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# FROM MORB TO SSZ – THE SOUTH ALBANIAN OPHIOLITES AND THEIR DINARIC-HELLENIC FRAMEWORK

by

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Within the eastern Mediterranean ophiolites the Albanian portion forms very well developed sections. They are part of the western ophiolitic belt, ranging from Croatia in the north over Bosnia, Montenegro, Albania to Greece in the south. Generally, the Albanian ophiolites, locally named Mirdita ophiolites, are divided in a western and an eastern zone, where the former shows MORB and the latter SSZ signatures according to SHALLO, 1992; BORTOLOTTI et al., 1996, ROBERTSON & SHALLO, 2000. They continue towards the south into the Pindos ophiolites and the Central Greek ophiolites. Towards the north they are connected with the Bosnian and Croatian ophiolites.

The ophiolite complex of Voskopoja, one of the major ophiolite bodies of the South Albanian ophiolites is located in the southernmost part of the Albanian (Mirdita) ophiolites and forms, together with the complexes of Shpati, Devolli, Vallamare, Morava, Shebeniku, and Bitincka, the southern Mirdita ophiolites. Except for the latter two complexes they are interpreted to be a continuation of the western zone, the Shebeniku and Bitincka are compared to the ophiolites of the eastern zone (SHALLO, 1992). The contrast between the western and the eastern ophiolites, well developed in northern Albania, is not so clearly recognizable in southern Albania.

According to our own investigations most of the ophiolitic mantle sections in the Voskopoja and neighbouring ophiolites such as Rehove or Morava, contain lherzolite together with a subordinate amount of harzburgite and dunite. Individual ultramafic thrustsheets in Voskopoja and Morava are separated by metamorphic soles. Wehrlites are common and form the majority of the ultramafic cumulates, which indicates that pyroxenites and wherlites are not only restricted to the Shebeniku and Spati Massif as believed earlier.

Troctolites, metagabbros and olivinegabbros represent the mafic cumulates, clinopyroxene gabbros, occur in Devolli, Voskopoja and Rehove, but are not so common. Gabbronorites occur only in Morava, plagiogranites seem to be mainly absent.

Fragments of a sheeted dike complex are were found recently in the Rehove section. Only four ophiolites (Shpati, Devolli, Vallamare, and Voskopoja) contain a volcanic section directly overlying the ultramafic and/or mafic cumulate sequence. Ultramafic cumulates, gabbros and basalts underwent an oceanic metamorphism of variable degree. For example, amphibole, hydrogrossular and serpentinite result from a metamorphic overprint.

Geochemical data of lavas of the Voskopoja and Rehove (an extrusive section is missing in Morava) indicate a relatively wide range of geochemistry intermediate between typical MORB and island arc tholeiites erupted in a SSZ environment. They can be grouped into four groups: a high Ni-group; a low Ni-group; a high Ti-Zr Group and a low Ti-Zr group. The first two groups are apart from the Ni concentration relatively similar, the high Ni group contains additional olivine and spinell xenocrysts from the mantle causing the high Ni concentration. In the spider diagrams both groups are similar to MORBs, but often slightly depleted as observed in back arc basins. The High Ti-Zr basalts are significantly enriched, the low Ti-Zr group is markedly depleted. This variation in element concentrations and element ratios can not be explained by crystal fractionation or partial melting processes alone but requires most probably a tapping of geochemical heterogeneous mantle portions.

Compared with other ophiolites in the Dinaric-Hellenic realm (e.g.: the Pindos ophiolite in Greece, a continuation of the western zone of the south Albanian ophiolites) there is obviously a wide variety in lithology and geochemistry of the ophiolite. This indicates a geochemical variation from MORB to SSZ tholeiites, not only between the eastern and the western zone, but also in a north-south direction along the main axis of the ophiolites on a regional scale. The same mid- to upper Jurassic formation age, the occurrence of metamorphic soles and comparable sediments on top indicate a common formation and emplacement history.

**References**

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