NEW INSIGHTS INTO THE GOLD MINERALISATION CONTROLS IN NORTHERN MATO GROSSO: TELES PIRES AND X1 EXAMPLES OF MAGMATIC SOURCE.

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ABSTRACT: In the northern part of the Mato Grosso State, the Alta Floresta Gold Province (AFGP) has been an important target of discussion about gold mineralisation and its controls. Debates regarding petrogenesis and the tectonic evolution of the Rio Negro-Juruena are present in the literature but a consensus among the authors seems far.

This work based on geochemical analyses and petrography compares two porphyry-type rocks that are usually assumed as related to the gold mineralisation in the AFGP. It aims at providing new insights into the magmatic sources (geochemical signature) of these gold bearing rocks: The X1 quartz-feldspar porphyry, that is related to the X1 gold deposit near Guarantã do Norte city, and the subvolcanic granites and porphyries that occurs around the gold deposits near Matupá, Peixoto de Azevedo, Guarantã do Norte and União do Norte towns, that are related to the Teles Pires Intrusive Suite (TPIS).

The geochronological data present in the literature shows that the X1 quartz-feldspar porphyry yields U-Pb age 1773 ±6 Ma (SHRIMP) with a Sm-Nd model age (T_{DM}) ranging from 2.18 to 2.12 Ga and ε_{Nd} ranging from -1.38 to -1.69. The dataset of U-Pb crystallization ages from the TPIS plutonic rocks ranges from 1782 ±17 to 1757 ±16 Ma. In addition, the Sm-Nd (T_{DM}) dataset ranges from 2.3 to 1.94 Ga, with the ε_{Nd} varying between -3.4 to +3.0. Especially the União do Norte porphyry, attributed by some authors as part of the TPIS magmatism, yielded 1774 ±7 Ma and Sm-Nd model age (T_{DM}) from 2.3 to 2.24 Ga. Considering the above, we assume that both X1 quartz-feldspar porphyry and the TPIS plutonic rocks are coeval.

In addition, the petrographic analyses do not show major differences. As we move forward, applying the geochemical analysis, we observe that the samples from the TPIS are enriched in both LREE and HREE, have minor negative Nb anomalies and are more depleted in Ba than the quartz-feldspar porphyry from X1 deposit. In comparison to X1 rocks, the TPIS rocks have also a higher concentration of TiO_2, MgO and FeO_t. This is revealed as compositional gaps in the binary "Harker" diagrams built for these rocks. This difference in the REE and trace elements pattern plus the compositional gaps may be caused by two processes: (1) fractional crystallization with assimilation, mixing and/or mingling, that depletes the residual magmas in REE and trace elements by the entrance of mafic magmas on the system; or (2) melting of distinct source rocks and/or different partial melting rates. Although there are evidences of coeval system destabilization (mafic enclaves with enclosed K-feldspar crystals, *rapakivi* textures, etc.), we should expect that in the more depleted rocks (X1 quartz-feldspar porphyry) there would be a higher MgO, TiO_2 and FeO_t contents, which does not occur.

Based on those evidences and the slightly different Sm-Nd model ages, we concluded that the contrasting compositional signature between the two porphyries is the result of the chemical content of the source and/or the partial melting rates.

KEYWORDS: TELES PIRES, PORPHYRY, ALTA FLORESTA GOLD PROVINCE.