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The Agrio Fold and Thrust Belt of the Neuquén Basin, Argentina: A New Exploration Play Concept

The exploration activity in the Agrio Fold and Thrust Belt of the Neuquén Basin was mainly concentrated on testing the tight sandstone gas reservoir of the Jurassic Tordillo Fm. The lack of primary porosity reservoirs enclosed within the large anticline structures, as well as the general misunderstanding of the timing relationship of the Vaca Muerta-Agrio-Troncoso(.) petroleum system made this region unattractive for exploration activities. Regional correlations based on Ar/Ar ages, single crystal fission track analyses, synorogenic deposit studies, seismic reprocessing, etc., allowed to propose a new structural model that primary consists of a basement-involved tectonic wedges combined with thin-skinned triangle zones that left large anticline structures beneath apparent surface synclines. The timing relationship of the prospectable petroleum system with the critical moment is now adjusted making this area attractive for new exploration targets. An example of this new target is the Cerro La Seña Lead that consists of a major anticline structure located at the core of a large-scale triangle zone. This structure was formed between 94 and 55 Ma, when the major source rocks were expelling liquid hydrocarbons. The hydrocarbon preservation and the trap integrity are favoured by the presence of an evaporite top seal cap. In addition, the presence to the south of an active kitchen (fetch area) that may have been charging this structure with light hydrocarbon and gas during the last 50 Ma increases the chances of hydrocarbon accumulation and preservation.