

PS Gravity Flow Systems in the Los Molles Formation in the Arroyo La Jardinera Region, Neuquén Basin (Argentina)*

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Search and Discovery Article #30118 (2010)

Posted June 7, 2010

*Adapted from poster presentation at AAPG International Conference and Exhibition, Rio de Janeiro, Brazil, November 15-18, 2009

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Abstract

The Pliensbachian to Early Callovian Cuyo Group in the Arroyo La Jardinera area reflects a shelf-slope-basin plain physiography. A major unconformity defines the onset of a thick turbidite succession and represents a 2nd order sequence boundary. It consists of a regressive succession punctuated by several abrupt shifts of physiographic elements (3rd order sequence boundaries). The 3rd order depositional sequences include Aalenian slope rise and slope deposits in the Los Molles Formation, Early Bajocian shelfal facies at the transition of the Los Molles and Lajas formations, and Middle to Late Bajocian inner shelf to nearshore strata in the Lajas Formation that are overlain by Bathonian alluvial deposits of the Challacó Formation.

Higher frequency cycles punctuate the succession and have controlled the origin, deposition and abandonment of the architectural elements. Facies and architectural elements analyses indicate that gravity flow deposits in the Los Molles Formation fit in a submarine ramp model. The three identified gravity flow (GF) types have been related to 4th order relative sea-level falls. The GF1 was ascribed to fluvial derived turbidites deposited during 4th order early lowstand, coeval to fluvial incision on the shelf, which were ignited in the slope and produced depletive depositional pulses with a fluvial compositional signature. The GF1 system includes relatively small channels in the slope, well-developed lobes in the slope rise and proximal basin plain, and lobe fringes in the basin plain.

The GF2 strata were also related to fluvial derived turbidity currents, but influenced by an oscillatory component, and associated with the 4th order late lowstand systems tract that also includes the incised channels fill. They are characterized in the slope by widespread, undulating and laminated sandstone and heterolithic facies, which include low relief scours at their central portions. They represent more diluted and finer-grained density flows relative to the GF1.

The GF3, also associated with the 4th order lowstand wedge, comprises mass and debris flow deposits in the slope and slope rise that represent classical, short-lived surges caused by slope failures on relatively steep slopes. The 4th order transgressive and highstand systems tracts led to the abandonment of the turbidite stages and widespread mud deposition. An expanded version of this subject is presented in the Revista de La Asociación Geológica Argentina 63 (4): 728-753.

References

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