

[Pelagonian margins in central Evia island \(Greece\). Stratigraphy and geodynamic evolution](#)

DE BONO Andrea, 14 décembre 1998

Directeur de thèse: Prof. Gérard STAMPFLI, Institut de Géologie et Paléontologie

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Introduction

The main goal of this work was to unravel the geodynamic evolution of the "Pelagonian terrane" (Stampfli 1996 & 1998). From a geodynamic point of view, the Pelagonian terrane is considered as an Eurasian fragment drifted since the Early Mesozoic. At this time it was located between the Meliata oceanic basin to the North and the Cimmerian blocks to the South ("Greater Apulia"). This evolution is the consequence of the northward subduction of the Paleotethys below the Eurasian continent. The Pelagonia terrane comprises, from South to North, the following zones: Vardoussia, Parnassos, Beotia, Pelagonian and Maliac-Othrys.

The evolution of the Pelagonia terrane's margins was studied in the units outcropping in central Evia, where about 300 km² were mapped at 1:25'000 scale.

This resulted in the following main observations:

- The northern passive margin sequence of Pelagonia (Paleogeographic sense) is related to the Meliata ocean opening during the Early Mesozoic.
- The westward emplacement of the ophiolitic nappe onto the Pelagonia northern margin occurred in Late Jurassic.

The presence of possible remnants of the Paleotethyan suture zone in more external units than Pelagonia.

The northern margin of Pelagonia

The northern margin of Pelagonia is represented by a Variscan basement overlain by syn- and post-rift sequences, separated by a volcano-sedimentary episode.

The basement is made up of granites and granodiorites (Skotini granites) with calco-alkaline affinity, dating from 315 to 311 Ma (U-Pb). A regional unconformity separates them by the overlying formation. The magmatism is seen as a consequence of the northward subduction of the Paleotethys below Eurasia.

The synrift sequences comprise Permian siliciclastic sediments in Verrucano tectofacies, (Ano Mavropoulon Formation) and a small carbonate platform (Zigos Limestone) developed from Permian to the Middle Anisian. The Ano Mavropoulon Fm was subdivided in to three members:

- The lower, (Permian s. l.) lying on the basement and characterised by medium-coarse clastic terrigenous sedimentation.
- The middle (Late Permian) Koprises limestones, made up of shallow-water limestones.
- The upper (Latest Permian-Early Triassic) comprising clastic terrigenous and minor reworked carbonate sediments.

A regional unconformity (lower Early Triassic) separates the Zigos Lm by the top of the Ano Mavropoulon Fm.

The peritidal carbonates belonging to the Zigos Lm. have subdivided themselves in to three lithozones ranging in age from Spathian to Pelsonian (late Early Triassic to Middle Anisian).

The volcanic episode is well constrained in all the Pelagonian domain. In central Evia it has been dated from Middle Anisian to Early Carnian. The alkaline basalts contained in the volcano-sedimentary sequence (Volcano-sedimentary Complex) have a within-plate affinity. The volcanism occurs between the synrift and postrift stages, and is probably not linked to the passive margin evolution proper. It is interpreted as a mantle plume due to the slab roll back and detachment of subducted Paleotethys under the southern margin of Pelagonia.

The postrift sequences are represented by the onset of the Pelagonian platform aggradation ("Pantokrator" Carnian to Middle-Late? Jurassic) following the Meliata break up which occurred probably in the Early Triassic.

Ophiolites emplacement

Since Middle-Late Jurassic the evolution of the Pelagonian terrane was strongly influenced by the westward obduction of the Vardar ophiolites ("Eohellenic orogenic phase").

In central Evia this phase was recorded by the Late Jurassic (Early Cretaceous ?) sediments as shown by:

Kimmeridgian-Tithonian radiolarian cherts (Olympos cherts) overlying the top of the "Pantokrator" limestones. They represent a rapid submersion of the platform interpreted as the flexuration of the passive margin in front of the ophiolite obduction.

The occurrence of ophiolitic detritus in the uppermost Jurassic (Early Cretaceous ?) detrital sequence overlying the radiolarian cherts.

A "mélange unit" was also recognised, tectonically overlying the detrital sequence. It consists of an olitostrome part and a mélange s. s. part. The latter contains Triassic radiolarites, volcanic rocks (with a calco-alkaline affinity) and Ladinian Hallstatt-type limestones associated with basic extrusives (sea-mount remnants). The mélange s. s. was interpreted as part of an accretionary prism. The origin of the prism is probably due to an intra-oceanic subduction involving (Early Jurassic ?) the Meliata ocean. In this way the Vardar is regarded as the back-arc basin related to the Meliata subduction.

Paleotethys remnants

The Liri unit is a Triassic flysch sequence outcropping at the base of the Pelagonian sequences in central Evia. It contains as olistoliths, Carboniferous limestones and Variscan granites (309 and 310 Ma, U-Pb). It has been correlated with the "Détritique Triassique" of the Pindos zone and interpreted as belonging to the Paleotethys suture zone, probably located on the southern margin of Pelagonia.