EMPLACEMENT AND DEFORMATION OF THE LATE MAGMATIC MADEIRA GRANITE FACIES (PITINGA MINE, AMAZONIAN CRATON, BRAZIL)

Siachoque, A.[1]; Salazar, C.A.[2]; Trindade, R.I. [3]
[1, 2] Universidade Federal do Amazonas; [1, 3] Universidade São Paulo

The Madeira granite is one of the large Paleoproterozoic (1.82 Ga) A-type granite intrusions in the Amazonian craton. It hosts Sn, Nb, Ta, F, Y, Li and REE mineralizations in its late magmatic facies, namely albite granite. This facies is subdivided in the border albite granite (BAG) and the core albite granite (CAG). Also, in the central portion of the CAG, there is a massive cryolite deposit. The pluton is oriented in the NE-SW direction and the late magmatic facies form an elongated stock oriented in the N-S direction. Classical structural techniques and the anisotropy of magnetic susceptibility (AMS) method were applied to the study of its internal fabric for establishment the emplacement model of Madeira granite. AMS fabric pattern is controlled by pure magnetite in all facies, despite the significant amounts of hematite in the BAG. The magnetic foliation is oriented preferentially along the NE-SW direction and magnetic lineations are dominantly vertical, likely reflecting the magma emplacement processes. This magnetic fabric correlates to magmatic state fabrics that are defined by a weak NE-SW orientation of mafic and felsic silicates. Considering that the vertical magmatic lineations reflect the upward magma movement, the fabric of the pluton can be interpreted in terms of its emplacement model. In this way, we suggest that the emplacement of the late facies of the Madeira granite likely occurred through tension sites along the NE-SW corridor of the main pluton. Late magmatic and post-magmatic deformation were investigated through the orientation of pegmatite dykes, faults (strike-slip and normal), hydrothermal veins and joints. Their orientation and kinematics is consistent with the magmatic and solid-state structures. Dykes usually orientated along the S70°W/40°N plane, which is nearly parallel to the strike of AMS and magmatic foliations. In contrast, veins and some joints are oriented perpendicular to the mentioned trend. The faults define a conjugate system that is kinematically coherent with the other features. Taken together, the kinematics of all these structures shows evidence for dextral sense of movement in the system in the brittle regime revealing a continuity in the stress regime from the last magmatic stages until the complete cooling of the pluton along a NE-SW dextral corridor related to the regional stress field.

KEYWORDS: MAGNETIC SUSCEPTIBILITY, AMS FABRICS, MAGMATIC EMPLACEMENT