CURRENT RESEARCH PROJECTS

2018-2020:

Project 1: Macro and micro tectonic evolution of the hanging wall of the Soapaga Fault, Floresta massif, eastern cordillera Colombia.

Previous work has outlined the history of the footwall of the Soapaga fault. This work is aimed to investigate the structural evolution of the hanging wall and the structural control of the Floresta basement uplift.

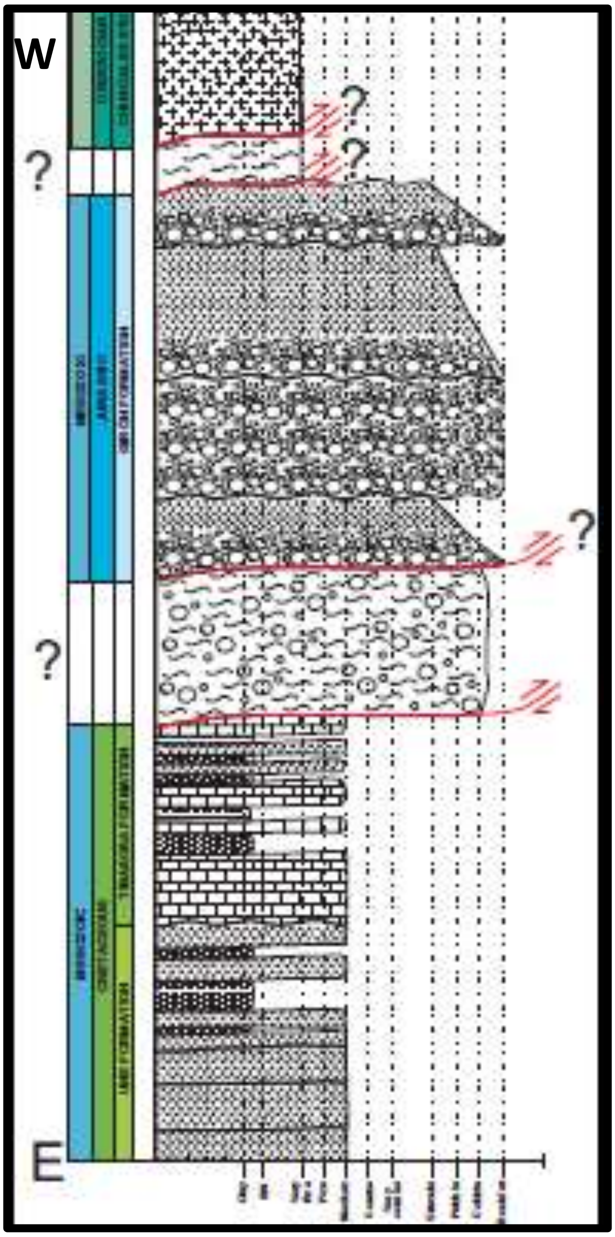

Figure 1. Tectono-stratigraphic column showing the effect of deformation in the middle part of the Floresta basement, Colombia. Note the repetition of basement tectonic slices.

Project 2: Structural relationship between the Antioquia Batholith and adjacent tectonic units in the Central Cordillera, Colombia: a tectonic, geochronological and microstructural approach.

The Antioquia batholith is the largest igneous body in Colombia and is bounded by two major shear zones. It have previously been explained as a positive flower structure, however, our preliminary results suggest this interpretation may be questionable.

