Structure and Tectonics of the Llanos Foothills of Colombia

Obi Egbue and James Kellogg
Department of Geological Sciences, University of South Carolina, USA

The Llanos foothills represents the frontal-thrust zone of the eastern flank of the Eastern Cordillera of Colombia. It is limited to the west by the Guaicaramo fault system and to the east by the Yopal fault system. The Llanos foothills and the Eastern Cordillera have been shortened, uplifted and sheared by the converging Nazca, Caribbean, and South American plates since the Late Cretaceous. Compressional deformation resulting from the oblique subduction of the Nazca oceanic plate beneath the South American plate and the Panama block-North Andean collision are accommodated through inversion of normal faults and shortening in the region. These reactivated normal faults originally developed during the rifting associated with the opening of the Proto-Caribbean from Late Triassic to Early Jurassic. We present a structural model constrained by surface geology, well data, and seismic reflection profiles. This model contains reactivation of basement structures as reverse faults, imbricated thrust sheets, and a triangle zone. The Nunchia syncline, a prominent structural feature in the central portion of the Llanos foothills, containing Oligocene to Recent rocks, is produced by the forelimb of a blind thrust on the northwest and the Yopal thrust ramp on the southeast. The main deformation styles are basement involved and basementdetached shortening, and we estimate approximately 160 km of shortening and up to 20 km of right-lateral range-parallel strike-slip displacement across the region.