

STABLE ISOTOPIC CONSTRAINTS ON THE ORIGIN OF THE PROTEROZOIC GOLD MINERALIZATIONS OF FRENCH GUIANA

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Two types of proterozoic gold-sulphide mineralizations have been distinguished in French Guiana : 1) Pre-S1 tourmaline-hosted stratabound mineralization, hosted by Paramaca volcano-sedimentary Series, where gold is associated with disseminated sulphides in a zoned hydrothermal system with a chlorite-bearing outer zone and a tourmaline-bearing inner zone (Dorlin). 2) Discordant polymorph mineralization, in which pre-S1 sulphide disseminations are crosscut by quartz-carbonates-sulphides stockworks emplaced essentially during the D2 deformation. It is hosted by Paramaca Series (Changement, Yaou B), by the Upper detrital unit (Esperance) and by granitoids (Yaou A, Loulouie, Saint-Pierre). The $\delta^{13}\text{C}$ and $\delta^{18}\text{O}$ of carbonates from all these deposits show a relatively large but continuous range, respectively -0.5 to -5.5 ‰ (PDB) and +10 to +15.5 ‰ (SMOW). Assuming low temperatures of deposition (350°C), that suggests mineralizing fluids with a small magmatic component and a large participation of external fluids. First oxygen and hydrogen data obtained on the hydrothermal minerals (chlorite and tourmaline) from the Dorlin deposit indicate seawater-derived fluids. The $\delta^{34}\text{S}$ of sulphides, essentially pyrite, from all these deposits are relatively homogeneous, independently of the type of mineralization, and range between -5 and +3 ‰ (CDT). It strongly suggests a magmatic origin of the sulphides, either a magmatic fluid or more likely leaching of magmatic rocks.