

Stable isotope (C-O-S) and REE study of BIF hosted Ganjur gold deposit, Neoproterozoic Dharwar craton, India: Evidence for Mantle/Magmatic source of mineralizing fluid

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The Ganjur gold deposit in the Shimoga greenstone belt, southern India, consists of mineralized quartz-carbonate veins (QCVs) emplaced in sulphide facies banded iron formation. The source of fluids for gold mineralization has been debated in the gold deposits of the Dharwar craton as elsewhere in the world. Recently, metamorphic origin for mineralizing fluids has been proposed for Ganjur gold deposit [1]. In this work, we present C-O-S isotope and REE studies of QCVs, to reflect upon source of mineralizing fluids.

$\delta^{13}\text{C}$ values ($-7.0 \pm 1.5\%$) & $\delta^{18}\text{O}$ values ($15.0 \pm 7.4\%$) of carbonates of QCVs are similar to the mantle ($-6 \pm 2\%$, [2]) or magmatic ($-5 \pm 3\%$, [3]) derived fluids. While the heavier $\delta^{18}\text{O}$ values may be due to low temperature alteration, as observed in some other gold deposits [4]. The $\delta^{34}\text{S}$ values ($0.8 \pm 0.4\%$) of pyrite grains carrying gold support mantle derived fluids ($0 \pm 2\%$, [5, 6]). LREE and HREE enrichment with strong positive Eu anomaly (1.30 ± 0.57) indicating that mineralized calcites of QCVS were precipitated from reducing mantle derived fluids. Therefore, based on C-O-S isotope and REE geochemical evidence, we propose that Ganjur gold deposit was formed from juvenile, rather than metamorphic fluids. [1] Ganguly et al (2015) OGR. 73: 59-82. [2] Ohmoto, H (1986) Min. Soc. of America: 491-560. [3] Burrows, et al (1986) Nature 321, 851-854. [4] Swain, et al (2015) OGR. 70: 305-320. [5] Thode, et al (1961) GCA 25:159-174. [6] Ohmoto & Rye (1979) Geochem of Hydrothermal dep. pp. 509-567