

Geology of southern Crete: new stratigraphic data and geodynamic implications.

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The geology of Crete is fundamental for the understanding of the Tethyan geodynamics providing a link between the Hellenides and the Taurides. This work supplies new paleontological and geochemical data allowing the connection between these two orogenic systems.

The studied region in the southern part of the island exposes a complex nappe pile, which results from the accretion of the Paleotethyan back-arc basins and their intercalated continental fragments to the main Eurasian margin. The Pindos domain represents the youngest back-arc basin of Paleotethys. It opened during Late Triassic time and displays a continuous sedimentary sequence up to the Eocene. Detailed sections were logged in the Pindos and Lentas series.

According to our results, the Lentas series has been recognized as the basis of the Pindos succession in the studied area, constituting the syn-rift stage of the basin opening. It exposes a polygenic conglomerate reworking middle Permian limestones with Paleotethyan derived faunas overlain by a volcanoclastic series. Geochemistry shows E-MORB and N-MORB signatures, which are concordant with a syn-rift emplacement. For the youngest formation of the Lentas unit, facies and Carnian-Norian ages are comparable to the ones identified at the base of the Pindos series.

Remnants of the Pindos Ocean are found all over the eastern Mediterranean area and series of southern Crete have equivalents in Greece and Turkey (Huğlu-Pindos series).

The ophiolitic mélange units (Vatos, Spili, Miamou and the Ophiolitic nappe) were studied in order to constrain the ages and origins of the reworked material. The geochemical analyses gave variable signatures: arc lavas as well as E-MORB and N-MORB basalts. Ages range from Ladinian to Late Cretaceous and recorded the evolution of the Pelagonian terrane. The main results consist in the identification of pelagic sediments attributed to the flexuration of the lower plate during obduction events. We could identify Oxfordian-Kimmeridgian radiolarites related to the Vardar obduction, but also Turonian-Santonian pelagic limestones related to the Lycian event. The latter is well known in Turkey, where all ophiolites are (Cenomanian)-Turonian in age, but it was not identified in Greece.