

Structural configuration of the Eastern Cordillera of Colombia as a response to the Northandean slab setting

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The Eastern Cordillera of Colombia is completely detached from the main Andean trunk system and bracketed between the moderately west-dipping remnant margin of the Central Cordillera and the gently bent Guyana Shield. By its strongly folded cover and penetratively shortened basement it contrasts to its undeformed encasing foreland blocks, as envisioned by the vice model. In its middle segment it attains an exceptional width of 200km that was predetermined by a Cretaceous forebulge delimited by inward dipping normal border faults, which became reactivated during the Neogene shortening. This constellation gave rise to the concept of an inverted graben. This backarc setting was, however, long-lived and correlates to a Cretaceous subduction cycle. Its underlying mantle dynamics provide an explanation for the rheological differences between weak orogenic crust and encasing backstops.

Along-strike variations of folding and faulting is evidenced at its eastern deformation front by the exclusive presence of fault-related folds in its southern part and their transition to fault-dominated imbricate stacks in its northern part. The folded southern part correlates with a thermal anomaly, as evidenced by anomalously high values of vitrinite reflectance. The morphologic and structural changes from narrow southern to broad middle segment closely image the change from a moderate to a shallowly dipping slab segment.

In this contribution we track changes in structural style by means of three cross sections, basing our arguments on a thermal weakening at the slab tear to the south. Here, gross crustal structures involve an axial depression and cordilleran structures are isostatically compensated. Further north, an intermediate section displays large-scale antiforms in its axial domain, evidencing a buckling of a more resistant crust. The northernmost section of the Cocuy syntaxis, finally, exhibits axial antiforms throughout the section and is isostatically imbalanced, attesting to a support of the down-going slab.