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Changes in deformation styles in the foreland of the Northern Andes as a response to slab segmentation

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Slab segmentation plays a key role in determining the location of Miocene and younger deformed belts within the Northern Andes. We focus on two such changes, which account for the partitioning of deformations related to a long-lived collisional event between South America and adjacent oceanic plates. A southern change in slab configuration occurs at 4'30o along a major tear zone that puts an end to the moderately inclined North Ecuadorian/South Colombian slab and its correlative volcanic arc. An ensuing flat slab segment may be traced until 7o N, where the intermediate-depth seismic Bucaramanga nest indicates a slab detachment at a horizontal tear which, in turn, may have been triggered by a change in slab configuration between the Nazca and Caribbean plate. A mid-Miocene deformation front demarcates in detail these slab changes. In the south Colombian segment Mid-Miocene deformation is restricted to the foothills of the Central Cordillera. The tear zone marks a major relay along discontinuous ramps, where the mid-Miocene deformation front jumps to the eastern foothills of the Eastern Cordillera. North of this relay, the deformation front attains a structural relief exceeding 10 km, but is abruptly terminated at the Chucarima fault ramp at 7o N, which acted as a trap door with an opposed displacement polarity with respect to the southern relay zone. Between the two relay zones there exists a marked thermal gradient which resulted in a ductile deformation and a large scale decoupling between a floating crustal lid of the Eastern Cordillera and its foreland to the S and a relatively more brittle and homogeneously distributed deformation to the N.