A critical revision of the Liguride complex in the Pollino area (Southern Apennines)

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The geodynamic reconstructions of the Apennine-Tyrrhenian system strongly rely on chronological and P-T data derived from the study of ophiolite-bearing units accreted in orogenic belts, frequently affected by HP-LT metamorphic overprint. Consequently, we carried out a detailed geological survey, combined with the study of calcareous nannofossils and the analysis of mineralogical and petrographic features of low-grade metamorphic rocks, in order to reconstruct the tectono-stratigraphic relationships among different formations of the Liguride Complex and perform a critical review of the existing literature on the P-T evolution of the Liguride accretionary wedge exposed in the Pollino area of the Southern Apennines.

A geological-structural survey allowed us to distinguish four major tectonic units, characterized by an overall decrease of metamorphic grade from top to bottom. The tectonic units consist of: i) slices of continental crust rocks consisting of Albitic gneisses, Garnet gneisses and Amphibolites; ii) the Frido Unit Auctorum p.p. with a variable intensity of deformation and HP/LT metamorphic grade. This unit consist of a typical ophiolitic assemblage, including serpentinites with metadolerites or altered peridotites, pillow lavas, foliated metabasites, metalimestones and metabreccias, quarzites, and jaspers. The upper part of the succession is made up of calcschists and low-grade metapelites, displaying variable PT conditions from about 7 kbar and 200 °C to 12 kbar and 350 °C. A wide variation of P-T conditions suggests that the Frido Unit consists of different thrust sheets, showing a progressive increase of the metamorphic grade moving from north to south; iii) the Seluci-Cogliandrino Unit, consisting mainly of metapelites and slices of an upper Jurassic seafloor succession with pillow lavas; iv) the non-metamorphic Nord Calabrian Unit represented, from the bottom, by ophiolites, shales with pencil cleavage (Crete Nere Formation) and by a prevailing calciclastic unit (Saraceno Formation), topped by thrust top deposits (Albidona Formation).

Calcareous nannofossil assemblages were studied in samples coming from the main successions of the investigated area, in order to provide age constraints for the deformation of the Liguride accretionary wedge. Results show that Frido Unit did not preserve calcareous nannofossils in all analyzed samples, because of the strong deformation produced during the HP-LT metamorphic overprint. In the upper part of the Seluci-Cogliandrino Unit, Eocene inf. CNE4 biozone has been documented. On the other hand, in the lower part of the Saracenò Fm a late Albian age (CC9 p.p.) was documented, based on the occurrence of Eiffellithus turriseiffeli and Hayesites irregularis.
Moreover, the occurrence of Discoaster lodoensis, Reticulofenestra dictyoda and Toweius callosus framed the lower stratigraphic interval of the Albidona Fm to the early Eocene (Ypresian; CNE4 p.p.). Based on the above data, the current views on the Cretaceous-Paleogene geodynamic evolution of the southern Apennine thrust and fold belt should be substantially revised.