Tectonic Influence of the Cordillera Oriental Thrust Salient on the Shortening and Subsidence History of the Llanos Foreland Basin of Colombia

Campos, Henry [1]; Mann, Paul [2] (1) Jackson School of Geosciences, The University of Texas at Austin, Austin, TX. (2) Institute for Geophysics, The University of Texas at Austin, Austin, TX.

In contrast to foreland basins of Venezuela that show a west-to-east progression in subsidence related to the time-transgressive and oblique collision of the Caribbean arc, the Llanos foreland basin of eastern Colombia shows a major pulse of Middle Miocene subsidence taken as the onset of the foreland basin in response to shallow subduction and collision events along the Pacific margin of western Colombia. Middle Miocene to recent, east-west shortening, driven in part by collision of the Panama arc along the Pacific margin of Colombia, has created a major thrust salient, the Cordillera Oriental, which overthrusts the Llanos foreland basin along an arcuate thrust front that extends basinward by 130 km. In this study we used 2000 km of 2D-seismic data and 32 wells, for which structure maps of key horizons and subsidence curves were constructed and analyzed both parallel and perpendicular to the chord of the thrust salient. Subsidence curves show an increase in the rate of tectonic subsidence in the salient area during the middle to late Miocene, coeval with the collision of the Panama arc with northwestern South America plate. Regional balanced cross-sections north and south of the salient apex, show shortening across the Cordillera Oriental of ~30 km and ~40 km, respectively. Most known hydrocarbons in the thrust belt and foreland basin are located either south of the salient (Cusiana-Cupiagua, Rubiales) or north of the salient (Cano Limon-La Victoria) but not within the salient where subsidence, source rock thicknesses and fracturing may be greatest according to the model of Macedo and Marshak (1999). We discuss whether this lack of major fields in the salient is a result of geologic conditions or reflects underexploration.