

amount of new data published in the last ten years. Therefore, some aspects described in this paper are rather problematic.

However, the basic features of the Alpine and Variscan metamorphisms are relatively well clear. The Alpine metamorphism turns out to be characterized by medium to high pressures. The Variscan metamorphism displays low pressure conditions in the certainly monometamorphic, low-grade sequences. In the high grade pre-Alpine terranes, barrovian-type conditions have been also reported as related to the Variscan event: however, they could also be a record of a pre-Variscan history, survived after the prevailing Variscan effects, as some chronological data and geo-petrographic hints may suggest.

## **THE AGE OF FRIDO UNIT METALIMESTONES: IMPLICATIONS ABOUT A PALEOTECTONIC ROLE OF THE SANGINETO LINE.**

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The occurrence in the Frido Unit metalimestones at the Calabria-Lucania border of nanofossil associations not older than the Oligocene is reported. Therefore the HP/VLT metamorphism of the unit-till now referred to as Eo-alpine - must be interpreted as already related to the Apenninic tectogenetic phases. This strengthens the hypothesis of the persistence as far as the Oligocene of a relic of the oceanic Tethys, kinematically disengaged from earlier deformed segments like the area originating the Calabrian ophiolitic units.

## **AN OVERVIEW OF THE LATE-VARISCAN MAGMATIC EVOLUTION IN THE ALPINE BELT**

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After the major orogenic episodes, the pre-Mesozoic Alpine basement was subjected to large-scale shearing effects accompanying lithosphere distensional thinning, Basin and Range tectonics and high geothermal regimes. As a result of intrusion of mantle-derived melts and induced crustal anatexis, almost all pieces of basement within the Alpine belt underwent abundant late-Variscan magma emplacement.

After the *late-Devonian* collisional stage, low-pressure regional regimes ultimately

developed "wet" and/or H<sub>2</sub>O-deficient partial melting, which may or may not have been induced by the intrusion of mantle-derived melts. Consequently, peraluminous associations of crustal melts were associated and mixed with high-K mafic magmas.

*Lower to middle Carboniferous* high-K calc-alkaline suites indicate a postcollisional stage with uplift and erosion in a short-lived transpressional and/or transtensional regime. They were followed by *late Carboniferous* near-alkaline suites, yielding both alkaline and calc-alkaline characteristics.

During *late Carboniferous to early Permian* times, scarce subduction-related calc-alkaline suites resemble closely the circum-Pacific Cordilleran batholiths. They may indicate a renewed ocean-continent plate margin convergence at the southern flank of the Variscan belt.

*Mid-Permian* post-orogenic and *late Permian to Triassic* non-orogenic alkaline complexes were accompanied by large thermal imprints recorded in the basement by mineral isotopic clocks. The alkaline magmatic activity is related both to consolidation of continental plates and to precursory stages in the formation of the Meso-Tethys oceanic basin.

## ORDOVICIAN AND PERMIAN PLUTONISM IN THE SOUTHALPINE CRUST (NW ITALY AND TICINO-CH): A COMPARISON

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Granites and their mafic precursors contributed a great deal to the growth of the Southalpine crust in the Ordovician in an active continental margin, and in the Permian in a post-orogenic extensional regime.

The Ordovician plutonic rocks of Series dei Laghi (W Southern Alps) range from diorite to leucogranite with a maximum in the granodiorite interval. They intruded non-metamorphic terrigenous rocks. Some of the coarsest host rocks were impregnated by pegmatitic residual melts. Intrusives and country rocks underwent an Hercynian lower amphibolite facies regional metamorphism, but their original features and relationships can still be identified. Minerals record the Hercynian metamorphism (Rb-Sr ages: biotite 234-310 Ma, muscovite 311-325); whole rocks behaved as closed system for Sr as is demonstrated by the whole rock isochron at 468±9Ma.

Trace elements (included REE), as well as Sr isotopic data, indicate a lower crust heterogeneous source or a mantle source with crustal contribution. The Pb isotopic systematics on the whole rocks, shows a displacement in some samples, that suggests some fluid circulation. The initial Pb isotopic composition of the unaffected samples is