

Subsidence analysis of the Barinas-Apure Basin: Western Venezuela

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Abstract/Excerpt

A series of structural and isopach maps have been produced for the Barinas-Apure Basin, Western Venezuela, in order to determine the regional distribution of the main tectonostratigraphic units in the area, to quantify the original thickness of these units at the time of their sedimentation and to estimate the total basement-driven subsidence of the basin. The structural and isopach maps were produced using fourteen 2D seismic regional transects and well log information provided by PDVSA. Six sequences were interpreted on the seismic lines since they reproduce best the tectonostratigraphic evolution of the basin, these are: Pre-Cretaceous (S6), Lower Cretaceous Campanian (S5), Maastrichtian-Paleocene (S4), Eocene-Lower Miocene (S3), Middle-Upper Miocene (S2) and Pliocene-Pleistocene (S1). The sediment thicknesses of these units then were decompacted using a 3D flexural decompaction software. Results show that S5 was deposited in a passive margin with a maximum subsidence rate (msr) of 21.4 m/Ma, S4 marks the transition to a compressive regime associated with the collision of the Caribbean and South American plates towards the northwest of the area (msr=38.2 m/Ma), S3 was deposited in a foreland basin produced by the flexure of the western Venezuelan crust associated with the Lara Napes emplacement (msr=47.5 m/Ma) and S2 and S1 mark the formation of the Barinas-Apure foreland basin as the result of the emplacement of the Mérida Andes, in were maximum subsidence rates increased considerably to 263.5 m/Ma for S2 and 337.7 m/Ma for S1.