

Paper Number: 3839

Shelf-edge sand bodies in the western Mediterranean: relict deltas reworked by modern processes

Berné, S.¹, Alonso, Y.¹, Agin, G.², Mauffrey, M.¹ Simplet, L.³

¹Université de Perpignan, CEFREM, France- Contact: serge.berne@univ-perp.fr

²Parc naturel marin du golfe du Lion, Port Vendres, France

³IFREMER, Géosciences Marines, France

The origin of several large shelfal sand bodies in the rock record has been a matter of controversy in either interpreting them as the product of oceanic processes or invoking allocyclic (relative sea-level changes) processes for their origin.

Even in the low to moderate-energy Gulf of Lions (western Mediterranean Sea), large sand dunes (up to 9 m-high) and sand ridges are observed between the shelf edge (-120 to -150 m) and ca. 90 m water depth. These features are particularly large in the vicinity of the shelf edge, around canyon heads and in relation to relict depot centers of the Last Glacial Maximum. They mark the position of former shelf-edge deltas that connected to canyon heads during glacial sea-levels. Landward of these depot centers, the retreat paths of rivers during the last deglacial sea-level rise are marked by “shoal retreat massifs” that were eventually reworked into erosional sand dunes as sea-level rose. Numerical modelling shows that strong easterly winds are capable, after a few hours, of generating bottom currents sufficient to transport coarse sands, and that the position of predicted highest shear stresses matches the position of the largest dunes [1]. The dunes are therefore “active”.

Because of the high subsidence rate of this margin (~250 m/Myr at the shelf edge), the preservation of sequences linked to 100-kyr glacial cycles is high. A “motif” of buried sand bodies (including dunes) is found within “forced-regressed sequences” formed during Marine Isotope Stage (MIS) 6.2 and MIS 8.2, roughly at the same position. They are now encased within prodeltaic muds and form analogs of reservoirs described in many stratigraphic frameworks.

Finally, in our case study, it appears that a combination of auto- and allo-cyclic processes better explain the position and architecture of large sand bodies.

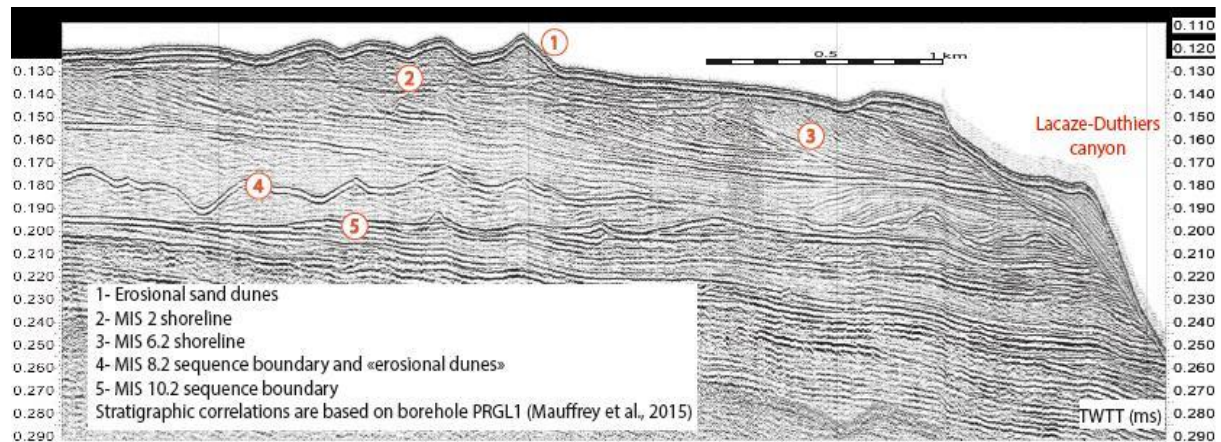


Figure 1: Relict sand bodies on the outer shelf at the Lacaze-Duthiers Canyon head.

References:

- 1 Bassetti, M.A., Jouet, G., Dufois, F., Berné, S., Rabineau, M., Taviani, M., 2006. Sand bodies at the shelf edge in the Gulf of Lions (Western Mediterranean): deglacial history and modern processes. *Mar. Geol.* 234, 93-109
- 2 Mauffrey, M. A., S. Berné, G. Jouet, P. Giresse and M. Gaudin (2015). Sea-level control on the connection

between shelf-edge deltas and the Bourcart canyon head (western Mediterranean) during the last glacial/interglacial cycle. *Mar. Geol.* 370, 1-19.

