

Net northeast slip of the North Andes Sliver (NAS) along the Eastern Frontal Fault System (EFFS), northwestern South America (NW SA)

F. A. Audemard M.¹, H. Mora Páez²

¹FUNVISIS, Caracas, Venezuela

²SGC, Bogotá, Colombia

The NE-directed tectonic escape of the NAS with respect to SA is generally accepted now. As first-order boundaries, the NAS is limited by the Ecuador-Colombia trench on the west and the right-lateral EFFS (Pennington's acronym kept for simplicity) on the east, which we now know extends from the Gulf of Guayaquil-Tumbes basin (GGTB; Ecuador) to the Caribbean coast of Venezuela. These two structures define an open-to-north wedged-shaped block amalgamation herein named as NAS, which is bounded on the north by the subducting Caribbean plateau flat slab (Audemard, 1993). From SW to NE, EFFS comprises: In Ecuador, Puná-Pallatanga-Cosangá-Chingual (CCPP); In Colombia, Afiladores, Sibundoy, Algeciras and Guaicáramo; and Boconó (BF) in Venezuela.

From NE to SW, several estimates of total dextral slip have been calculated. Although a 70-80 km offset in Mesozoic rocks was once proposed across BF, more reliable and frequent dextral offsets are of the order of 30 km (Giraldo, 1989). A supportive argument to this 30 km net slip along the Mérida Andes axis may be derived from present "mismatch" of Bouguer anomaly minima in both adjacent flexural basins (Audemard & Audemard, 2002).

The Algeciras lazy Z-shaped pull-apart basin (Huila Dpt., Colombia) provides another estimate. The extent of the Q basin fill measured along the fault trend on SGC plate 345, is about 10 km. This is a minimum estimate because the fault shortcuts the basin in more recent times, increasing such slip in a ~1-2 km.

In Ecuador, Baize et al. (2015) indicate that the Pallatanga fault (part of the CCPP) displaces several large geologic units in about 10 km. Farther south, at the very southern tip of the EPPZ, from seismic data acquired from the GGTB, Witt & Bourgois (2010) estimate 13.5-20 km of lengthening of this basin from the Plio-Quaternary boundary.

From all the estimates of total slip here compiled along EFFS, we can conclude that the NE tectonic escape of NAS is most likely ~30 km, as estimated by Audemard & Audemard (2002). Therefore, despite the large size of NAS, its escape remains modest at plate scale. Remarkably, EFFS net slip is in the same order of magnitude as the ~20 km for the Sumatra Fault, which is even longer than the EFFS (~1900 km long).

Audemard F. A., 1993. Néotectonique, Sismotectonique et Aléa Sismique du Nord-ouest du Vénézuéla (Système de failles d'Oca–Ancón). PhD thesis, U. Montpellier II, France, 369 p.

Audemard F. E. & Audemard F. A., 2002. Structure of the Mérida Andes, Venezuela: relations with the South America-Caribbean geodynamic interaction. *Tectonophysics*, 345: 299-327.

Baize S., Audin L., Winter T., Pilatasig L., Taipei M., Reyes P., Kauffmann P. & Yepes H., 2015. Paleoseismology and tectonic geomorphology of the Pallatanga fault (Central Ecuador) a major structure of the South-American crust. *Geomorphology*, 237: 14–28.

Giraldo C., 1989. Valor del desplazamiento dextral acumulado a lo largo de la falla de Boconó, Andes venezolanos. *GEOS* 29: 186-194.

Witt C. & Bourgois J., 2010. Forearc basin formation in the tectonic wake of a collision-driven, coastwise migrating crustal block: The example of the North Andean block and the extensional Gulf of Guayaquil-Tumbes Basin (Ecuador-Peru border area). *GSA Bull.* 122: 89-108.