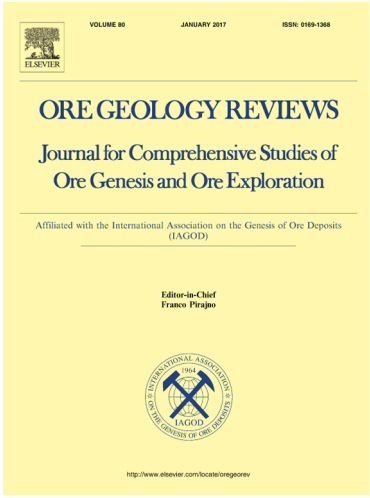
Accepted Manuscript



Stable Isotope (C-O-S) and Geochemical studies of auriferous quartz carbonate veins, Neoarchaean 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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PII: S0169-1368(16)30458-9
DOI: https://doi.org/10.1016/j.oregeorev.2018.03.005
Reference: OREGEO 2521

To appear in: *Ore Geology Reviews*

Received Date: 31 July 2016
Revised Date: 19 February 2018
Accepted Date: 5 March 2018

Please cite this article as: S.K. Swain, S. Sarangi, R. Srinivasan, A. Sarkar, M. Kesarwani, A. Mazumdar, M. Satyanarayanan, Stable Isotope (C-O-S) and Geochemical studies of auriferous quartz carbonate veins, Neoarchaean Orogenic Ajjanahalli and Gadag Gold Field, Chitradurga Schist Belt, Dharwar Craton, Southern India: Implication for the source of gold mineralizing fluids., *Ore Geology Reviews* (2018), doi: https://doi.org/10.1016/j.oregeorev.2018.03.005

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Abstract Carbon ($\delta^{13}C_{PDB}$) and oxygen ($\delta^{18}O_{SMOW}$) isotopic compositions of carbonates of auriferous quartz-carbonate veins (QCVs), S-isotope ($\delta^{34}S_{CDT}$) composition of gold bearing sulphide minerals and REE geochemical characteristics of the auriferous QCVs of Ajjanahalli and Gadag Gold Fields in the Neoarchaean Chitradurga-Gadag greenstone belt, Dharwar Craton, southern India have been studied in detail to constrain the source of auriferous vein fluids. The carbonate $\delta^{13}C$ values of the auriferous QCVs of Ajjanahalli fall in the range -2.09 to -8.59‰ (average: -4.5±1.5‰); $\delta^{18}O$ are in the range 11.27 to 26.12‰ (average: 15.69±4.12‰). The $\delta^{13}C$ and $\delta^{18}O$ 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 $\delta^{13}C$ values between -1.39 to -1.92‰ (average: -1.59±0.24‰) and $\delta^{18}O$ between 11.44 to 12.91‰ (average: 11.88±0.6‰). $\delta^{13}C$ and $\delta^{18}O$ 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 $\delta^{13}C_{\Sigma}c$ are in the range -2.97‰ to -9.45‰ (average: -5.2 ±1.4‰) and $\delta^{18}O_{H2O}$ fall in the range between 6.46 and 20.58‰ (average: 7.8 ± 0.95‰). The $\delta^{13}C$ and corresponding $\delta^{13}C_{\Sigma}c$ values of the QCVs are comparable to those