GEOLOGICAL AND GEOCHEMICAL CRITERIA ON THE CLASSIFICATION OF MESOZOIC VOLCANITES OF THE HELIKON MOUNTAINS, GREECE

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During the upper Jurassic continuous subsidence of the sedimentary basin of the Helikon area resulted in the deposition of thick radiolarian cherts. This evolution was accompanied by a marked volcanic activity which occurred mainly at the base of the radiolarian cherts. Occasionally volcanics are found as peneconcordant intercalations with in the radiolarian cherts. They from pillow-lavas frequently and are closely associated with turbidites and volcanoclastic sequences. They represent submarine basaltic extrusions which show under the microscope partly porphyritic or ophitic textures. Using their thickness, lateral extension, lithologic association and chemistry as criteria for definition, they can be interpreted as submarine, short-lived, small strato-volcanoes which were active near a probable back-arc basin.

SEDIMENTATION AND MAGMATISM RELATED TO THE OPENING OF A MESOZOIC OCEANIC BASIN IN THE AXIOS (VARDAR) ZONE

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A sequence marking the opening of the Axios (Vardar) ocean has been preserved along the western margin of the Vertiscos group (Serbomacedonian Massif). The sequence starts in the Permian with continental fan deposits (Examili formation) indicating extension, block faulting and basin formation on the Hercynian Vertiscos basement. A shelf was then formed during the Middle Triassic rimmed with reefal carbonates. Intraplatform basins received argilaceous pelagic sediments and carbonate olistoliths and olistostromes. Acid volcanics were extruded on the continental margin partly subaerially, partly in deep water. Devitrified obsidian flows and ignimbrites are preserved. Accretionary lapilli indicate phreatomagmatic eruptions resulting from groundwater or shallow marine interaction. Rhyolitic blisters with radiating cracks infilled with carbonate mud and hyaloclastites are evidence of eruption at the base of slopes below carbonate build-ups. In a few places hypabyssal porphyritic rhyolites cut the shelf carbonates. Eroded channels in the volcanics received coarse continentally derived clastics suggesting that the basement was locally exposed on fault scarps.

We believe that the acid volcanism may had started in the Early Triassic but it also

continued during the Middle Triassic. At the same stratigraphic levels as the acid volcanics there are scarce mafic dyke-like bodies and extrusives now metamorphosed to greenschists. Intermediate volcanic rocks are noticeably rare. The association appears to be a bimodal suite with the acid members dominant.

The geochemistry of the basic rocks is consistent with high degrees of melting of an asthenospheric source with no detectable arc signature. The acid volcanics have trace elements contents indistinguishable from the western Vertiscos group basement migmatites and schists.

We envisage continental extension occuring from sometime during the Permian up to the Middle Triassic, during which time asthenospheric upwelling and basalt underplating produced extensive melting of the thinned continental crust and extrusion of the resulting acid melts. Later, probably in the Middle Jurassic, extension and rifting culminated in the opening of the Axios (Vardar) ocean.

THE ROLE OF EXTENSION IN UNROOFING THE CYCLADIC BLUESCHIST BELT

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Peak metamorphic pressure contitions of 15 kbar indicate that the Cycladic blueshist unit emerged from a depth of ca. 50 km. The HP rocks are delimited from above by low-angle faults which cut-out crust and hence operated with a normal sense of motion. These normal faults facilitated the exhumation of the HP rocks by removing and dispersing the overburden laterally. A ca. 30 km thick section was removed from above the blueschist unit in the oligocene but extensional structures of this age are not known. Oligocene - Miocene ductile stretching, probably enhanced by elevated temperatures, occurred in Naxos and Paros, whereas contemporaneous low-angle normal faulting attenuated the crust in the western part of the Cyclades (Tinos). Continuous extension is documented by lowangle normal faults which cut through foot-wall Miocene granites and which show a prolonged deformation history.

The blueschist unit overthrusted a lower pressure paraautochthon when a significant portion of the overburden was removed. Therefore, the extensional unroofing of the Cycladic blueschist unit occurred during plate convergence.