

IRON FORMATIONS OF THE SÃO JOSÉ DO CAMPESTRE MASSIF CENTRAL PORTION, RIO GRANDE DO NORTE, BRAZIL.

Abrahão Filho, E.A.¹; Dantas, E.L.¹; Figueiredo, B.S.

¹Universidade de Brasília

ABSTRACT: Metric to kilometric bodies of Banded Iron Formations (BIFs) occur in the central portion of the São José do Campestre Massif (SJCM), an Archean core of the Borborema Province, Northeast of Brazil. Establishing contacts with mafic-ultramafic rocks, calc-silicate rocks, olivine marbles and garnet gneisses, these BIFs are inserted on the Serra Caiada Meta-volcanic-sedimentary Sequence, a possible greenstone belt of the region. These BIFs were mapped and sampled (1:25.000 scale) in a 45 km² area. Together with the other rocks, they are high-grade metamorphosed and deformed as a synclinal fold. BIF samples are mainly constituted of magnetite (45-55%), quartz (35-40%) and traces of apatite (<1%), however, it was possible to discriminate three groups of BIFs according to the other minerals. Group A is composed by low contents of grunerite (2-4%) and Group B has higher modal compositions of this amphibole (6-10%). Group C show the most heterogeneous mineral assemblages: grunerite (3-7%), hornblende (2-6%), clinopyroxene (1-5%), orthopyroxene (~1%) and garnet (~1%). Electron microprobe analysis of magnetite grains of Group C show high contents of Al, Co, Sn, medium contents of Cr, Mn, Ni and low contents of Mg, Ti, V, Zn, revealing chemical similarities with Skarn-related hydrothermal and approaches with IOCG-type and primary BIF-type. Distinctions between the three different groups of BIF are reflected in whole rock chemical composition and expressed in cartography, once these groups are distributed as zones in the map. Group A show higher contents of base metals, Σ REY average 36ppm and Eu positive anomalies ($Eu/Eu^{*PAAS} = 1.26-2.27$). Group B show medium contents of base metals, Σ REY average 87ppm and absence or slight Eu positive anomalies ($Eu/Eu^{*PAAS} = 0.92-1.22$). Group C show lower contents of base metals, Σ REY average 88ppm and absence or slight Eu positive anomalies ($Eu/Eu^{*PAAS} = 0.84-1.26$). All groups show majority of real Ce negative anomalies (Group A, $Ce/Ce^{*PAAS} = 0.59-1.04$; Group B, $Ce/Ce^{*PAAS} = 0.62-0.89$; Group C, $Ce/Ce^{*PAAS} = 0.59-1.03$), and groups A and B show positive Y anomalies (Group A, $Y/Y^{*PAAS} = 0.97-1.64$; Group B $Y/Y^{*PAAS} = 1.42-1.64$), while Group C show positive and negative anomalies ($Y/Y^{*PAAS} = 0.76-1.42$). Group A and B display slight convexes REY patterns depleted in LREY, and Group C show large variations of this patterns. From comparisons with other BIFs in the world and in the SJCM, we can interpret that these BIFs were deposited in submarine environments. Apparently Groups A and B are most influenced by hydrothermal vents with very slight sedimentary contribution. Group C show higher detritus contribution than the other two. The high Σ REY of these BIFs and the chemical heterogeneities of Group C can be explained, respectively, by the presence of apatite and garnet and, thus, confirm magnetite post-events chemical signatures. BIFs as chemical-exhalative sediments can provide information about physicochemical conditions of ancient oceans. Apparently the chemistry of the central MSJC BIFs may preserve the elemental signature of an Archean recluse sea, in a transitional MORB-Arc tectonic environment. We suggest that the detected BIFs zoning can be a guide for prospecting VMS-type deposits.

PALAVRAS-CHAVE: IRON FORMATIONS, SÃO JOSÉ DO CAMPESTRE MASSIF, RARE EARTH ELEMENTS.