

BLUE QUARTZ AS AN INDICATOR OF STRONGLY DEFORMED ROCKS: AN EXAMPLE FROM GUAYAGUÁS HILL, SAN JUAN PROVINCE, ARGENTINA

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Guayaguás Hill is a mylonitic domain located at 31° 54' south latitude and 67° 14' west longitude. It is part of the Pampean Ranges System, Upper Precambrian-Lower Palaeozoic in age, and is composed of extremely deformed rocks of medium-grade metamorphism, affected by diaphthoresis. The rocks are intruded by quartz-veins up to 2 meters wide. Quartz is opalescent and has notorious pale blue/mauve colour. Microscopic observations reveal that quartz underwent strong deformation. Colour changes in the quartz are recognized with successive ductile deformation. Less deformed veins are weakly blue. Quartz crystals (? 2 mm) are flattened by intracrystalline deformation, with irregular grain boundaries, undulose extinction and deformation lamellae. With increasing deformation, elongate subgrains appear along with coincident intensity of blue coloration. Recovery begins at grain boundaries and, in restricted extent, at subgrain boundaries. Afterwards, subgrains pass laterally into domains of small recrystallized grains. Old quartz can remain, thus a bimodal grain size distribution is characteristic. These samples contain both blue and colourless quartz. When complete recrystallization is reached, the blue tint disappears, and quartz becomes an aggregate of approximately uniform size grains (0,01 mm), with weak shape-preferred orientation. This study demonstrates a direct relationship between the colour of quartz and deformation. The colour is induced by interference processes and/or light spectrum differential absorption (Rayleigh scattering), due to dislocations in the crystalline structure. Neither microscopic observations nor electron microprobe analyses indicated rutile and/or ilmenite inclusions in the quartz lattice, also capable of inducing a similar scatter.