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Extensional Structures Related to the Jurassic-Cretaceous Rift of the Middle Magdalena Valley Basin – Colombia

The Middle Magdalena Valley Basin (MMVB), Colombia, evolved to its actual configuration through several stages closely linked with the tectonic events of the northwest corner of South America. During Early Jurassic extensional deformation related to the break-up of Pangea, resulted in the development of rift structures in the MMVB area. The syn-rift infill consists of fluvial and lacustrine sedimentary rocks (Jordan, Giron and Santos formations), overlain by limestones and shales (Rosablanca and Paja formations). Irregular discontinuous reflectors, rotated by normal fault blocks and increasing thickness towards the south-east, characterize the Jurassic syn-rift section. In Early Aptian, a post-rift phase controlled by thermal subsidence started. During this phase the Tablazo, Simití, La Luna and Umir formations were deposited. The seismic character of this sequence, consists of continuous reflectors and slow changes in thickness. From the end of the Cretaceous through the present, the collision of the oceanic terranes of the Colombian Western Cordillera first, and the Panama Arc later, caused thrusting in the Central and Eastern Cordilleras until the MMVB became an intermontane basin. Sedimentation during this period consisted of fluvial deposits accumulated as continental molasses. The rift structures are well preserved in the northern part of the MMVB. In addition, it has been proposed that the range-bounding faults of the Eastern Cordillera are controlled by the geometry of the Jura-Cretaceous rift, however it is often difficult to demonstrate this unambiguously due to the complexity of the Andean structure. In contrast, many smaller scale compressional structures in the MMVB are cored by high-angle reverse faults that are clearly inverted normal faults. Inversion can be documented by thicker rift strata on the hanging wall and by variation of fault throw with depth.