The Ubaira-Nova Canaã Belt: from a gamma-ray Th anomaly to a new REE (Th, Nb, Sc, Ti) Province.

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The Ubaíra-Nova Canaã Belt (UNCB) contains Th-U airborne anomalies known since the 1970s. This is a ~15Km wide, ca. 170 km long NNE-SSW oriented area in which a large airborne Th, U anomaly is defined by a great number of individual anomalies mainly corresponding to leucogranites and alkaline mafic to intermediate rocks of the Volta do Rio Plutonic Suite (VRPS), which is a lower rank lithodemic unit of the Jequié Complex, in Bahia, Northeastern Brazil.

Two main rock groups have been recognized in the VRPS: (i) ~2.6 Ga (U-Pb, zircon) metaluminous coarse-grained granodiorites/granites and, (ii) metaluminous to peraluminous leucogranites with biotite and/or brown amphibole, of age still unknown. All these granitoids are calc-alkalic to alkali-calcic ferroan high-K, metaluminous to weakly peraluminous, rich in HFSE with high Ga/Al and low Y/Nb ("A2-granites"), all of them recrystallized by Paleoproterozoic granulite facies metamorphism. The leucogranites are closely associated to a succession of also metamorphosed alkaline gabbro, monzodiorite, monzonite, leucomonzonite and syenite, in addition to ultramafic cumulates with chevkinite group minerals (CGM). The leucogranites also contain rare centimetric restitic enclaves of paragranofels (quartz-rich rocks with biotite, sillimanite, cordierite, rutile and monazite).

This area shows rare earth elements (REE) mineralization, which is present as: (i) Cumulates of CGM + Apatite + Amphibole in monzosyenites, monzodiorites, and diorites; (ii) CGM- rich mylonitized quartz segregations and quartz veins in pegmatites and leucogranites; (iii) Monazite + quartz segregations/veins in pegmatites and granites; (iv) CGM- or monazite-rich late hydrothermal quartz veins; (v) Adsorbed REE in clay minerals of latosols. Supergene REE deposits likely formed from intensive weathering of leucogranites and their associated pegmatitic rocks and CGM- and monazite- rich quartz rocks in the Atlantic rainforest domain. They possibly show the most important economic potential at this time due to the presence of thick weathering profiles, and being readily minable at a lower cost of REE extraction.

The cumulates of chevkinite group minerals are unique in the world. REE mineralization of the Volta do Rio Suite is polycyclic and it is unique in the geological record due to very high REE contents, reaching up to 18% REO in cumulates. Moreover, Th, Nb and Sc concentration is very high, and the perspective of using Th in safer atomic reactors increases the interest in this area.