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Paleogene 'Negative Flexure' Basins in Colombia and Venezuela

Cretaceous passive margin history of northern South America ended with Maastrichtian-Paleocene onset of subduction of Caribbean crust beneath Colombia, and of Proto-Caribbean crust beneath Venezuela-Trinidad. Palinspastic restoration of Andean, Caribbean deformations facilitates interpretation of paleogeographic development in the interior. Onset of subduction caused uplift of the outer margin of the South American continental crust, and caused interior areas to sag under negative flexure. We present a range of characteristics that may be found in negative flexure basins in general. These basins are broad (flexural wavelength ca. 200-400 of km), show strong tectonic control and do not show strictly eustatic cyclicity. Heatflow may be low due to underthrusting plate. Negative flexure basins are ideal sites for development of broad lacustrine systems if climate is humid. Marine influence in the lakes and connection to the sea will be controlled by eustasy, flexural maintenance of continental rim flanking the basin, and fresh water supply. In Colombia, we interpret the Lower Socha/Upper Socha/Picacho I-Mirador I as a lacustrine cycle driven by negative flexure. Lake sediments have coals and type-I source rocks. Flanking/interfingering 'lacustrine plain' sediments are reservoir-prone (Mirador I). A second cycle (Picacho II/Mirador II/Concentración) with slightly different origin includes source rocks with >10% TOC. In eastern Venezuela, Vidono Formation filled a negative flexure trough, with southward onlap of the eroded Cretaceous margin. This basin remained open to the sea. Viewing the Paleogene sections of Colombia and eastern Venezuela this way clarifies sequence stratigraphic and paleogeographic models.