RADIOLARITIC-OPHIOLITIC MELANGE ANALYSIS: NEW POTENTIAL FOR PALAEOGEOGRAPHIC RECONSTRUCTIONS OF LOST OCEANS AS DEMONSTRATED IN THE MIRDITA OPHIOLITE ZONE (ALBANIA)

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The Albanian ophiolites of the Mirdita Zone represent remnants of Mesozoic oceanic lithosphere within the Dinaride-Hellenide segment of the Alpine orogenic system. They form a coherent, north-south trending belt and consist of a large variety of rocks attributed to originally complete ophiolitic sequences through oceanic uppermost mantle and crust. Most recent studies distinguish two different rock associations forming the Western (WOB) and Eastern Ophiolite Belt (EOB). Both are thought to derive from a narrow Jurassic ocean between Apulia in the west and the Korabi-Pelagonian microcontinent to the east called Pindos-Mirdita Ocean.

Creation of oceanic crust in the Pindos-Mirdita Ocean is inferred to have started around the Early/Middle Jurassic boundary followed by intra-oceanic subduction in Late Jurassic times. The age of the ocean seemed to be proven by radiolarians from sediments associated with basaltic and dacitic lavas which gave Late Bajocian to Early Callovian and Middle Callovian to Late Oxfordian ages, respectively. The ophiolite suite is closely associated with radiolarites and ophiolitic mélanges containing blocks of up to kilometer-size. Blocks of Triassic radiolarites in the mélanges were interpreted to have been derived from the continental margins surrounding this short-lived Jurassic ocean. Mélange formation is generally considered to have taken place during post-sedimentary thrusting in Tithonian time.

The Mirdita Ophiolite Zone in Albania is associated with widespread mélanges containing components of up to nappe-size. We dated matrix and components of the mélange by radiolarians, conodonts, and other taxa. The components consist of radiolarites (equivalent to Meliata facies), pelagic limestones (different Hallstatt facies block – grey and red Hallstatt facies) and shallow-water limestones (Dachstein limestone facies), all of Triassic age, as well as ophiolites. Triassic radiolarite as a primary cover of ophiolite material proves Middle Triassic onset of Mirdita ocean-floor formation. The mélange contains a turbiditic radiolarite-rich matrix („radiolaritic flysch"), dated as Late Bajocian to Early Oxfordian. It formed as a synorogenic sediment during west-directed thrusting of ophiolite and sediment-cover nappes representing ocean floor and underplated fragments of the western continental margin. The tectonic structures formed during these orogenic events („Younger Kimmeridgian or Eohellenic Orogeny") are sealed by Late Jurassic platform carbonates (equivalent to the Plassen carbonate platform in the Northern Calcareous Alps).

From the scenario we see no evidence for an independent Pindos-Mirdita Ocean. An in-situ position of the Mirdita ophiolites would mean that the Triassic passive continental margin with its typical facies arrangement from the pelagic outer shelf (Hallstatt limestone facies) towards the inner shelf with its reefal and lagoonal carbonates (Dachstein limestone facies, Hauptdolomite facies) would have been disrupted by an ocean. Remnants of the passive-margin sequences are found both to the west and the east of the present Mirdita Zone. Therefore we conclude that the Mirdita-Pindos Ophiolite Zone is no more in its original position relative to the geologic units to its east and west but must be a far-travelled part of the Neotethys Ocean (Vardar segment), brought into its present position by west-directed far-distance thrusting from the Vardar Zone. In the Northern Calcareous Alps the situation is the same in a number of particulars, although the in Late Jurassic times obducted ophiolite units are not preserved but only indicated in detrital material of the Kimmeridgian to Tithonian radiolaritic wildflysch.

The geological history conforms with that of the Inner Dinarides and adjoining areas; we therefore correlate the Mirdita-Pindos Ophiolite Zone with the Vardar Zone and explain its present position by far-distance west-directed thrusting.