

The Mercure River Basin (Southern Italy): Quaternary stratigraphy and large mammal biochronology

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SUMMARY: A preliminary analysis of the Quaternary geological evolution of the Mercure River Basin is presented, together with the biochronological framework of the mammal faunas found in this area. The Mercure Basin is located along a regional tectonic discontinuity (Mt. Pollino area), that was filled during Quaternary times with fluvial and lacustrine deposits. Three main sedimentary phases have been identified. An almost complete skeleton of *Elephas antiquus* has been found within fluvial deposits of the lower cycle, in the Calorie locality. During the last twenty years several large mammal bones coming from different localities of this area have been collected. The analysis of the mammal remains allowed the recognition of at least two distinct faunal assemblages: the older (including *Elephas antiquus*) is referable to the Middle Pleistocene (Galerian mammal age), the younger to the Late Pleistocene (late Aurelian).

1. INTRODUCTION

The Mercure Basin is one of the southern Apennine intramountain basins, located along a regional tectonic discontinuity (Mt. Pollino area), that was filled during Quaternary times with fluvial and lacustrine deposits (Monaco *et al.* 1995). The origin of this basin is related to the extensional and transtensional tectonic events which occurred in this part of the Apennine chain, starting from Early and/or Middle Pleistocene (Schiattarella *et al.* 1994). The Pleistocene successions, from the bottom to the top, include alternating conglomerates and sands, which pass to carbonate silty deposits that end with gravel deposits. The finding of mammal fossil bones in the gravels of the lower cycle and the biochronological analysis of the fossils coming from other localities of the area, gave reliable chronological constraints to the study of the Quaternary evolution of the basin.

2. GEOLOGICAL SETTING

The reconstruction of the Quaternary sedimentary succession of the basin allows the definition of three main phases of the Mercure Basin filling (Fig. 1) which occurred during the entire Pleistocene time span.

a) In the first sedimentary phase (from Early to Middle Pleistocene), thick gravel and sandy deposits, in alluvial fan and fluvial facies, took place (250-300 m of thickness; Fig. 1). These deposits outcrop in the southern part of the basin and have been also found in boreholes in the northern area. Abundant mammal remains were found at the top of these deposits.

b) The second phase of filling (Middle Pleistocene) is characterised, from the bottom to the top, by: alternating clay-silty deposits (70-80 m), discontinuous lignite levels of marshy origin (north-central area), passing to carbonate silts of open to marginal lacustrine environment (south-central area, 130 m of

thickness). The fossil assemblages are characterised by rich mollusc and ostracod assemblages without any mammal fauna.

c) Finally, in the Late Pleistocene the tectonic and climatic events produced the incision of the lake threshold, the renewal of pattern drainages and the deposition of fluvial coarse-grained deposits.

The basin is bounded by several tectonic elements with SW-NE and WNW-ESE direction, with a normal and/or transpressive component which control its sedimentary evolution.

The Mercure fault system which displaced

toward North the Quaternary successions (Fig. 1) can be considered as one of the most important in the area. The activity of the Mercure fault produces the uplift the southern part of the basin (the Rotonda area) in relation to the northern sector, giving the start to erosional phenomena on the Middle Pleistocene lacustrine deposits. As a consequence of these features, the lacustrine deposits outcropping in the southern area show minor thickness (70-80 m) than those from the deposits of the northern part (100-130 m).

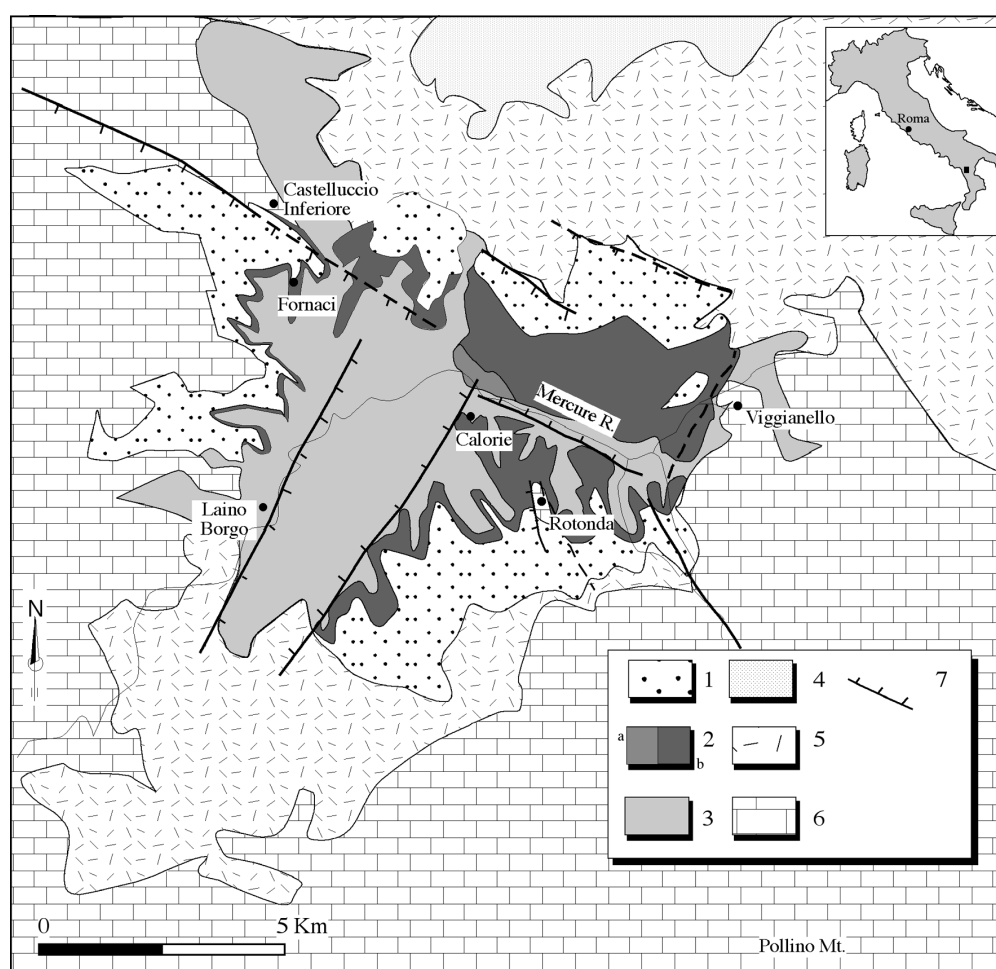


Fig.1 - Geological map of the Mercure Basin. Legend: 1 - Alluvial fan (Upper Pleistocene); 2) Palustrine (a) and lacustrine deposits (b) (Middle Pleistocene) (with molluscs and ostracods); 3) Alluvial fan and fluvial deposits with mammal fauna (? Lower Pleistocene-Middle Pleistocene); 4) S. Arcangelo flysch (Upper Pliocene); 5) Frido Unit (Cretaceous); 6) Maddalena and Pollino Unit (Triassic-Miocene); 7) Normal and transtensional faults.



Fig.2 - Mandible of *Stephanorhinus hundsheimensis* from Calorie.

3. BIOSTRATIGRAPHY AND BIOCHRONOLOGY

Fossil bones of large mammals generically referable to Middle Pleistocene, coming from the fluvial deposits of the first filling phase in the southern area of the Mercure Basin, have been found. In particular, in locality Calorie in the Eighties, an almost complete skeleton of *Elephas antiquus* Falconer & Cautley has been discovered. The bones, recently restored, are still to be studied in detail. The general taphonomical features on the excavation area showed evidences of a short transportation by the fluvial stream and a quick burial of the carcass of the elephant. Today the fossil bones of the straight-tusked elephant and several other Pleistocene mammal remains are stored at the Museo Naturalistico of Rotonda.

New material, a mandible of a rhino (Fig. 2) and some teeth of hippos, were collected during a recent excavation carried on by some of the authors of the present paper (June 1997) at Calorie site. The fossils are stored today at the Soprintendenza Archeologica of Policoro and are still under study.

A preliminary analysis of the fossil bones coming from the same level from which the skeleton of *Elephas antiquus* was excavated, allowed the classification of *Stephanorhinus hundsheimensis* Tola and of *Hippopotamus antiquus* Desmarest. This assemblage is refer-

able to the Galerian mammal age (early Middle Pleistocene; Gliozzi *et al.* 1997).

The fossil bones stored in the Museum of Rotonda come from different localities of this area and stratigraphical levels. Remains of large mammals come from Fornaci (Fondo Pagano, Castelluccio inferiore), but should pertain to different faunal assemblages. In fact, a metacarpal of a large megacerine, probably pertaining to *Megaceroides* ex gr. *M. verticornis*, some molar teeth referred to *Dama* cf. *D. clactoniana*, and the distal part of a metatarsal of *Bison* sp. (fitting in the biometrical range of *Bison schoetensacki*, but an attribution to *Bison priscus* is also possible) testify the occurrence of Galerian taxa. From the same locality also taxa with modern features have been recorded: *Dama dama* (Frisch), *Cervus elaphus* Linnaeus (advanced form) and *Equus hydruntinus* Regalia. Remains of these three taxa come also from the Scaldacane locality (near Rotonda, Fig. 1). The analysis of the fossil material suggests at least the occurrence of two different faunal assemblages:

1) *Elephas antiquus*, *Stephanorhinus hundsheimensis*, *Hippopotamus antiquus* from Calorie (with stratigraphical control) and taxa coming from a correlated level: *Megaceroides* ex gr. *M. verticornis*, *Dama* cf. *D. clactoniana* and *Bison* sp. (Fornaci-Fondo Pagano); all these could be referred to Middle Galerian

F.U., probably Ponte Galeria or Isernia F.U. (Petronio & Sardella 1999);

2) *Dama dama*, *Cervus elaphus*, and *Equus hydruntinus* referable to the late Aurelian (Late Pleistocene) (Di Stefano & Petronio, 1997; Gliozzi *et al.* 1997).

4. CONCLUSIONS

The occurrence of at least two distinct faunal assemblages gave biostratigraphical constraints to the evolution of the sedimentary successions occurring in the Mercure basin. On the basis of the mammal assemblage which have been found at the top of the sequences, the alluvial deposits of the first filling phase have been attributed to Middle Pleistocene. This mammal fauna, where an *E. antiquus* skeleton in anatomical connection was found, testified the quick burial of the carcasses during the sedimentation of the alluvial plain sequences. The second lacustrine phase filling deposits, devoid of mammal fauna but rich of mollusc and ostracod assemblages, are related to the uppermost part of Middle Pleistocene. The Late Pleistocene mammal fauna assemblages, associated in the southern part of the basin with the Middle Pleistocene fauna, suggest the transport and deposition of teeth and skeleton fragments onto the lower alluvial deposits. This is probably related to the quick erosion of the Middle Pleistocene lacustrine deposits during the last climatic and tectonic events which occurred in the Mercure Basin.

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