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**Anatomy of a Cretaceous Detached Forced Regression (Avilé Sandstone), Neuquén Basin, West-Central Argentina**

The Avilé Member (Early Hauterivian) is a relative thin non-marine clastic wedge encased within a thick succession of marine sediments (Agrio Formation). This sandstone package is one of the most prolific reservoirs in the northwestern Neuquén basin, supplying 11% of the total hydrocarbon production.

Detailed outcrop and subsurface analysis indicate that deposition occurred in a terminal fan environment entering into an ephemeral lake surrounded by an eolian sand field. Disconnection of the backarc depocenter from the Pacific Ocean drove basin isolation and desiccation. Relative base level oscillations, climate, rock composition and paleogeography of the older sequences exerted a strong control on the erosion-deposition processes during an early continental stage. Noticeable stacking pattern of fluvial and eolian facies resulted from repetitive flooding-desiccation events.

During the final stage, a relative base level rise and a backward expansion of the depositional systems to the basin borders is evidenced by an overall dryness increase and the accumulation of an extensive eolian dune field above the precedent shelfal sequences. This tendency ended up with a basinwide marine flooding and drowning of the hinterland system when the connection between the Pacific Ocean and the Neuquén depocenter was reestablished through the magmatic arc.

Organic-rich marine black shales below and above Avilé, coupled with the high quality of the non-marine reservoir, provided key elements for a prolific petroleum system. The remarkable preservation of the eolian dune topography beneath the marine shales and the high acoustic impedance contrast between reservoir-source-seal elements, allowed a clear and accurate subsurface imaging.