

Anatomy of a Permian erg sequence: the De La Cuesta Formation
(northwestern Argentina)

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ABSTRACT

Permian red beds of the De La Cuesta Formation (Sierra de Narv ez, northwestern Argentina) are composed of sandstones associated with mudstones and subordinate conglomerates. Facies distributions and stacking patterns indicate that these sediments resulted from the interaction between aeolian and ephemeral fluvial systems, and are represented by aeolian dune, dry aeolian interdune and aeolian sand sheet, mudflat, wet aeolian interdune, and fluvial deposits. The De La Cuesta Formation is characterised by aeolian (erg) sequences alternating with non-aeolian (terminal alluvial fan – mudflat) sequences. Each erg sequence is bounded at its base by a regionally extensive sand-drift surface and at the top by an extinction surface. A number of architectural elements, including aeolian dunes limited by interdunes, grouped crescentic aeolian dunes, longitudinal dunes, and draa with superimposed crescentic dunes are recognised in the erg

sequences. The sand sea developed during phases of increasing aridity, whereas non-aeolian deposition might have occurred during more humid phases. Thus, the styles of aeolian-fluvial interaction are considered to result from cyclical climatic changes. Within the drier hemicycles, the rhythmic alternation between dune deposits and aeolian dune and interdune deposits indicates higher frequency cycles that could be attributed to subtle climatic oscillations and/or changes in sand supply and availability. The development of the Permian sand sea in the Paganzo Basin seems to be related to the growth of a volcanic chain to the west. This topographic barrier separated the Paganzo Basin from the Chilean Basin, located along the western margin of Gondwana and characterised by shallow marine carbonate sedimentation. The correlation between the Permian erg and the shallow marine carbonates suggests a regional warming period during the Middle Permian in western Gondwana.

KEYWORDS Erg sequence. Permian. Argentina. Western Gondwana