MICROSTRUCTURAL AND CRYSTAL ORIENTATION ANALYSIS OF QUARTZ IN A NEOPROTEROZOIC TRANSCURRENT SHEAR ZONE: IMPLICATIONS FOR DEFORMATIONAL PROCESSES (ORÓS, NE BRAZIL)

Kaue Seoane[1], Andrea Tommasi[2], Carlos Jose Archanjo[1]

[1]Universidade de São Paulo (kaueseoanes@gmail.com, archan@usp.br);[2]Universite de Montpellier II (andrea.tommasi@umontpellier.fr)

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In the Rio Grande do Norte domain, a transcurrent system named Orós-Aiuaba is composed of multiple shear zones. The Orós shear zone (OSZ) is a 300 km long zone with an average width of 21 km and a trend that abruptly shifts from N-S (the dominant trend) to ENE-WSW to the south at 130 km. A comparatively smaller NE-SW shear zone nominated Aiuaba shear zone (ASZ), with a length of approximately 85 km and an average width of 6 km, has been interpreted as potentially linked to the ENE-trending OSZ. The ASZ exhibits microstructural features that suggest deformation occurred under greenschist temperature conditions. The foliations data throughout the system is mostly vertical varying directions as the shear zone trend changes, and the lineations are generally subhorizontal plunging to NE and SW, although in the middle segment some data display plunging close to vertical. The mylonitic deformation that produced the Orós-Aiuaba shear zone system has affected a large variety of rocks, including ortho- and paragneiss, schist, quartzite, leucogranite and rhyolite. On the east basement, the Paleoproterozoic rocks of 2.18-19 Ga orthogneisses of the Jaguaretama Complex is intruded by the 1.77 ortho- and paragneisses of the Serra do Deserto. These rocks are interleaved with Paleoproterozoic metavolcanosedimentary rocks of the Orós Group. On the west basement, the Neoproterozoic rocks are present in the 929 Ma metasediments of the Acopiara Complex. The granitic rocks are composed of synkinematic plutons varying in ages from 590-500 Ma interval (Aiuaba pluton), with the Banabuiú pluton dating of 565 Ma. The microstructural data of these mylonitic rocks suggests a difference in deformational intensity between the units and the geographic position in relation to the shear zone nuclei. Crystal orientation data in quartz for the OSZ shows concentration of <c> axes parallel to the Y direction, with some dispersion along the YZ plane, and a distribution of <a> axes within the XZ plane with two maxima symmetrically distributed relative to the X direction. For the ASZ, the quartz bulk [c]-axis pole figure defines an asymmetrical major maximum at the periphery. These data combined might indicate that the mylonitic rocks constituting the OSZ exhibit a consistent decrease in temperatures associated with deformation, progressing from the upper-to lower amphibolite facies from north to south. Whilst in the ASZ, the microstructural and crystal orientation data suggest that deformation occurred under greenschist temperature conditions.

PALAVRAS-CHAVE: EBSD; MICROSTRUCTURES; CRYSTALLOGRAPHY