

The Oca-Ancon fault is a right-lateral fault with 2 mm/yr of Holocene motion as much as 85 km of Oligocene and younger right-lateral offset that forms a steep and linear mountain front along the Caribbean coast at the Santa Marta massif and northern Sierra de Perija of Colombia. We have assembled 900 km of multichannel seismic data and 4 wells from the oil industry to show the variable deeper structure of the fault along this 400-km-long segment. Off the coast of the Santa Marta massif, profiles show a subvertical fault with a northward-thinning clastic wedge of Middle Miocene age. Wedging along the fault becomes less prominent up section in the Late Miocene and younger units suggestive of waning fault activity during these times. To the east in the border region between Colombia and Venezuela, profiles show that the single, linear trace of the Oca fault exhibits both positive and negative flower structures. The location of Tablazo strait - connecting the Gulf of Venezuela and Lake Maracaibo - is controlled by a major, active rhomboidal pull-apart basin formed where the Oca fault steps 15 km to the south to the Ancon fault which continues eastward into the Falcon basin. Restoration of 85 km of right-lateral motion of the Oca-Ancon fault realigns basement provinces and hydrocarbon trends in the Maracaibo basin and Gulf of Venezuela.