SPATIAL DISTRIBUTION AND STRATIGRAPHIC ARCHITECTURE OF THE ALMANZORA RIVER PRODELTA FROM SOUTHEASTERN SPAIN (PALOMARES, ALMERÍA)

Fernández-Salas L.M. [1, *], Díaz-del-Río V. [1], Sanz J.L. [2] and Tello O. [2]

[1] Instituto Español de Oceanografía, Centro Oceanográfico de Málaga, Puerto Pesquero, s/n, Apartado 285, Fuengirola 29640, Spain - * luismi.fernandez@ma.ieo.es

[2] Instituto Español de Oceanografía, Servicios Centrales, C/ Corazón de María, 8- 8º Pl. 28080. Madrid, Spain

Abstract

Konsberg Simrad EM3000 multibeam echosounder and very high resolution seismic profiles (TOPAS) data have been used to study the spatial distribution and the stratigraphic stacking of the Almanzora river prodelta (Almería, southeastern Spain).

Keywords: delta, Mediterranean Sea, sea-level changes, multibeam, high resolution seimic

The Almanzora River is characterised by a pronounced seasonal variability in the sediment supply regime and by its torrential character. This river is 90 km long and has a drainage basin that extends for about 2611 km^2 (1). The coastline configuration reflects the "Palomares Fault" direction (N10º-20ºE). Goy and Zazo (2) suggest that the tectonic trend for the 100 ky is uplifting in the south of the Almería littoral while this one is subsidence in the north. The dominant littoral drift has a SW direction. The width of the adjacent continental shelf is about 5.5 km and its average gradient ranges between 0.5º in the shallow water areas and 10º in the canyon faces.

The Almanzora river prodelta is 3500 m wide and 4000 m long with a predominant spatial distribution in E-NE direction (Fig. 1). The prodeltaic fan is divide in two lobes by, one in the south with 1500 m wide which axis is NW-SE, and the second one, which wide is 2000 m and extends in W-E direction. The creeping and the channels are a common feature in the whole prodelta.

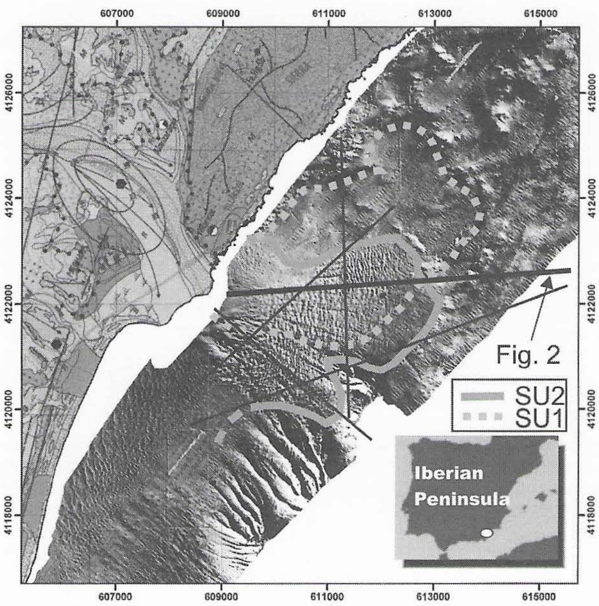

Fig. 1. Multibeam map of the study area shown the spatial distribution of the Almanzora river fan. SU1 distribution is represents in hard line and SU2 distribution in dotted line.

Other important characteristic is the presence of canyon heads near (<3000 m) of the coast. These channels play an important role in the transport of the sediment from the continental shelf to deep basin. Besides, these morphologic elements condition the spatial distribution of the prodelta. So, the prodelta has a greater development in the north part where do not exist the canyons.

The seismic stratigraphy analysis of the prodeltaic deposits evidence that surficial spatial distribution deduced of the multibeam data is not completely correct. So, this analysis shows that the Almanzora prodelta is wedge-shaped and extends about 5500 m along-shelf. The thickness exceeds 12 ms TWTT in the proximal and central areas and then gradually decreases in the northeastern and seaward direction.

Two distinct seismic units have been identified: SU1 and SU2. These units are located above a high amplitude seismic discontinuity (Fig. 2).

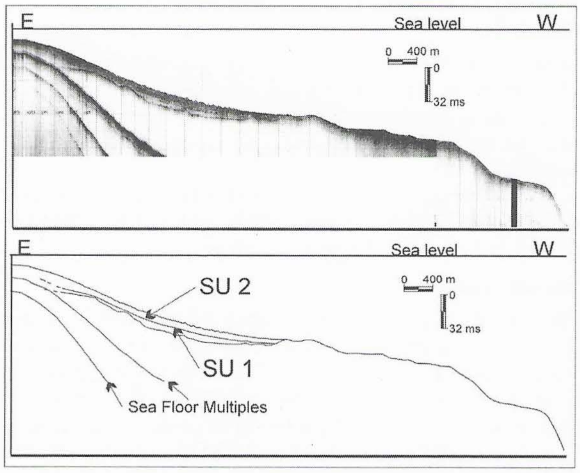

Fig. 2. Uninterpreted (above) and interpreted (below) seismic profile of the Almanzora prodelta. The prodelta is composed of two units: SU1 and SU2.

Seismic Unit 1 is a sheet shape, with average thickness values 4 ms TWTT. It displays a transparent acoustic response and extends from the mouth of Almanzora river to 5000 m in the northeastern direction. The upper boundary of this seismic unit is the present seafloor where it is not overlain by the shallowest seismic unit 2.

Seismic Unit 2 is a wedge-shaped unit, which displays a chaotic configuration and reflective pattern. This unit overlay the Seismic Unit 1. The reflection terminations are a downlap on the lower boundary. The upper limit is the present-day seafloor. Its average thickness value is 8 ms TWTT. This has smaller spatial distribution than SU1 and extends in NW-SE and W-E directions. The limits of the its spatial extension fit with the limits come to multibeam data.

The SU1 characteristics (transparent seismic facies, constant and moderate thickness through the entire distribution area and sheet shape) suggest that it is composed of fine sediments which escaped from the nearshore and also that it was deposited when sea level was transgressing and/or in a highstand position (3). In contrast, SU2 can be included in a reggresive and/or lowstand conditions. Somoza *et al.* (4) described that short cool/humid events should produce a sea-level fall and an increase in sediment supply by increasing precipitation within the Ebro drainage basin. So, SU2 would has been deposited under these conditions which explain its reflective and chaotic configuration.

Finally, the existence of delta lobe switching processes seems to be determined by the control of the sea-level cycles.

References

1 - Ferre Bueno E., 1979. El valle del Río Almanzora: estudio geográfico. Excma. Diputación Provincial de Almería y Caja Rural Provincial de Almería.

2 - Goy J.L. and Zazo, C., 1986. Synthesis of the Quaternary in the Almería littoral neotectonics activity and its morphologic features, eastern Betic, Spain. *Tectonophysics*, 10: 259-270.

3 - Fernández-Salas L.M., Lobo F.J., Hernández-Molina, F.J., Somoza L., Rodero J., Díaz del Río, V. and Maldonado, A., 2003. High-resolution architecture of late Holocene highstand prodeltaic deposits from southern Spain: the imprint of high-frequency climatic and relative sea-level changes. *Contin. Shelf Research*, 23: 1037-1054.

4 - Somoza L., Barnolas A., Arasa A., Maestro A. Rees J.G. and Hernández-Molina F.J., 1998. Architectural stacking patterns of the Ebro delta controlled by Holocene high-frequency eustatic fluctuations, delta-lobe switching and subsidence processes. *Sedim. Geol.*, 117: 11-32.