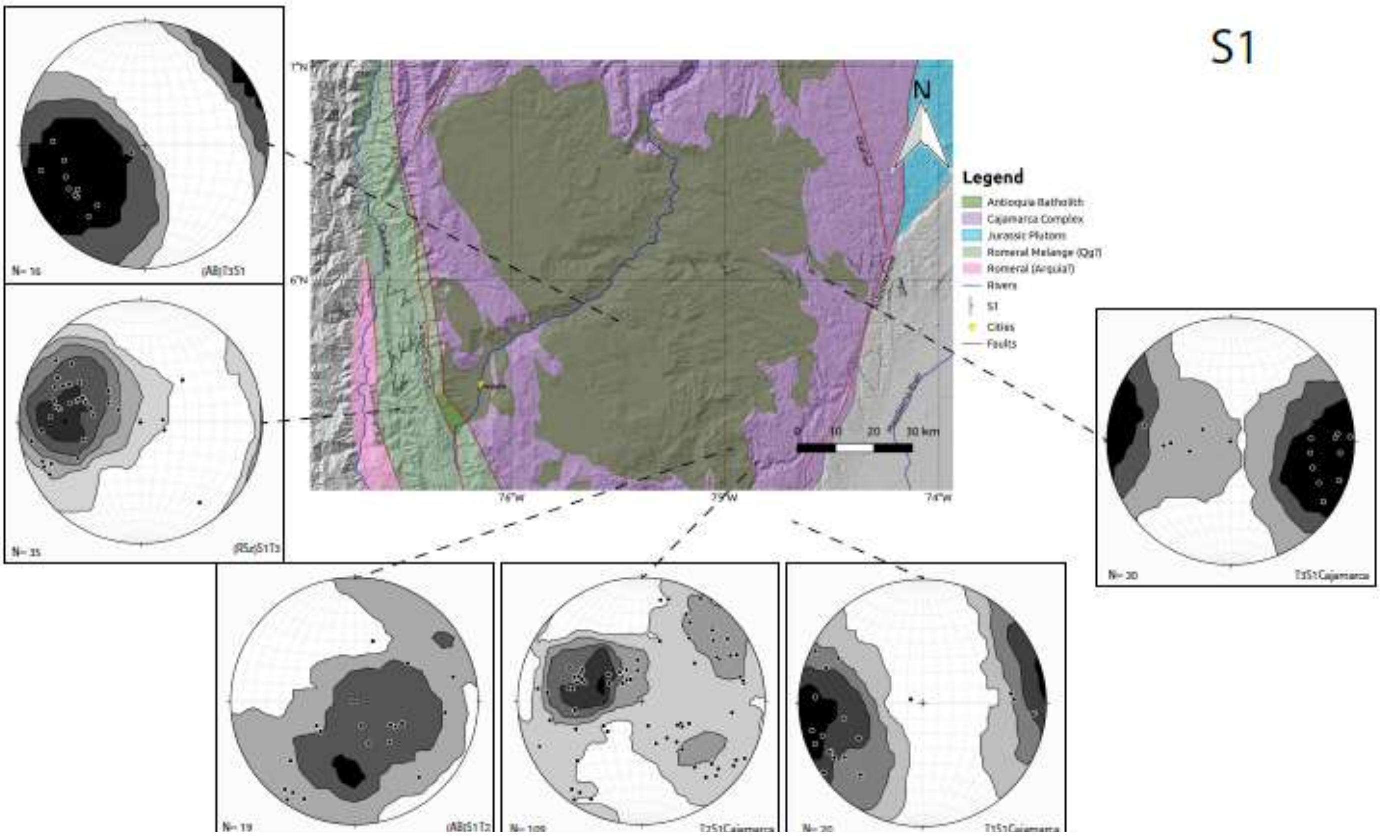

Figure 2. Geological map of the central cordillera, Colombia showing stereographic projections of S1 surfaces of the Antioquia Batolith and the adjacent tectonic units. Note the variation of the S1 foliation within the shear zone corridor highlighted by red lines.

Project 3: Deformation style of the Paleozoic basement in the Colombian Eastern Cordillera, the Quetame and Floresta Massifs: New constrains on the structural and tectonic evolution

The Floresta and Quetame basement inliers are located to the east of the Guyana craton and the Guaicaramo fault system. They occur marginal to major shear zones. The aim of this project is to determine their uplift history and structural evolution.

