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Paleoenvironmental reconstruction of late Quaternary sequences on the Gulf of Lions continental shelf, PROMESS GL2-2 borehole

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PROMESS GL2-2 borehole was drilled on the outer shelf of the Gulf of Lions (Western Mediterranean) at 103 m water depth. The nearly continuous, 100.2 m GL2-2 drill core documents the effect of sea-level changes on sedimentary facies and sequences during the last ca 500 ky. As such it represents one of the very few successful attempts for recovering almost continuous cores of such intervals where abundant sand makes recovery difficult. The sector of the shelf sampled by GL2-2 corresponds to a zone that was alternatively emerged and submerged during sea-level changes. Seismic evidence displays alternating gently ($<1^{\circ}$) and highly ($>5^{\circ}$) dipping clinoforms that constitutes a “motif” repeated throughout the stratigraphic column.

The topmost unit (U150, stages 5-6) is characterized by up to 7° steep foresets, mainly made of homogeneous and amalgamated beds of well-sorted sand with wave and ripple lamination with a lower part showing fine-grained intervals passing seawards to silty and clayey beds, intensively bioturbated. Similar lithologic characteristics are found in the older U80 (stage 10), despite the difference in clinoform internal geometry (topsets preservation being better in U80). Interbedded with U150 and U80 is the wavy unit (U100) lithologicaly made of mud and silt that has been interpreted as sediment waves.

Biostratigraphic control has been done on nanno-plancton.

Below these prisms, several erosional, almost amalgamated, bounding surfaces are

observed. These coarse-grained deposits bounding the seismic units reflect surfaces of polygenic origin firstly cut by subaerial erosion during regressive phase and, subsequently, they represent reworking zones that top the sedimentary sequences and are easily referable to *ravinement* surfaces.

The coarse-grained lags are marked on the seismic profiles by very strong reflectors.

In PRGL2-2 we had the unique opportunity to observe and define (both in lithological and faunal terms) the characteristics of these intervals, reflecting various types of marine environments (from sublittoral to open shelf conditions).

Based upon fossil assemblages (molluscs, ostracods, foraminifers) and erosional surfaces associated with the clinostratified bodies, the sequences can be classifed into genetically different types of transgression-related *ravinement* surfaces. Times of sea-level lowstands consistently correspond to major cold phases as suggested by the presence in these units of macrofossils of marked climatic significance (e.g., *Modiolus modiolus*, *Arctica islandica*, etc.) occurring systematically occurring in correspondence of the erosional surfaces .

Finally, the GL2-2 basal erosional surface clearly shows a continental fluvial influence that represents the evidence of connection between a river, the axial incision and a canyon head.