

Theme: * South American Polymetallic Deposits and Metallogeny

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Title of Abstract: * Age Constraints and Isotope Signature of the Ediacaran Pb-Zn and Cu-Epithermal Deposits, Minas do Camaquã, Brazil

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Epithermal Cu (Au) and Pb-Zn (Ag) mineral deposits of intrusion-related source, hosted in siliciclastic sedimentary rocks of Ediacaran age, are investigated. Pb isotopes of Cu and Pb-Zn mineralization and U-Pb SHRIMP dating of interlayered intermediated lava provided interesting clues on the source of the mineralization. Most of the analysed sulphide minerals from Cu (Au) deposits display juvenile Neoproterozoic signature such as early Neoproterozoic ophiolite and island/magmatic arc and the later granite melting (0.6 Ga), while those sulphide minerals of Pb-Zn deposits contain a Paleoproterozoic signature. The analysed sulphides associated with Cu-mineralization show a Pb isotope signature of a mixed source with mantle and upper crust and a low U-Pb ratio fluid. The Pb isotope data support that the most probable source for Pb-Zn mineralization is associated with volcanic-sedimentary rocks of the Camaquã Basin with strong contribution of the melted Paleoproterozoic between 0.58-0.54.

The Camaquã Basin occurs in the central part of the Sul-Riograndense Shield, Rio Grande Sul State, overlying the Paleoproterozoic and Neoproterozoic basement rocks (Chemale Jr. et al., 1995; Paim et al., 2000). The Camaquã Basin is the location of a depositional basin formed between 630 and 500 Ma, from the base to the top: Maricá Group (<630->594 Ma), the Bom Jardim Group (594-580 Ma), the Acampamento Velho-Santa Bárbara Group (574- 547 Ma) and the Guaritas Group (547-500 Ma). The first depositional cycle, the Maricá Fm., starts with alluvial fans to braided alluvial sediments that grade up into shallow-marine to turbidite sediments. It is interpreted to be formed as result of Dom Feliciano Belt overload in a retro-arc tectonic setting (Paim et al., 2000). Overlying the Maricá Formation are the three continental sequences, formed under the postcollisional stages of the Brasiliano Cycle, between 595 and ~500 Ma. The basal is the Bom Jardim Group, a volcano-sedimentary sequence formed from 595 to 578 Ma. Overlying in unconformity are the Acampamento Velho Fm., basal alkaline volcanic association, and the Santa Bárbara Group, a fluvial-deltaic-lacustrine sequence, formed from 578 to 540 Ma, which contains the fault-controlled Cu and Pb-Zn mineralization. These units are covered by the Guaritas Group comprising aeolian and alluvial plain and fan deposits (~547-500 Ma).

Based on situ U-Pb dating the sedimentary host rocks are deposited between 573 ± 9.7 Ma (Fig. 1) and 547 ± 6 Ma, which is the age of the hydrothermal process controlled by normal faults oriented at N60°-70°W and N-S.

Most of the analysed sulphides associated with Cu mineralization have a signature associated with the Neoproterozoic rocks of the Dom Feliciano Belt showing a mixed source with mantle and upper crust (orogenic environment after Zartman and Doe, 1981) and a low U-Pb ratio fluid (Fig. 2). The sulphides associated with Pb-Zn metal deposits have isotope signature of the Paleoproterozoic Santa Maria Chico Granulite Complex, Paleoproterozoic gneisses of the Santa da Boa Vista Dome and may have a direct link with crustal source for the 0.58-0.547 Ga Acampamento Velho magmatism (with dominant Paleoproterozoic Nd model age).

References

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Fig. 1. U-Pb SHRIMP age for the intermediate volcanic lava of the siliciclastic hosted Cu-deposits.

Fig. 2. $^{206}\text{Pb}/^{204}\text{Pb}$ x $^{207}\text{Pb}/^{204}\text{Pb}$ diagram for the sulphides of the Camaquã Cu-deposits.

Graphics:

