DEFORMATION FEATURES WITHIN THE PALOMBINI SHALES OF THE EXTERNAL LIGURIAN UNITS AND MT. VERI COMPLEX: A COMPARISON

Giuseppe Bettelli and **Paola Vannucchi**

Dipartimento di Scienze della Terra, Università di Modena e Reggio-Emilia, Italy.

ABSTRACT

The Northern Apennines are characterised by a large amount of chaotic complexes of different age and tectonic significance. Here we concentrate on the Casanova Complex (External Ligurian Units of the Northern Apennines) a chaotic rock body deposited before and during the Campanian time and composed by sedimentary breccias, ophiolitic turbidites and plurikm blocks of coherent to incoherent oceanic rock-units of the Ligurian realm (deep water oceanic sediments and ophiolite rocks). The Casanova Complex has been interpreted as the product of mass wasting and turbidite deposition and is overlain by the Ligurian Helminthoid Flysches. A portion of the Casanova Complex has been recently recognised as characterized by the presence of more or less coherent blocks, chunks and slabs (up to few km in size) of Palombini Shales formation (Lower Cretaceous) alternated with a matrix-supported sedimentary breccia formed by disruption of the same formation. This portion has been named Mt. Veri Complex.

We concentrated on a section along the Upper Taro Valley, east of S. Maria Val di Taro, where large coherent portions of highly deformed Palombini Shales, interpreted as slide blocks, are in stratigraphic contact with matrix supported sedimentary breccias. These outcrops were previously mapped as “Argille a Blocchi di M. Veri”.

This study aims to document the deformation of the Palombini Shales prior to their emplacement as slide blocks within the Mt. Veri Complex at the base of the Helminthoid Flysch sequence before/during Campanian time.

The shaly and carbonate clasts of the sedimentary breccias display a wide range of internal deformational structures clearly testifying that the source rock (the Palombini Shales formation) was already completely lithified and also strongly tectonically deformed before their formation.

The large coherent portions of the Palombini Shales, associated to the sedimentary breccias, are affected by two superimposed generations of flexural-slip folds. The first generation is characterised by close-to-isoclinal, strongly non-cylindrical folds and by an axial plane cleavage developed only in the shaly interbeds. During this first stage of deformation the scattered fine-grained turbidite sandstones interbedded with limestone layers were still poorly lithified or unlithified. The second folding generation coaxially refolds the first generation isoclinal folds originating both type 3 and type 2 interference patterns. Type 2 interference patterns are locally formed as effect of the non-cylindrical style of the first generation of folds, which locally appear as sheath-like folds. During the two folding stages the limbs experienced layer-parallel extension. In the limestone the extension has been accommodated by two sets of intersecting extensional fibrous calcite veins disposed perpendicular to bedding.

A comparison between the Mt. Veri Palombini Shales and the Palombini Shales of the External Ligurian Units deformed by offscraping during the Ligurian tectonic phase – Early/Middle Eocene – reveals that they both share the same style of deformation and structural evolution. This straight correspondence may lead to the assumption that also the Palombini Shales of the Mt. Veri Complex were probably piled up by offscraping in an ancient (Late Cretaceous) proto-Ligurian accretionary prism before their displacement by mass wasting during Campanian time.

Presented at the mid-term COFIN-PRIN Project Workshop “Tectonic processes in fossil accretionary prism and comparison with modern analogues: evidences from oceanic units of Northern Apennine, Ligurian Alps and Alpine Corsica”. Firenze, November 2004.