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Approaching the facies architecture of the emerged and submerged part of the Llobregat quaternary delta, Barcelona, Spain

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A new geological conceptual model is proposed for the Llobregat delta from a combined interpretation of log-data (in the emerged delta) and seismic profiles (in the submerged delta), based on sequence stratigraphy concepts.

The Llobregat River has accumulated multiple deltas through Quaternary eustatic cycles. The rapid rises and step-wise, relatively slower falls in sea level have produced a bias towards preserving forced regressive system tracks and eroding the high-stand system tracks with the exception of the Holocene delta. Subsurface data indicates that the Quaternary deltas were feed by the Llobregat river and streams derived from Garraf and Collserola mountains, but the sediment was probably redistributed by long-shore currents to form a unique delta front. The Holocene Llobregat River high-stand delta progrades over older fluvial, flood-plain and shoreline deposits equivalent to the older deltas now preserved at the continental margin.

The characterization of three paleochannel systems in the Pleistocene unit (emerged delta) and forced regressive coarse deposits (submerged delta) allowed the identification of main flow paths for groundwater near the coast, thus explaining the seawater intrusion pattern described in the area. A number of paleo-flow channels feeding the older Quaternary deltas and the connection between the old delta complexes in the sumerged delta illustrate the complexity for the exploitation and protection of ground-

water found in these deposits.