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Stable Isotope (C-O-S) and Geochemical studies of auriferous quartz carbonate veins, Neoarchaeal Orogenic Ajjanahalli and Gadag Gold Field, Chitradurga Schist Belt, Dharwar Craton, Southern India: Implication for the source of gold mineralizing fluids.

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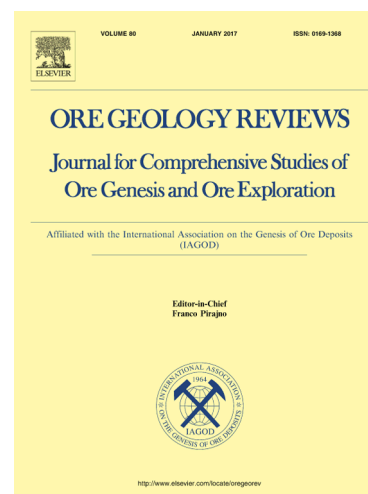
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Stable Isotope (C-O-S) and Geochemical studies of auriferous quartz carbonate veins, Neoarchean Orogenic Ajjanahalli and Gadag Gold Field, Chitradurga Schist Belt, Dharwar Craton, Southern India: Implication for the source of gold mineralizing fluids.

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Abstract Carbon ($\delta^{13}\text{C}_{\text{PDB}}$) and oxygen ($\delta^{18}\text{O}_{\text{SMOW}}$) isotopic compositions of carbonates of auriferous quartz-carbonate veins (QCVs), S-isotope ($\delta^{34}\text{S}_{\text{CDT}}$) composition of gold bearing sulphide minerals and REE geochemical characteristics of the auriferous QCVs of Ajjanahalli and Gadag Gold Fields in the Neoarchean Chitradurga-Gadag greenstone belt, Dharwar Craton, southern India have been studied in detail to constrain the source of auriferous vein fluids. The carbonate $\delta^{13}\text{C}$ values of the auriferous QCVs of Ajjanahalli fall in the range -2.09 to -8.59‰ (average: -4.5 ± 1.5 ‰); $\delta^{18}\text{O}$ are in the range 11.27 to 26.12‰ (average: 15.69 ± 4.12 ‰). The $\delta^{13}\text{C}$ and $\delta^{18}\text{O}$ values of carbonates of the BIF that host the auriferous QCVs respectively are -1.54 to -2.00‰ (average: -1.76 ± 0.19 ‰) and 14.12 to 26.36 (average: 21.9 ± 5.6 ‰). The carbonates from the carbonated metabasalts, also host for QCVs show $\delta^{13}\text{C}$ values between -1.39 to -1.92‰ (average: -1.59 ± 0.24 ‰) and $\delta^{18}\text{O}$ between 11.44 to 12.91‰ (average: 11.88 ± 0.6 ‰). $\delta^{13}\text{C}$ and $\delta^{18}\text{O}$ of QCVs are clearly distinct from those of meta-sedimentary carbonates in BIF and carbonates in carbonated metabasalts.

The calculated isotope composition of the original fluid for the auriferous QCVs $\delta^{13}\text{C}_{\Sigma\text{C}}$ are in the range -2.97‰ to -9.45‰ (average: -5.2 ± 1.4 ‰) and $\delta^{18}\text{O}_{\text{H}_2\text{O}}$ fall in the range between 6.46 and 20.58‰ (average: 7.8 ± 0.95 ‰). The $\delta^{13}\text{C}$ and corresponding $\delta^{13}\text{C}_{\Sigma\text{C}}$ values of the QCVs are comparable to those

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