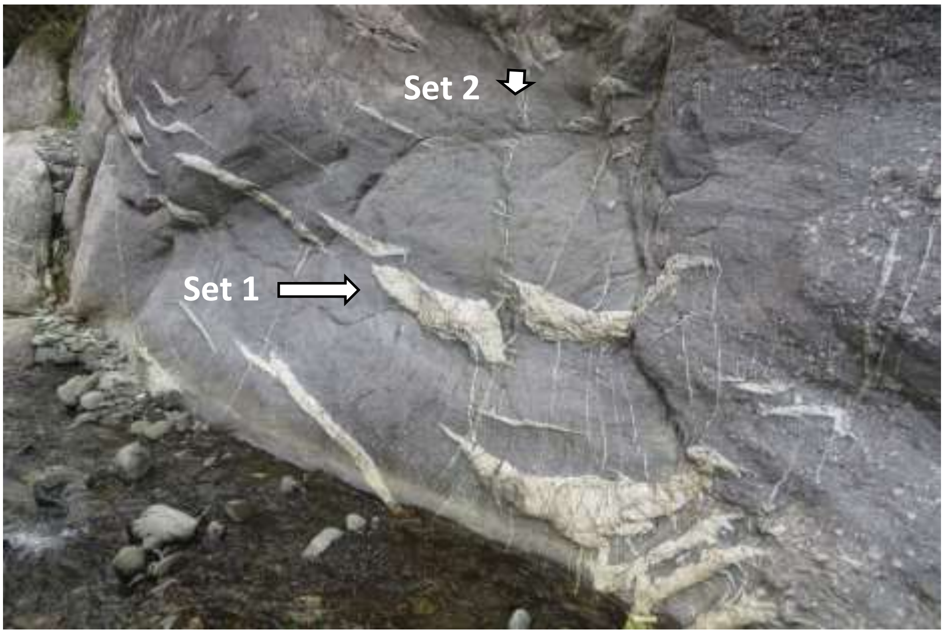

Figure 3. Two sets of sigmoidal veins in metaconglomerate, Quetame basement, Colombia. Evidence of brittle-ductile deformation at intermediate crustal levels.

Project 4: Morphotectonic analysis of Upper Guajira, the septentrional region of Colombia: A GIS and Remote Sensing approach.

This study uses Landsat 8 and Digital Elevation Models (DEM) to show the dominant orientations and morphological features as well as the correlation between measured trends and the tectonic evolution of the Upper Guajira, in the northernmost region of the South American plate. From the Cretaceous onward, the faults lineament azimuth frequency rotates from a NE-SW trend to a prominent E-W direction which bring them into parallelism with the Caribbean plate movement since the Cretaceous.

