Geophysical Research Abstracts
Vol. 14, EGU2012-6388-5, 2012
EGU General Assembly 2012

Geochemical features of metabasic rocks from an Early to Middle Jurassic Accretionary Complex (Refahiye metamorphics, Eastern Pontides, NE Turkey): Implications for Late Jurassic-Early Cretaceous magmatic lull

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The Refahiye metamorphics (Eastern Pontides, NE Turkey) represent a metamorphosed accretionary complex of Early to Middle Jurassic age and occur as an interleave between coeval ophiolite. This Early to Middle Jurassic metamorphics and ophiolites are bound by a Permo-Triassic accretionary complex in the north and a Late Cretaceous accretionary complex in the south. The Refahiye metamorphics are made up of greenschist, marble, serpentine, phyllite and subordinately amphibolite, micaschist, eclogite and metachert knockers.

The Jurassic and Late Cretaceous accretionary complexes in Eastern Mediterranean are related to the consumption of a Mesozoic ocean, the so-called Neo-Tethys. Regional geology in the Eastern Pontides indicate that the Early to Middle Jurassic and Late Cretaceous times correspond to volumious igneous activity, while Late Jurassic and Early Cretaceous time to an igneous lull. Here we present whole-rock geochemical data on metabasic rocks from the Refahiye accretionary complex, and discuss these data in terms of accreted material and its implications for the Jurassic evolution of the Eastern Pontides.

All the metabasic rocks are well recrystallized, free of any relict texture and are variably hydrated (LOI $\sim$ 1.3-5.1 wt%). Some samples are characterized by the unusually high-Al_2O_3 contents (up to 20.8 wt%) suggestive of derivation from high-Al basalts. Geochemically three distinct metabasic group are distinguished, on the basis of fluid immobile HFSEs and REEs. Group I is characterized by moderately to strongly fractionated REE patterns [$(La/Yb)_{cn}$ $\sim$8-18], absence of any Nb-Ta anomaly in multi element variation diagrams and high Ti and low Zr/Nb ratios (3.68-5.72), corresponding to unorogenic alkaline basalts (ocean island basalt). Group II characterized by moderately fractionated REE ratios [$(La/Yb)_{cn}$ $\sim$0.6-2.6], absence of any Nb-Ta anomaly, resembling unorogenic tholeiitic basalts (E and N-MORB). Group III on the other hand, displays unfractionated, nearly flat REE patterns [$(La/Yb)_{cn}$ $\sim$0.6-1.1], negative Nb-Ta anomaly and enormously high Zr/Nb values (38-62), corresponding to orogenic tholeeitic basalts.

These data indicate accretion of unorogenic alkaline and tholeiitic basalts similar to those in seamounts, MORB and IAB during the Early to Middle Jurassic subduction. This together with widespread Early to Middle Jurassic magmatism in Eastern Pontides and Crimea and absence in the southern Menderes-Taurus continental block, conclusively indicate for a northvergent subduction. On the basis of the general absence of a Middle to Upper Jurassic unconformity, we tentatively ascribe the Late Jurassic-Early Cretaceous magmatic lull to the accretion of large submarine topographic highs to the subduction zone.