Geophysical Research Abstracts, Vol. 8, 03504, 2006
SRef-ID: 1607-7962/gra/EGU06-A-03504

New data on the thermo-baric evolution of the Liguride units, southern Italy

C. Invernizzi (1), S. Corrado (2), P. Di Leo (3), M. Schiattarella (4), M. Zattin (5)

(1) Dip.to di Scienze della Terra, Università di Camerino, Camerino, Italy (chiara.invernizzi@unicam.it), (2) Dip.to di Scienze Geologiche, Università "Roma Tre", Roma, (3) IMAA – C.N.R., Tito Scalo (PZ), Italy, (4) Dip.to di Scienze Geologiche, Università della Basilicata, Potenza, Italy, (5) Dip.to di Scienze Geologiche e Ambientali, Università di Bologna, Bologna, Italy

The Liguride units crop out in a narrow belt at the boundary between Calabria and Lucania regions in southern Italy. They are mainly constituted by a complex assemblage of Jurassic to Oligocene ocean-derived units, formed of both basement and cover rocks. Although the structural set and the stratigraphic pattern of these ophiolite-bearing units are sufficiently known, a contribution to some open issues in term of tectonic and burial history and exhumation modalities of such a key sector of the southern Appennines is still needed.

New data about the reconstruction of the thermo-baric evolution of this relict of a Miocene accretionary wedge by subduction of Ligurian oceanic lithosphere, later thrust on the African-Apulian continental margin and then refolded and faulted in Neogene to Quaternary times, are attempted by using inorganic and organic thermal indicators. In particular, quantitative data on thermal history of the low-methamorphic Frido Unit and non-metamorphic Nord-calabrese (Saraceno and Crete Nere Fms) Unit have been collected by a combination of different methodologies such as clay mineralogy, fluid inclusion microthermometry, fission tracks analyses, and organic matter maturity.

Mineralogical data (whole rocks analysis, illite and chlorite crystallinity) suggest that the rocks from Frido Unit experienced temperatures in the range of 180-250 ˚C (late diagenesis-anchizone). Such temperatures are in agreement with those suggested by fluid inclusion microtermometry on quartz-calcite extension veins (160-180˚C). White mica b_0 parameter, typical of accretionary wedge, indicates intermediate pressure fa-

cies series. Considering an inferred geothermal gradient of 25-35 ˚C/km^{-1}, the accretionary burial should range between 6 km (late diagenesis) to 7-8 km (late anchizone).

In the non-metamorphic Nord-calabrese Unit, the mineralogical data for the Crete Nere Fm suggest that these rocks experienced maximum temperature in agreement with those registered by the fluid inclusion microtermometry. However, if in the Frido Unit homogeneous metamorphic conditions are achieved, in the Crete Nere Fm local dynamic conditions related to shear or strain concentration zones may by responsible for the different P/T condition typical of late diagenesis-anchizone limit (150-200 ˚C) and of late diagenesis (110-130 ˚C). The Saraceno Fm samples record congruent thermal data from clay mineralogy (I in I/S of 75% and KI of 0.8-0.9 ˚$\Delta 2\theta$), organic matter maturity (Ro=1%) and Fluid Inclusion microthermometry (trapping temperature around 100-110˚C).

On this basis, it can be suggested that intense shortening and subsequent tectonic denudation by extensional collapse of the wedge competed to exhume the Liguride units in a short time-span. Further, not only the tectonic stack but also the exhumation rate may have been responsible for producing the P/T pattern suggested by the thermal indicators adopted in the present study.