



Geometric framework and thermal history of the Laga basin: constraints for integrated basin analysis

Bigi S.(1), Casero P. (2), Corrado S. (3), Milli S. (1), Moscatelli M. (4) & Stanzione O.(1)

(1) Dipartimento Scienze della Terra Università “La Sapienza” Roma, P.le A. Moro 5 – 00183 Roma, Italy

(2) Via Enrico di S. Martino Valperga, 57 Roma – Italy

(3) Dipartimento di Scienze Geologiche, Università degli Studi “Roma Tre”, L. San Leonardo Murialdo, 1 - 00146 Roma, Italy

(4) IGAG – CNR Via Bolognola, 7 – 00138 Roma

In the last decade the Laga Basin -filled by Lower Messinian siliciclastic turbidites- has been defined as a foredeep basin developed as a consequence of the eastward migration of the Apennines foreland basin system.

In the present study, the combined use of thermal indicators in diagenesis has been integrated with the interpretation of a seismic dataset covering most of the basin extension, and with stratigraphic and structural field data, in order to reconstruct the kinematic evolution of the Laga Basin. Thermal indicators comprise vitrinite reflectance, Tmax and percentage of illite in illite/smectite mixed-layers. They allowed the reconstruction of thermal maturity patterns of the basin. Available seismic dataset, calibrated by bore-hole data, comprises profiles which are part of surveys performed between 1983 and 1985, for a total length of about 200 Km. They provided essential pieces of information on the tectonic setting of the basin. Stratigraphic and structural data suggested a complex physiography of the basin during its early development.

The present map pattern of Laga Basin has a triangular shape: the inner edge consists of two regional thrust fronts which are, respectively, the Mt. Sibillini thrust front, trending NE-SW and the Gran Sasso thrust front, trending E-W. Eastward, the Montagna dei Fiori-Montagnone anticline trends N-S and can be considered the exter-

nal edge of the basin. The basin is filled by a siliciclastic turbiditic sequence (Laga Formation, Messinian age) onlapping onto the back limb of the Montagna dei Fiori-Montagnone anticline. The hanging wall of the Gran Sasso thrust comprises Triassic–Miocene carbonate platform deposits, whereas the hangingwall of the Mt. Sibillini thrust is largely made up of pelagic Meso-Cenozoic carbonates. Coeval pelagic sequence widely crops out in the Montagna dei Fiori anticline and also constitutes the substratum of the Laga Basin.

Main results indicate that the Laga Basin was characterized by an early developed thrusting process in the innermost part of the basin. This is confirmed by a general trend of decreasing thermal maturity moving from Mt. Gorzano, where was located the main depocenters, to the Montagna dei Fiori-Montagnone anticline, where the progressive onlap onto the foreland crops out; whereas lower values characterized the innermost southwestern part, where a complex transfer zone between Sibillini and Gran Sasso thrust front was reconstructed through seismic lines analysis. This area comprises the whole Gran Sasso structure that can be interpreted as a wide wedge top area developed during the deposition of the Laga Formation.