Sedimentological aspects of Southern Adriatic Basin Cores

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The Apulian margin consists of a complex shelf-slope system that merges into an elongated deep basin. Four long-axis cores, collected along the basin axis, have been studied from the micropaleontological point of view.

In terms of lithology, bedding and sedimentologic features, at first sight you find what you expect in these cores: that is, more graded beds (turbidites) and continuous deposition in the deepest part of the basin as compared with more elevated parts of the bottom to the South. You would also expect some reworking of sediment and erosion as the bottom shallows and the basin narrows.

However, after biostratigraphic analysis has been done and time lines traced (ecozone boundaries, matched by the $\delta^{18}O$ curve: see BORSETTI *et al.*, this volume), some puzzling elements stand out in the picture. For example, it is quite unclear why core 14, from maximum depth along the transect, where turbidites (both terrigenous and volcaniclastic) can indeed be detected, shows a strong thinning of interval 2. Could that be related to "erratic" erosion by gravity flows? But, where should they have deposited their load? And why the same interval is almost absent in Core 17, where the underlying ones are represented and evidence of turbidity flows is poor to absent?

Judging from these data, we should admit that we know very little about deep water circulation in the Adriatic. Are there bottom currents and 'abyssal storms'? Or is it possible that axial gravity flows interfere with lateral flows? Where are the entry points and dispersal path of these flows? What is the mutual influence of surficial currents and intermediate or deep flows? What their respective role in distributing (or disturbing) sediments?

Some useful information, apart from oceanographic factors, could be gained from detailed morphological and seismic surveys of the basin margins; in particular, they should provide a sufficient coverage parallel to contour lines, in order to detect gullies and other possible pathways for turbidity currents or debris flows.

Fig. 1.- Bathymetric map of the Southern Adriatic Sea (data from GIORGETTI and MOSETTI, 1969 and from FABBRI and GALLIGNANI, 1972; modified).
1, isobath in meters; 2, seismic lines showed in Fig. 2; location of gravity cores (3) and box-cores (4).

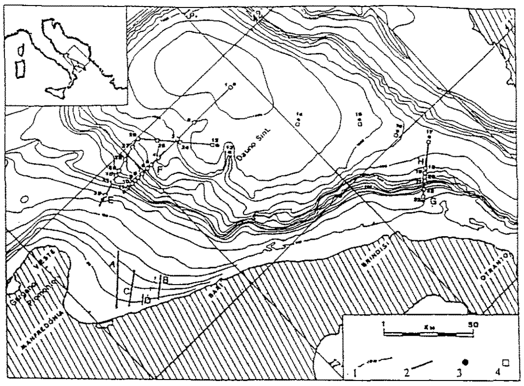
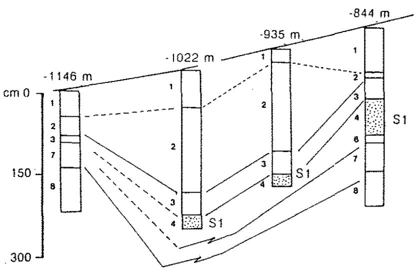


Fig. 2.- Correlation of plantik Foraminifera ecozones (in arabic numbers) and sapropelitic mud layers (dotted intervals) in the four long-axis basin cores.



Late-Quaternary deposits on the Adriatic shelf in a sequence-stratigraphic framework

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The Adriatic epicontinental sea is an heavily-sedimented basin where deposit geometries and key surfaces within the recentmost Quaternary depositional sequence can satisfactorily be resolved. The growing data-base of samples and high-resolution seismic profiles, gathered in the area, allows a reinterpretation of stratigraphic and sedimentologic data in a sequence-stratigraphic framework. Sequence stratigraphic principles proved to be helpful in interpreting Quaternary deposits on modern continental margins using high-resolution seismic images and shallow sediment samples. This paper documents the variability in shape, size and internal architecture that characterizes late-Quaternary deposits in the Adriatic epicontinental basin; this variability takes place on short distance and reflects the influence of multiple sediment sources.

Several seismic studies provide background information about the style of filling of the heavily-sedimented Plio-Quaternary Adriatic foredeep and foreland basin. Morphologically, two distinct shelf sectors are identified north and south of the Middle Adriatic Depression (MAD); they are characterized by a different style of filling and have likely undergone a different tectonic evolution during the Quaternary. The northern shelf is wide and gentle and encompasses huge quaternary progradational units that show negligible amounts of aggradation. The southern shelf is narrower, steeper less heavily sedimented and complicated by the occurrence of two major structural highs (the NW-SE-oriented Gallignani ridge and the NE-SW-oriented Tremiti high) both active during the Quaternary.

Three basic systems tracts developed during lowstand, rise and highstand of relative sealevel. Systems tracts are composed by several parasequences the stacking pattern of which is typically backstepping in the Transgressive systems tract (TST) and forestepping within the High-stand and Low-stand systems tracts (HSST and LSST). The formation of an extensive surface of subarial exposure is accompanied by fluvial entrenchment in the low-gradient northern Adriatic shelf while the southern area does not show preserved evidence of fluvial channels. In this area, the sequence boundary is a sharp contact at the base of a late-Pleistocene coastal wedge derived from a process of "forced regression" (consisting in the seaward and downward translation of shoreline facies in response to a relative sealevel fall); the contact becomes more gradual and conformable seaward.

The late-Pleistocene wedge of forced regression correlates to a thinner and draped deposit encompassing the southern flank of the MAD, an area of reduced sediment supply; north of this feature the lowstand deposit expands reflecting the influence of the Po lowstand delta. In this area a thick lowstand wedge rests on a type 1 sequence boundary that is extensively cut by fluvial erosion. The southern Adriatic shelf records the deposition of progradational wedges during conditions of relative sea level fall and predates the shelf-margin wedge deposited on the northern flank of the MAD. On the other hand, progradation at the shelf edge from the north encompassed the relative sealevel rise before R inflection point while the southern area was already experiencing transgressive erosion.

Within the recentmost Quaternary depositional sequence in the Adriatic epicontinental basin, the key surfaces that punctuate the stratigraphic record (sequence boundaries, transgressive, ravinement, and flooding surfaces) developed in response to variations of relative sea level modulated by sediment flux and basin physiography. Despite the primary eustatic control, lateral variations in the ratio between sediment flux and rate of change of accomodation are significant even within the short time span encompassed by the late-Quaternary sequence. Lateral variability characterizes thickness and internal organization of all the component systems tracts as well as the timing elapsed during the beveling of erosion surfaces and the formation of condensed sections.