

**CHARACTERISTIC TRENDS WITHIN LOBES AND LOBE COMPLEXES
OF A COARSE-GRAINED FAN, LOS MOLLES FM, NEUQUEN BASIN,
ARGENTINA**

Gabriel Giacomone

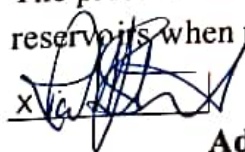
ABSTRACT

The Jurassic deep water marine deposits of Los Molles Fm, Neuquen Basin, Argentina (La Jardinera area) are a world class example of ancient coarse-grained basin floor fans. In this work, we improve the sedimentological architecture knowledge of these systems from facies to lobe complexes scale.

We made use of satellite images, drone imagery and 4000 m of logs to build isopach and net/gross (NG) maps that with facies analysis allowed reconstruction of the fan and its lobe complexes (LC1-4). In addition, grain size, facies and bed thickness trends were used to refine the interpretation at a lobe scale.

Facies, NG ratios and sandstone body geometry helped define six facies associations; hemipelagic deposits, lobe fringe, off-axis lobes, on-axis lobes, channels and debrites. The facies associations build lobes (~6 m thick) and these are grouped into lobe complexes (~20-40 m thick). Lobe complexes are separated by fine-grained intervals (~ 4 m thick). LC1 shows paleoflow trends towards the NW and the NE; it is composed of two lobes with a high proportion of unconfined deposits. LC2 shows paleoflows to the NE and is composed of three lobes that fill low areas left on the surface of LC1. LC3 exhibits paleoflows to the E and it is composed of six lobes with high proportion of channels; the lobes aggrade and migrate towards the NW. LC4 developed on top, with its axis shifting to the south and backstepping, exhibiting only unconfined elements. Maps at a lobe complex scale show serrated geometries downdip, a normal response of focused sediment dispersal associated with channels and high-density turbidites. Detailed study of lobes in LC3 show interesting trends in axial sections. Proximal to lobe axis beds are thicker (>40 cm), grain size is greater (medium sand to granules) and main facies are conglomerates and structureless sandstones. Off axis, beds are thinner (<40 cm), grain size ranges from fine to medium sand and there is an increase on normally graded and laminated sands. From lobe axis to off-axis, channels disappear and facies vary from high density to low density turbidites.

The present work shows that Los Molles Fm has significant sandstone units that likely form good reservoirs when present in the subsurface and an excellent analog for coarse-grained fan deposits.

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Advisor: Ronald J. Steel

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Co advisor: Cornel Olariu