A tectonic study (structural data; paleostress evaluation of fault-and-striae data) was carried out along the southern Sierra Maestra and Gran Piedra Mountains, SE Cuba. The studied region stretches c. 190 km E-W and accompanies the steep submarine wall of the Oriente fault (part of the North-Caribbean transform fault system). A steep topographic gradient is typical for the region, ranging from c. +1.932m (Pico Turquino) to – 6.500 in the southern adjacent Oriente/Cayman trough. The Neogene Santiago basin separates the Sierra Maestra from the Gran Piedra region.

The Sierra Maestra block is formed by two superposed volcanic arcs with independent geological evolution (Figs. 1, 2): (1) The Cretaceous volcanic arc is represented by Turquino and Manacal Formations (Aptian to Lower Maastrichtian), mainly of subvolcanic rocks, lava flows, and coarse-grained pyroclastic rocks. (2) The Paleogene volcanic arc is represented by El Cobre Group, Pilon, and Caney Formations including lava flows, pyroclastics, and granitoid intrusions. The age is Lower Paleocene to Middle Eocene. Both arcs were formed by northward subduction of oceanic lithosphere (e.g. Iturralde-Vinent, 1996).

The geology and tectonic of Cuba is the most complex in the northern Caribbean realm, fourth main tectonic system). A steep topographic gradient is typical for the region, ranging from c. +1.932m (Pico Turquino) to – 6.500 in the southern adjacent Oriente/Cayman trough. The Neogene Santiago basin separates the Sierra Maestra from the Gran Piedra region.

The deformation stages (D1 - D4) along La Sierra Maestra have been deciphered using overprinting criteria and shear sense indicators, and the approach of Angelier and Mechler (1977). Several distinct deformation stages are recognized in this area. These include initial N-S shortening and subsequent tectonic unroofing by normal faults which cut through the thermally weakened crust. The deformation stages (D1 - D4) along La Sierra Maestra have been deciphered using overprinting criteria and shear sense indicators, and the approach of Angelier and Mechler (1977). Several distinct deformation stages are recognized in this area. These include initial N-S shortening and subsequent tectonic unroofing by normal faults which cut through the thermally weakened crust. The deformation stages (D1 - D4) along La Sierra Maestra have been deciphered using overprinting criteria and shear sense indicators, and the approach of Angelier and Mechler (1977). Several distinct deformation stages are recognized in this area. These include initial N-S shortening and subsequent tectonic unroofing by normal faults which cut through the thermally weakened crust. The deformation stages (D1 - D4) along La Sierra Maestra have been deciphered using overprinting criteria and shear sense indicators, and the approach of Angelier and Mechler (1977). Several distinct deformation stages are recognized in this area. These include initial N-S shortening and subsequent tectonic unroofing by normal faults which cut through the thermally weakened crust. The deformation stages (D1 - D4) along La Sierra Maestra have been deciphered using overprinting criteria and shear sense indicators, and the approach of Angelier and Mechler (1977). Several distinct deformation stages are recognized in this area. These include initial N-S shortening and subsequent tectonic unroofing by normal faults which cut through the thermally weakened crust.
Fig. 1. Stratigraphic scheme of the Sierra Maestra and the succession of deformation events.

**D**₁: Dyke Intrusion

Fig. 2. Orientation of dykes (D₁) in the Sierra Maestra.
D$_2$: N-S COMPRESSION

Fig. 3. Deformation stages D$_2$ (thrust fault) and D$_3$ (S-directed normal fault). For legend see Fig. 3.

D$_3$: FILLED EXTENSIONAL JOINTS IN LA CRUZ-JAIMANITAS FMS

Fig. 4. Succession of deformation stages found in Neogene and Quaternary formations.

The central and eastern sectors of the study area exposes Miocene to Quaternary reef and carbonate/detritical limestones (La Cruz and Jaimanita Formations) which generally increase in elevation
(including several terraces) from W to E. These limestones are deformed, faulted, fractured, and cut by calcite- and karst-filled extensional veins. Paleostress investigations show several stages of deformation and also a variation of structures along strike together with a complex succession of deformation stages. We summarize here these deformation stages as $D_4$. We commonly observed initial E-W extension forming calcite- and karst-filled veins, likely correlated with dextral strike-slip and subsequent sinistral shear along E-W trending strike-slip faults and final N-S extension. Sinistral shear predominates and records similar kinematics as historical earthquakes in the Santiago region (Fig. 4).

References:


