R.C.M.N.S. Interim Colloquium

Vertebrate Migration in the Mediterranean & Paratethys

Neogene Park

MARCH 2011 - SCONTRONE (L'AQUILA), ITALY

Field Guide to the Post-Conference Excursions (Scontrone, Palena and Montagna della Majella)

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Edited by

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Excursion 1: Scontrone, 4th March 2011.

GEOLOGICAL FRAMEWORK OF THE SCONTRONE AREA

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In the Scontrone area an interesting stratigraphic sequence composed of Mesozoic-Tertiary carbonates crops out with very good exposures. This sequence is referable to the Gran Sasso-Genzana Unit, a cover nappe that extends from Northern Abruzzi to Alto Molise forming the bonebed of the Central Apennines, with mountains exceeding 2000 metres in elevation and with Corno Grande, the highest peak of Gran Sasso, reaching 2912 metres above sea level. The carbonate deposits are conformably overlain by siliciclastic flysch deposits of Messinian age. In the Scontrone area, the flysch deposits (Castelnuovo al Volturno Wildflysch, Patacca et al., 1990) contain huge olistostromes and olistoliths of Cretaceous-Miocene basinal deposits, which have derived from the Molise Nappe during their forward displacement towards the Apulia foreland.

In a palinspastic restoration referred to late Jurassic-early Cretaceous times, the Scontrone area lies in correspondence to the southward termination of the Gran Sasso-Genzana Basin against the

north-western margin of the Apulia Platform (fig. 1). This paleogeographic reconstruction is well documented by the facies of the Jurassic-Cretaceous carbonates of Scontrone which are indicative of platform margin, slope and proximal basin. Following the strike of the tectonic structures within the Gran Sasso-Genzana nappe, typical basinal deposits are exposed a few kilometres north of Scontrone, e.g. at Monte Greco and Monte Genzana, whilst coeval shallow-platform carbonates are exposed a few kilometres south of Scontrone at Monte La Rocca and Monte San Michele (High Volturno Valley).

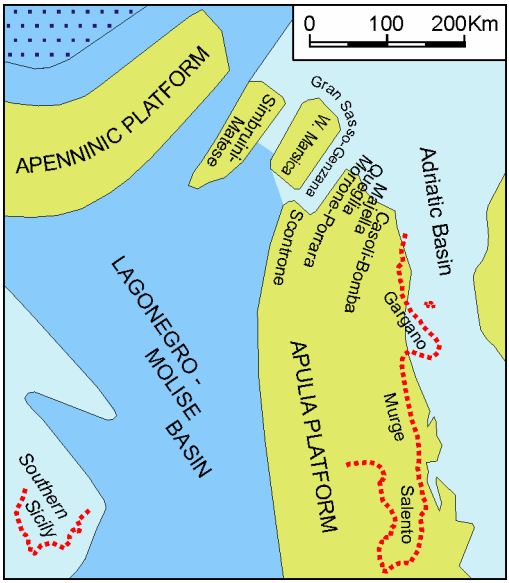

Figure 1. *Palinspastic restoration of the platform-and-basin system of the Central-Southern Apennines during late Jurassic times (about 150 Ma). The picture shows the southern termination of the Gran Sasso-Genzana Basin against the Apulia Platform in correspondence to the Scontrone paleogeographic domain.*

North of Scontrone, the stratigraphic sequence is basically made up of upper Triassic-lower Liassic shallow-water carbonates followed by middle Liassic-Paleogene basinal deposits which are covered, in turn, by uppermost Oligocene-upper Miocene outer-ramp carbonates. South of Scontrone, on the contrary, the stratigraphic sequences are characterized by persisting shallow-water conditions through Mesozoic times, with Neocomian platform-margin limestones and adjacent platform-interior carbonates unconformably overlain by upper Miocene inner to outer-ramp carbonate deposits. In the Scontrone area an almost complete sequence with transitional characteristics is exposed in the Sangro Gorge between Scontrone and Barrea (see enclosed geological map in foldout 1). The sedimentary sequence is represented in this area by Neocomian-Barremian platform-edge carbonates and marginal-slope megabreccias (uppermost portion of the Terratta Formation and Coral-bearing Calcirudite, respectively) disconformably overlain by slope-apron bioclastic calcarenites and calcirudites (Rudist-bearing Calcarenite, upper Albian-Turonian) followed by Coniacian-Campanian hemipelagic limestones with frequent intercalations of calciturbidite beds and lime debrites. The Neocomian-Campanian platform-to-basin depositional system, featured as a retreating margin, evolved from the latemost Maastrichtian into an overall prograding carbonate ramp punctuated by several unconformities with more or less prolonged temporal hiatuses. Outer-ramp bioclastic calcarenites of Maastrichtian age (Saccharoidal Limestone) are locally overlain by upper Paleocene fore-reef calcirudites (Coral-algal Limestone). The latter suggest proximity to a warm-water reefal slope belonging to a distally-steepened carbonate-ramp system. Upper Miocene cool-water shallow-marine carbonates (*Lithothamnium* Limestone) directly overlie the Cretaceous deposits, locally with an intervening discontinuous veneer of upper Paleocene coral breccias. The

