

Argille scagliose in Southern Italy - Origin and moving directions

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In eastern and southeastern Calabria and between the Gulf of Taranto and the Molise-region, outcrops of so-called argille scagliose with related flysches are widely spread.

Usually these sediments occur in chaotic mass, in which tectonic structures are not distinguishable. The range of magnitude of the different rock fragments lies between a sandgrain and some kilometers.

In the Molise-Gulf of Taranto-Zone (MGZ), the base of this allochthonous cretaceous to miocene sediments lies towards the Brandanic trough on progressively younger strata of the non-disturbed normal sedimentation and thins out. This indicates a very slow upward and forward building up in the order of cm/1000 years. This growth pattern, the shape of many surface outcrops, and the observed fauna combinations indicate, that these allochthonous layers are resediments of northeastwards moving submarine mudflows, that is olistostromes. The same interpretation can be applied to the bordering sea areas in the Gulf of Taranto with regard to the Flexotirprofiles [FINETTI & MORELLI 1972, 1974].

For the other areas with outcropping argille scagliose in the MGZ and Calabria, another newly worked-out method of determination of former mudflow direction by measurement of olistolithe-imbriation was applied [GÖRLER 1975]. The result (fig. 1) was the evidence of divergent mudflow-directions in the MGZ, where in its southwestern flank the movements of the resedimentation run in a direction exactly opposite to the general tectonic vergency. Measurements in Calabria confirmed a provenance from the Ionian Sea region as earlier postulated from other considerations [OGNIBEN 1955, 1974, SELLI 1962, BURTON 1971].

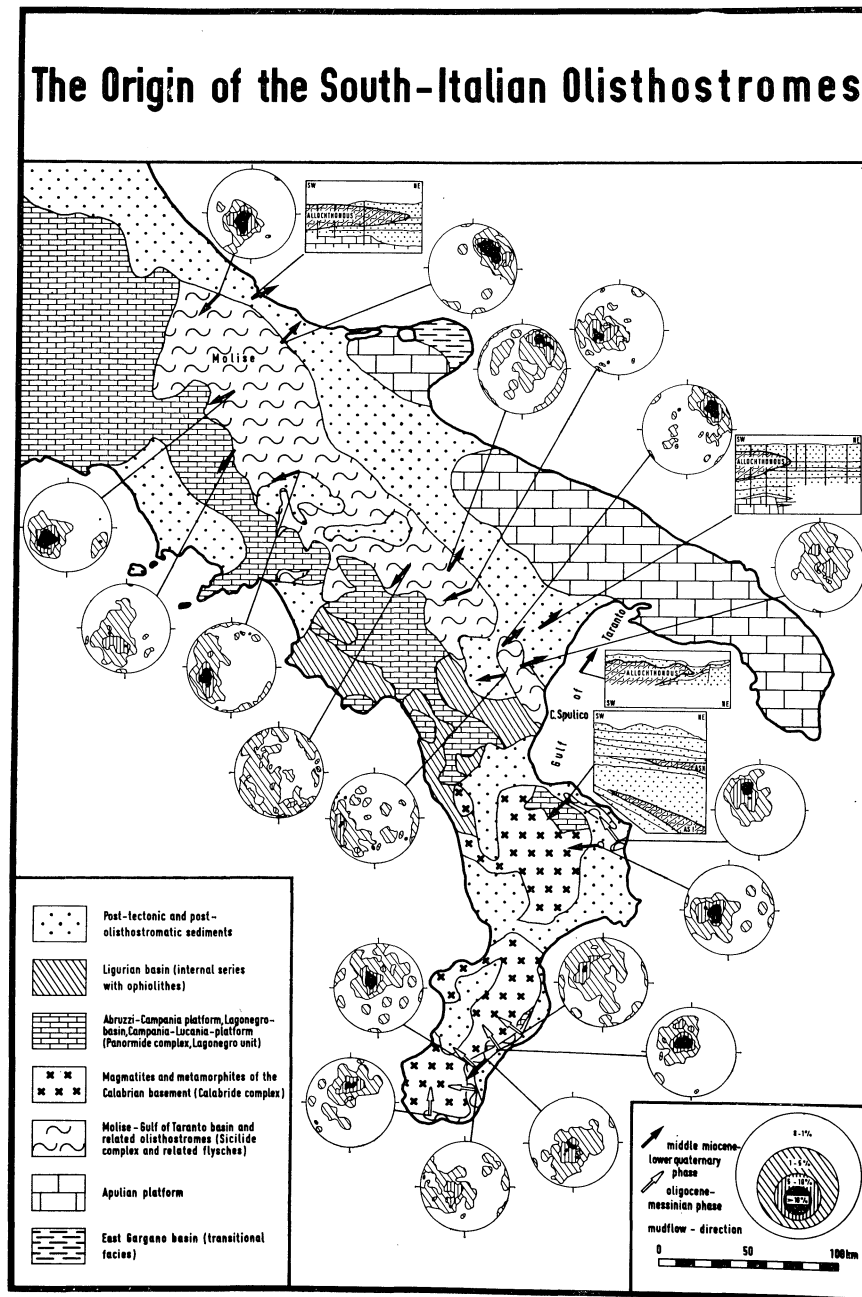
The age of emplacement of the argille scagliose can be determined with regard to the stratigraphic position inside the normal sedimentation and the faunal content, which comprises not only fossils from the source material but also younger forms admixed during the mudflow transport. From these criteria we have to distinguish two periods of olistostrome emplacement, which are characterized by different mudflow-directions :

An earlier period, mainly in southern Calabria for the time interval Oligocene to Messinian, whereas in northern Calabria and in the MGZ the building up of olistostromes started in the middle Miocene and lasted till Pliocene or Pleistocene.