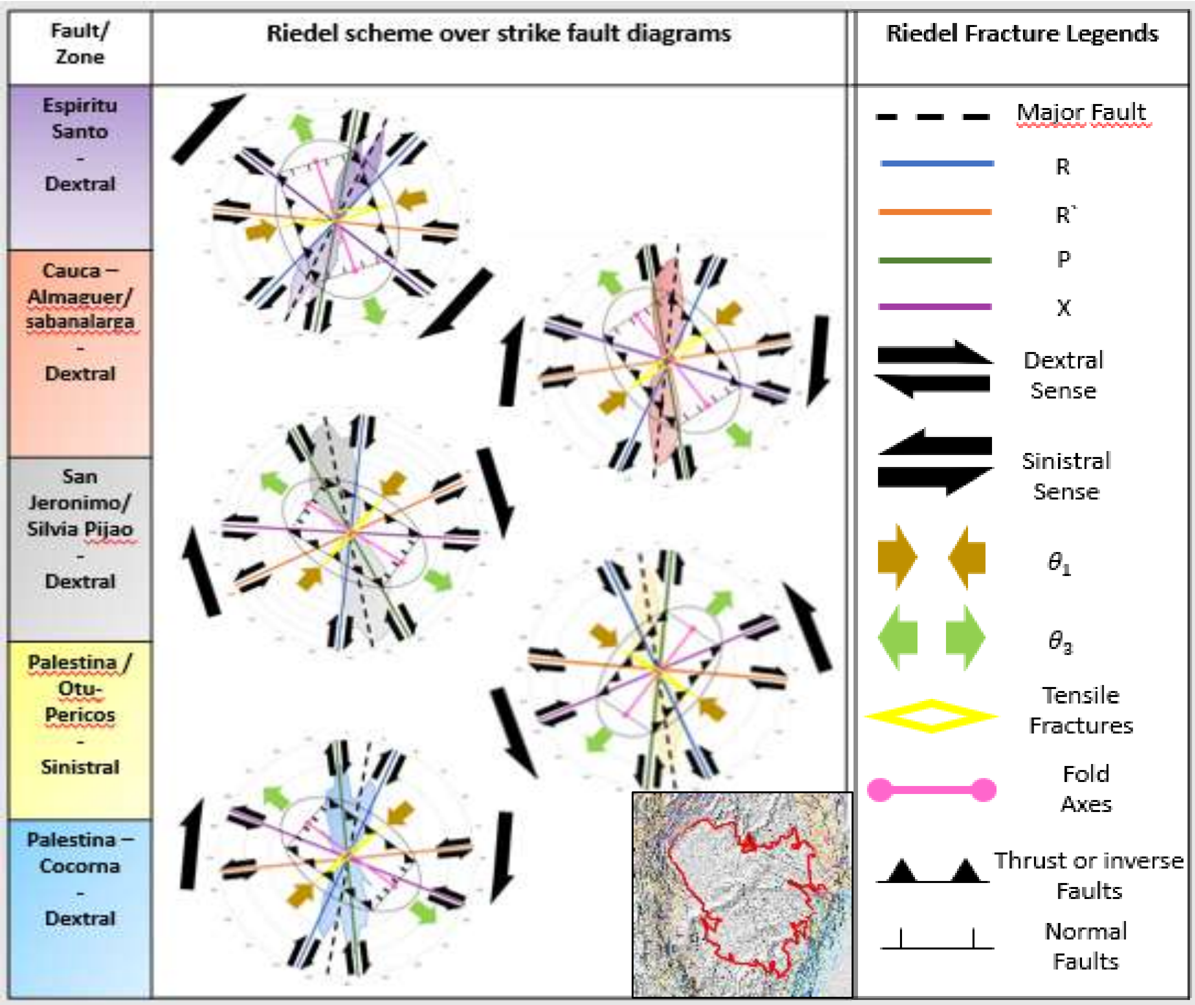

Figure 4. Riedel shear scheme associated with the Antioquia Batholith and the adjacent tectonic units, central cordillera, Colombia showing the main kinematics within the shear zone corridor.

Project 5: Granulite facies rocks along the southwest coast near Walpole, Western Australia. Age and geodynamic implications.

This project was set up to test the time of granulite facies metamorphism and whether these high grade gneiss were part of the Albany Fraser Orogen that resulted from collision between the Yilgarn craton and Antarctica.

Figure 5. High grade gneiss intruded by blue quartz vein indicative of post-emplacement granulite facies metamorphism.

Project 6: Fluid–mobile element behaviour from serpentinites and associated metamorphic rocks in the Escambray accretionary complex, Central Cuba. The plate interface process in an intraoceanic subduction zone

This project uses Boron isotopes in serpentinites and associated metamorphic rocks that went down to a subduction zone in the Caribbean during the Cretaceous. It is aimed to test fluid mobile element behaviour in the subduction plate interface in an intraoceanic subduction zone.

