



SEDIMENTARY VS. TECTONIC BURIAL OF THE LAGA BASIN(CENTRAL APENNINES, ITALY): CONSTRAINTS FROM COMBINED ORGANIC MATTER AND CLAY MINERAL DATA

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The reconstruction of the thermal history of folded and thrust units is crucial to define the pattern of tectonic loading and the time-space evolution of an orogen where tectonic exhumation processes occurred at shallow crustal levels. Nevertheless, in the external zone of fold-and-thrust belts, where levels of thermal evolution are generally low, it gets difficult to discriminate between the contribution to thermal maturity due to either tectonic or sedimentary burial. This is particularly true for sedimentary sequences deposited in basins characterized by highly variable subsidence rates such as syn-orogenic basins. Quantifying the amounts of thermal maturity due to different causes may be particularly significant for hydrocarbon exploration.

In the present study, the combined use of different thermal indicators in diagenesis (namely, vitrinite reflectance, T_{max} and percentage of illite in illite/smectite mixed-layers and chlorite in chlorite/smectite mixed-layers) allowed the reconstruction of thermal maturity patterns in the external zone of the central Apennines, in the Messinian Laga Basin. It is located to the East of the Sibillini Mts. and to the North of the Gran Sasso Range, that represent two of the main Meso-Cenozoic carbonate backbones of the Central Apennines. Since Lower Messinian this basin acquired the typical feature of a foreland basin and the siliciclastics of the Laga Fm. filled it up. We focused sampling on the lower and middle siliciclastic members of the Laga Fm. developed to the west of the Montagna dei Fiori-Montagnone alignment where facies architecture, subsidence amounts, and tectonic loadings (now eroded) show a consid-

erable variability along both strike and dip of the chain. Subordinately pre-orogenic succession was sampled in the structural culminations surrounding the basin (e.g., Montagna dei Fiori area).

About 70 samples for vitrinite reflectance analysis and about 40 samples for XRD analysis of the $<2\mu\text{m}$ grain size fraction were mainly collected from surface outcrops. These data were integrated with Tmax data derived from 75 surface and subsurface samples (outcropping Gorzano Mt. section and Varoni 1 well).

Our major results include:

1. the documentation of a general trend of decreasing thermal maturity in the pre-evaporitic member from the Sibillini front to the Montagna dei Fiori-Montagnone alignment. Data range from early mature to immature when compared to stages of hydrocarbon generation;
2. a direct correlation of thermal maturity data with subsidence amounts;
3. a local influence of the tectonic emplacement of the Sibillini Mts. and Gran Sasso Range structures onto the Laga Basin;
4. a low thermal maturity of the analysed pre-orogenic Meso-Cenozoic succession of the Montagna dei Fiori;
5. a tentative correlation among different thermal indicators in diagenesis.