Lithothamnium limestones grade upward into hemipelagic deposits (*Turborotalia multiloba* Marl). The deepening-up stratal architecture of the *Lithothamnium* Limestone-*T. multiloba* Marl indicates a gently subsiding homoclinal ramp. The onset of siliciclastic flysch deposits temporally constrains the incorporation of the Scontrone foreland domain in the Apennine foredeep basin in a well-defined moment of the Messinian after the first common occurrence of *Turborotalia multiloba* and before the beginning of the salinity crisis.

Figure 2 provides a stratigraphic scheme that describes the primary relationships between the lithostratigraphic units composing the Gran Sasso-Genzana nappe in an area that extends from the Monte Genzana (north) to the High Volturno Valley (south).

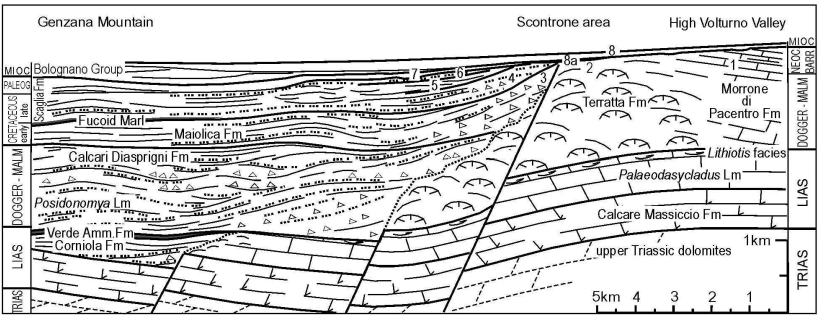

Figure 2. *Stratigraphic architecture of the Mesozoic-Tertiary carbonates of the Gran Sasso-Genzana Unit between the Genzana Mountain and the High Volturno Valley (after Patacca et al. 2008 with slight modifications). The Arabic numerals 1-8a refer to the lithostratigraphic units (or portions of lithostratigraphic units) cropping out in the Scontrone area and, a few kilometres towards the south, in the High Volturno region: 1) Neocomian-Barremian platform-interior limestones (Morrone di Pacentro Fm p.p.); 2) Neocomian-Barremian platform-edge limestones (Terratta Fm p.p.); 3) Neocomian-Barremian marginal slope-breccias (Coral-bearing Calcirudite); 4) Upper Albian-Turonian slope-apron calcarenites (Rudist-bearing Calcarenite); 5) Coniacian-Campanian hemipelagic limestones and platform-derived lime resediments with fragments of rudists (Scaglia Fm);*

6) Maastrichtian outer ramp biocalcarenites (Saccharoidal Limestone); 7) Upper Paleocene breccias with clasts of reefal limestones (Coral-algal Limestone); 8) Tortonian-lowermost Messinian rhodalgal ramp carbonates (Lithothamnium Limestone); 8a) Tortonian peritidal carbonates (Scontrone Member of the Lithothamnium Limestone).

The itinerary of the excursion is limited to Scontrone outskirts, but spectacular panoramic views, mainly from stop 1 and stop 3, will allow the participants to get a realistic idea of the geological characteristics of this interesting piece of Apennines.

References

PATACCA E., SARTORI R. & SCANDONE P. (1990) – Tyrrhenian basin and Apenninic arcs: kinematic relations since Late Tortonian times. *Memorie della Società Geologica Italiana*, 45: 425-451.

PATACCA E., SCANDONE P. & MAZZA P. (2008) – The Miocene land-vertebrate fossil site of Scontrone (Central Apennines, Italy). *Bollettino della Società Geologica Italiana (Italian Journal of Geosciences)*, 127: 51-7.