

Evolution of paleogene basins in northwestern Southamerica: tracking the change from caribbean to nazca subduction

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In the northern Andes, inversion of mesozoic extensional structures, have controlled the location of synorogenic successions and dispersal of detritus since Paleocene time. Detailed geologic mapping, tectosedimentological studies using provenance (petrography, heavy minerals, geochronology), biostratigraphy and termogeochronological data, conducted in several basins with paleogene strata across the present Eastern Cordillera, southern Llanos Basin and the Perijá Range, that reactivation of former normal faults broke the single Upper Cretaceous basin into different depocenters that migrates through the Paleogene period.

Maastrichtian to mid-Paleocene reverse reactivation broke the syn-orogenic basin into two depocenters. The western depocenter (Magdalena and Rancheria basins) was bounded to the west by eastward-tilted crustal blocks (Central Cordillera and Santa Marta Massif); crustal tilting and paleocene magmatism were associated to subduction of the buoyant Caribbean Plate. Crustal tilting favored reverse reactivation of the western border of former extensional Cretaceous basins. These reactivated structures, acted as the eastern boundary of the western depocenter. Terrigenous and magmatic detritus filling the western depocenter were derived mainly from the Central Cordillera and from the uplifts to the east.

In late Paleocene to early Eocene time, as eastern subduction of the Caribbean Plate continued, reactivation of older structures migrated eastward and disrupted the eastern depocenter (presently along the axial zone of the Eastern Cordillera, Llanos foothills, Llanos, Catatumbo and western Maracaibo Basin). The Eastern depocenter extended up to the present Llanos basin with minor uplifts, but in the Llanos Basin such uplifts could expose paleozoic metamorphic and sedimentary rocks. However, for most of the eastern depocenter, terrigenous detritus were derived from sources to the west and south, and they included reworking of the western synorogenic clastic wedge and erosion of the cretaceous sedimentary cover.

This Maastrichtian to early Eocene configuration of low-amplitude uplifts that separated at three major syn-orogenic depocenters is not similar to the middle-late Eocene and Oligocene basin configurations. Northward translation of the Caribbean Plate and onset of Nazca subduction were the primary control of the geometry of the basins.

Palabras clave: Tectonics, Paleogene, Caribbean subduction