INTERNAL STRUCTURE OF THE DRAMALA PERIDOTITE, PINDOS OPHIOLITE, GREECE

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The Dramala peridotite consists chiefly of harzburgite with pervasive dunite as layers or small pods. The presence of (from base to top) harzburgite, harzburgite with pyroxenite, harzburgite with gabbro dikes, and harzburgite with sizable dunite bodies defines a crude internal stratigraphy underlying a mixed zone of peridotite with cumulates: The transition to the cumulate section (oceanic layer 3) is preserved, but deformed into a «synformal» structure with respect to the position of the petrologic moho, and a ductile-brittle fault zone related to early emplacement.

The oldest peridotite fabric (high-temperature orthopyroxene foliation, dunite and cumulate layers) strikes 125/50S, with a parallel set of mylonitic zones. All these structures plus pyroxenite and some gabbro dikes are deformed into an 040/60S «low-temperature» foliation that extends into the cumulate section. Some «old» mylonites are folded to the new fabric, and some mylonites with parallel brittle shears appear to relate to the 040 deformation. The most highly deformed peridotite (non-annealed granulation fabric and highly elongated orthopyroxenes) lie in zones sub- to non parallel to either fabric, alligned with emplacement related (decoupling) fault zones. Brittle faults and shears trending from the 040 fabric into a 125/30N geometry demonstrate late back-thrust of the peridotite to the SW.

The geometry of the Dramala peridotite is entirely conformable to that of Vourinos: Earliest shear in the upper mantle conforms to a NE movement with 040 trending tear (transform?) faults. The Dramala unit is located in the trailing, «ductile» part of the obducting slab, and suffers some internal decoupling, while Vourinos conforms to a higher, brittle-field obduction.

METALLIFEROUS AND PELAGIC SEDIMENTATION OF THE MESOZOIC PINDOS OCEAN, GREECE

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Following reassessment of the Mesozoic tectonostratigraphy end structure of mainland Greece and the Peloponnesus it was concluded that during Late Triassic-Early Tertiary time

a small ocean basin (Pindos ocean) bordered an Apulian continental area to the SW and a Pelagonian microcontinent to the SE. A variety of metalliferous and pelagic sediments are associated with this ocean basin.

In the Peloponnese, S. Greece (Argolis) mid-Triassic rifting gave rise to intraplatform basins, floored by intermediate to siliceous extrusives and volcaniclastics. These are overlain by several cm-thick manganiferous crusts (Pb, Zn, Cu rich), then by highly condensed Late Triassic pelagic limestone (Ammonito Rosso), now prserved as olistoliths (Asklipion Limestone). Elsewhere in Argolis, Late Jurassic and manganiferous mudstones, with minor interlava and supralava pelagic carbonates and red ribbon radiolarites.

In the Peloponnesus thrust sheets of abyssal plain, sediments are locally underlain by oceanic extrusives (eg. Sellas) in places forming tectonic melange. This crust is locally overlain by Fe and/or Mn-rich oxide-sediments. In the W Peloponnesus Late Jurassic-Early Cretaceous manganiferous sediments also occur locally as Mn ores in mine areas, much more widely as Mn-rich cherts and mudstones, and as rare manganese nodules within non-calcareous ribbon cherts. At one locality (Aroania) Mn ores are spatially associated with alkaline volcanics within plate-type, suggesting a volcanogenic origin.

In central Greece, in Orthris, sulphides and ferromanganiferous oxide-sediments are associated with ophiolitic lavas. For example, Fe- and Mn-oxide-sediments are dispersed around massive sulphide ores within Jurassic? MORB-type extrusives (Limogardi). Elsewhere, small inter-lava massive sulphides are associated with interlava volcaniclastic sediments and MORB-type lavas are overlain by a thin *in situ* cover of metalliferous, pelagic and epiclastic sediments (Neokhorion).

In the N. Pindos Mountains, the major Pindos ophiolite is underlain by a dismembered ophiolite, largely comprising extrusives of highly depleted, boninite type. These are thought to represent a supra-subduction setting, similar to the Eocene Mariana fore-arc. The N. Pindos ophiolite extrusives include minor disseminated sulphides, and the lavas are overlain by ferruginous, trace-metal enriched mudstones, similar to the upper umbers of the Oman ophiolite.

In summary, new major – and trace – element, and mineralogical data indicate that hydrothermal processes played an important rôle in most of the Greek metalliferous sediments, with hydrogenous and detrital input in some areas. In general, hydrothermal Mn oxide sediments precipitated in small rift-related intra-platform basins, on MORB-type oceanic crust and associated with some seamounts. High temperature-type umbers, derived from black smokers, settled in hollows on the surface of Late Triassic oceanic crust and Jurassic supra-subduction zone type-oceanic crust. By contrast, more hydrogenous-influenced metal oxide-rich siliceous deposits accumulated on the basin plain away from hydrothermal discharge centres.