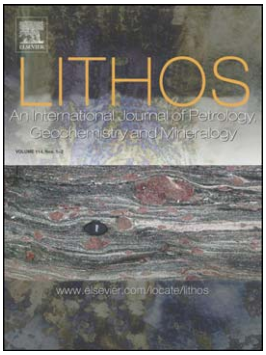


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# OROGENIC GOLD: COMMON OR EVOLVING FLUID AND METAL SOURCES THROUGH TIME

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Abstract

Orogenic gold deposits of all ages, from Paleoarchean to Tertiary, show consistency in chemical composition. They are the products of aqueous-carbonic fluids, with typically 5-20 mole percent $CO_2$, although unmixing during extreme pressure fluctuation can lead to entrapment of much more $CO_2$-rich fluid inclusions in some cases. Ore fluids are typically characterized by significant concentrations of $CH_4$ and/or $N_2$, common estimates of 0.01-0.36 mole percent $H_2S$, a near-neutral pH of 5.5, and salinities of 3-7 wt. percent NaCl equiv., with Na>K>>Ca,Mg. This fluid composition consistency favors an ore fluid produced from a single source area and rules out mixing of fluids from multiple sources as significant in orogenic gold formation. Nevertheless, there are broad ranges in more robust fluid-inclusion trapping temperatures and pressures between deposits that support a model where this specific fluid may deposit ore over a broad window of upper to middle crustal depths.

Much of the reported isotopic and noble gas data are inconsistent between deposits, leading to the common equivocal interpretations from studies that have attempted to define fluid and metal source areas for various orogenic gold provinces. Fluid stable isotope values are commonly