates indicate that the Middle Triassic radiolarites could be deposited in a continental slope of a passive continental margin. The latter are characteristics of a distal passive margin setting of the Neotethys realm.
3. The scenario of several independent Triassic oceans in the eastern Mediterranean mountain ranges is not supported by the identical sedimentological evolution of the Triassic outer shelf sequences in this region.
4. Middle Triassic radiolarites do not necessarily represent erosional products of original sedimentary cover of the Triassic Neotethys ocean floor. They were deposited over the distal passive continental margin of the Neotethys Ocean. Their finding cannot be used as an argument for an eroded oceanic domain. In contrast, The Upper Triassic radiolarites were exclusively deposited on the oceanic floor.