Interpretation : The MGZ is neither a direct product of a subduction-zone nor came their sediments as nappes from the Tyrrhenian Sea, as usually assumed. On the contrary these are more or less autochthonous (in the tectonic sense) of a deep sea area between the Abruzzi-Campania-Platform and the Apulia-Platform. This area was then strongly compressed and the unconsolidated argillaceous sediments flowed away towards NE and SW. These olistostromes and their area of origin merge with no sharp borders.

The MGZ is assumed to be a prolongation of the Mediterranean Ridge for the following reasons :

1. The Mediterranean Ridge lies along the strike of the MGZ.
2. According to seismic research work, the few photographs and samples of the sea bottom, the Micro- and Macro-reliefs of the Mediterranean Ridge show, at least partly, chaotic sediments, as we find in the MGZ.



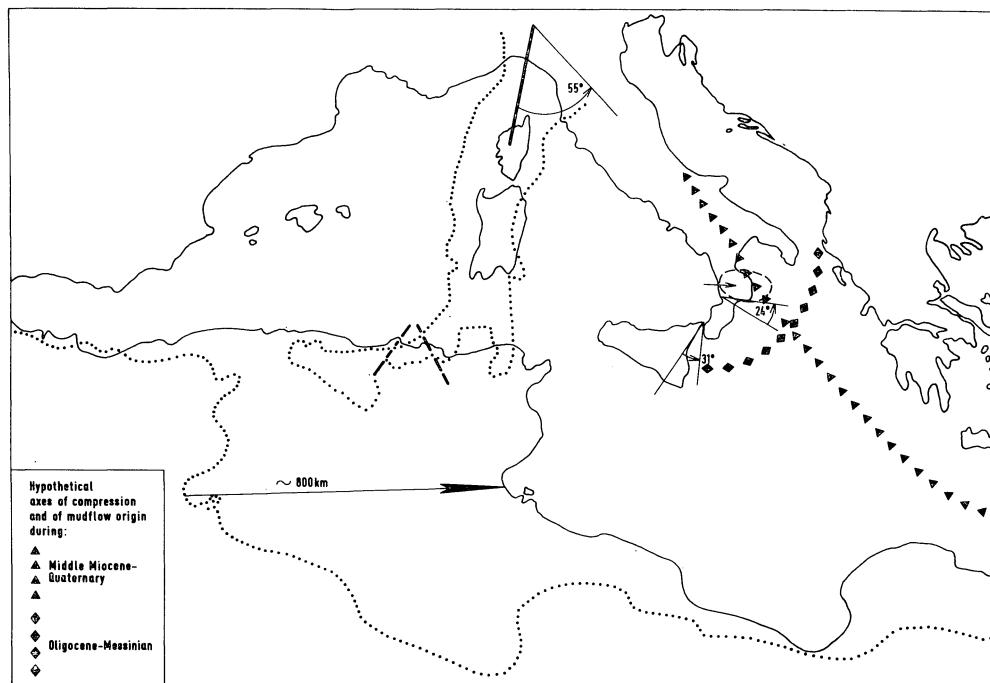
3. Both structures are accompanied to the north or northeast by deep sediment-filled troughs (Bradanic trough, "canale di Taranto", Hellenic trough).

4. Both structures are characterized by negative gravity anomalies.

5. There are not only olisthostromes on the Mediterranean Ridge as in the MGZ, but also other stratigraphic conditions known from the JOIDES-program are found in an equivalent position in the MGZ, as for example inclusions of cretaceous limestones, pliocene and pleistocene sediments.

The direct connection between MGZ and Mediterranean Ridge seems to be interrupted by the eastern extension of the Sila crustal-segment [GIESE & GÖRLER 1973].

As for the origin of the southern Calabrian olistostromes a provenance from the Calabrian Ridge seems very likely. Deduced from the olistostromes on mainland a formation by compression of much wider deep sea areas is assumed for the Calabrian Ridge and Mediterranean Ridge. As regards the origin of the Calabrian Ridge, a building during oligocene is supposed, because mudflow action in southern Calabria started just at this time. Regarding Argille scagliose outcrops, in Sicily and Northern Africa an original extension towards the West seems probable.



According to the olistostromes, the formation of the MGZ and the Eastern Mediterranean Ridge started later and probably is partly still in action.

