

SEDIMENTOLOGICAL AND PALAEOCEANOGRAPHICAL RECONSTRUCTIONS OF THE NILE DEEP-SEA FAN BASED ON SEDIMENTARY CORES : PRELIMINARY RESULTS

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Abstract

Based on forty five piston cores, an interdisciplinary study is developed for sedimentological and palaeoceanographical processes reconstructions. Two pelagic sites have been selected as stratigraphic references. The Nile deep-sea fan shows a wide range of sedimentary dispersal and deposition mechanisms from west to east : typical turbidite channel-levee complexes characteristics of Rosetta area, giant upper slope destabilization in the central province, complex deformed corridor with a high variability of facies north of Damietta mouth and nearly israelian margin a shift in sedimentary processes with basal glacial stage 6 turbidites overlapped by pelagic sediments.

Keywords : Nile, deep-sea fan, sedimentary processes, palaeoceanography

The Nile deep-sea fan is the most important sedimentary accumulation within the eastern Mediterranean. It is built on mobile Messinian evaporites and this specific setting has induced, through times, the gravity spreading of the salt/sediment package. The initial distributions and thicknesses of Messinian evaporites (related to specific pre-messinian structural heritage) have strong impacts on the actual contrasted sea floor shaping and associated sedimentary dispersal processes. Fluid migration pathes to the seafloor are also largely influenced by the specific structural pattern of the Nile deep-sea fan, resulting from interactions between gravity spreading and structural heritage (1). The Nile is also a possible source of fresh water enhancing the density stratification of the water column and the organic matter preservation. For this, the Nile margin represent a key area for investigating sapropel formation processes and for reconstructing palaeoceanographic scenarios (2).

About forty five piston cores have been collected on the Nile continental margin mainly during Noe 1984, Fanil 2000 and Nautinil 2003 cruises. Based on these cores an interdisciplinary study is developed for sedimentological and palaeoceanographical processes reconstructions : lithological facies analysis, lithostratigraphy, tephrochronology, biostratigraphy (planktonic and benthic foraminifers, ostracods and nannoplankton), isotopic stratigraphy, ¹⁴C datings, clay mineralogy and geochemistry (TOC, carbonates, sulfur, iron...). We have selected two pelagic sites as stratigraphic references : the first one on the southern Eratosthene seamount plateau (84 MD 637 and 638), the second one in the eastern province, north of Damietta (84 MD 648). These two sites allow a very high resolution for palaeoceanographic reconstructions.

The Nile deep-sea fan shows a wide range of sedimentary dispersal and deposition mechanisms : (A) typical turbidite channel-levee complexes (FKS05, 2823 m) and terminal lobes (FKS07, 2810 m) are characteristics of Rosetta area (western province) at the last glacial period (isotopic stage 2), (B) a giant upper slope destabilization occurs in the central province, debris flows are recorded on the continental margin between 1300 and 2300 water depth (84 MD 652, 653, 654 and 655), (C) the eastern province, north of Damietta corresponds to a complex deformed corridor and the recovered sediments exhibit a high variability of facies, debris flows (84 MD 644 and 647), turbidites interbedded in pelagic and hemipelagic sediments (FKS03, 84 MD 645, 646, 647, 650 and 651), (D) between Damietta area and the israelian margin, sedimentary deposits are mainly pelagic and hemipelagic since 125 Kyears (84 MD 640, 643, 627, 638, 637 and 635), however before, during the glacial isotopic stage 6 many

turbiditic currents occur (84 MD 627, 635 and particularly 637 site where there is a shift in sedimentary processes).

References

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