

Notes on geology and biology of the Manfredonia Gulf (South Adriatic)

by

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Abstract

In the "scogliera" zone of the Manfredonia Gulf three types of seafloor were discovered : 1. sands with rhizomes of *Posidonia*; 2. sands and gravels; 3. biogenic concretions. All these sea-floors are covered by a thin veneer of mud that limit the growth of the biogenic formations interpreted as the summital part of more extensive ones actually buried. A recent increase supply of fine sediments caused the deposition of mud and killed the *Posidonia* prairies.

Résumé

Dans la « scogliera » du golfe de Manfredonia on a trouvé trois types de fonds : 1. sables avec rhizomes de *Posidonia*; 2. sables et gravier; 3. concrétions organogènes. Tous ces fonds sont recouverts par un mince voile de vase qui limite l'accroissement des formations organogènes qui sont la sommité de formations plus étendues et maintenant ensevelies. Une récente augmentation de l'apport de sédiments fins a causé la déposition de vase sur les structures organogènes et a tué les prairies de *Posidonia*.

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Ship-based investigations showed that the continental shelf of the Manfredonia Gulf is characterized by three elongated belts of sediments : 1. coastal sands; 2. silty clays; 3. offshore sands. Between sediments a. and b. at the depth of 10-20 m, lies a discontinuous zone of rough morphology called "scogliera" by local fishermen. The dredged samples showed the presence of biogenic formations prevalently made up of calcareous algae together with *Serpulidae*, *Bryozoa*, etc. Thus it was believed that the rugged morphology of the "scogliera" was due to rocks and biogenic formations. Since these formations are little known we initiated a preliminary study of their exact nature and their relationship with the substratum. For this purpose our diving team made direct observations of the sea-floor and secured numerous samples. The dives had shown at least three distinct types of bottom :

1. *Sands with rhizomes of Posidonia*. The sands are medium-fine and organogenic. Also present are isolated flatish and slightly elevated zones formed by *Posidonia* mats which represent the remains of *Posidonia oceanica* prairies. In the zone studied living prairies do not exist any more, there only remain these large accumulations of rhizomes and sediments which appear extremely compacted. In some places *Posidonia* replacement by *Cymodocea nodosa* may indicate progressively decreasing environment dynamics. This type of bottom appears mainly in the northern and central part of the studied area.

2. *Sands and gravels*. They consist of very organogenic sands with rounded pebbles concentrated in small depressions. Here are found molluscs (mainly *Pectinidae*) and fishes (*Gobius*) that excavate

nests frequently surrounded by soft seaweeds. Calcareous algae (*Lithothamnium fruticulosum* and *Neogoniolithon mamillosum*) occurring as dead individuals suggest a deteriorating environment. The pebbles, characteristic of a fluvial deposition, probably were supplied when the sea level was lower and the rivers had a higher erosional and transporting capacity. This type of bottom exists a little to northwest of the river Ofanto.

3. Biogenic concretions. They were encountered across the mouth of the Ofanto and to the South of it. From a morphological and biological point of view we recognized three distinct types :

a. Nearer the coast predominate the concretions whose building material consists mainly from *Cladocora cespitosa* with the associated calcareous algae *Peyssonelia polimorfa* and *Lithophyllum dentatum*. **b.** Further seaward the *Cladocora* becomes less frequent while the calcareous algae and the Serpulides become very abundant. Coralligenous assemblage elements are present with *Lithothamnium incrustans* and *Pseudolithophyllum expansum* in addition to the above mentioned algae. **c.** The deepest stations indicate a prevalence of the calcareous algae over the constructing organisms. A clear coralligenous biocenosis is present.

The three types of bottom generally appear to succeed one another from North to South and their distribution can be related to the present sediment supply. The dives have shown that the sedimentation of fine materials is active and observable through an extremely reduced visibility. In particular the biogenic concretions become covered with a fine veneer of mud which limits their development and growth. On the contrary the abundant material in suspension favours development of suspension and filter feeders populations such as *Ophiuridae*, *Cerianthus*, *Cladocora*, *Serpulidae*, etc. In spite of the efforts to excavate mud around the concretions, their foundations could not be reached. Therefore, considering the size and the extent of the biogenous formations, also found by echo-sounding profiles to continue a few meters below the bottom, one could think that the actual formations represent the summital and, so far, living part of much more extensive constructions now partially covered by sediments. They probably are based on the surface of the post-würmian transgression which, as shown by echo-sounding, actually approach to surface in relation to these formations. At the present, however, they seem to be regressing and in process to being completely buried. An increased supply of fine materials, probably in very recent times, could have also caused the dying out of the *Posidonia* prairies and be responsible for the mud veneer covering the biogenic structures. Only some of the latter can be related to the coralligenous biocenosis. A problem in benthic bionomy individualized here merits further research. However only through diving one can see the differences in these sea-floor types.