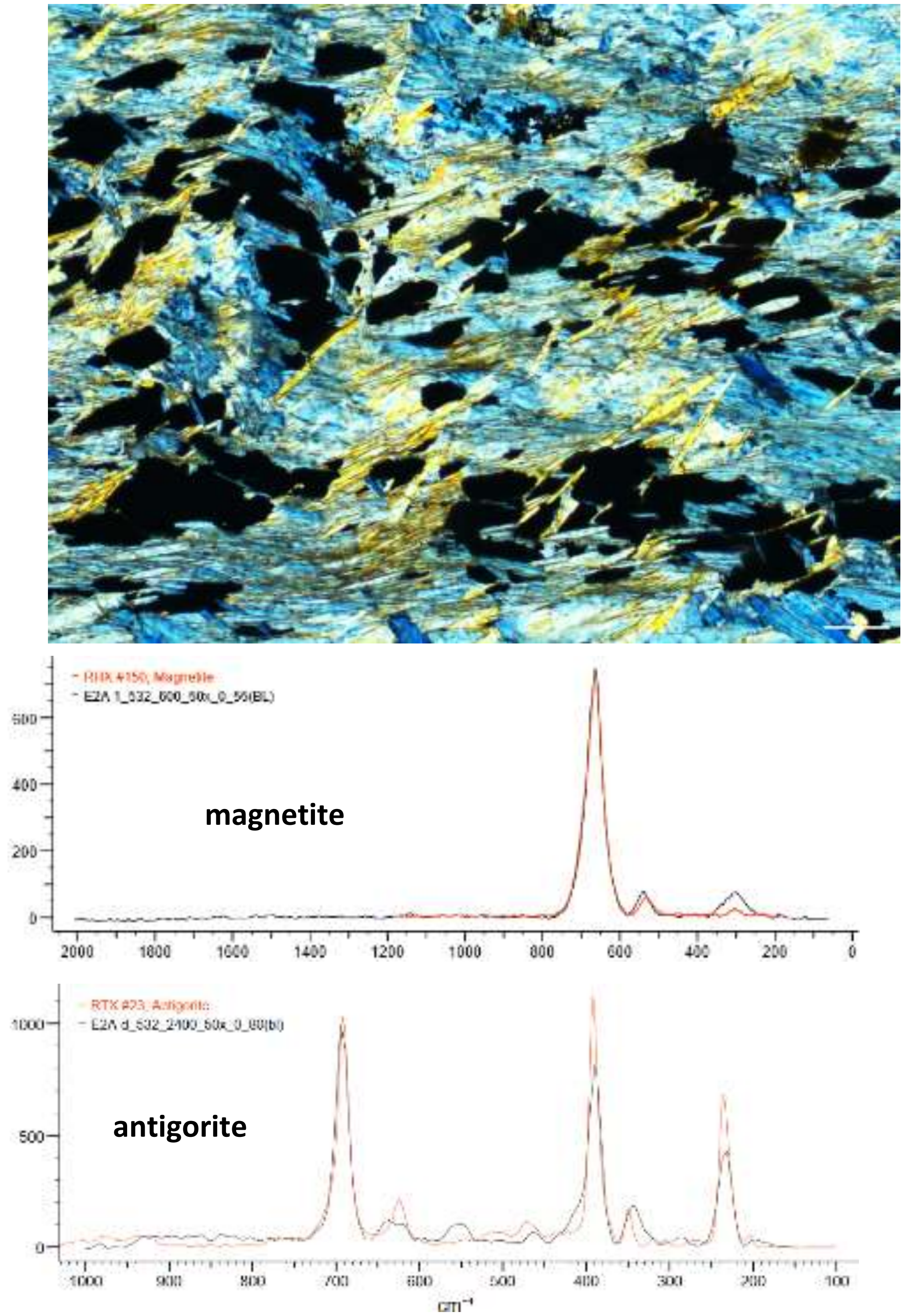

Figure 6. Subduction zone serpentinite thin section showing magnetite and antigorite aligned in the foliation plane with Raman spectra of major minerals.