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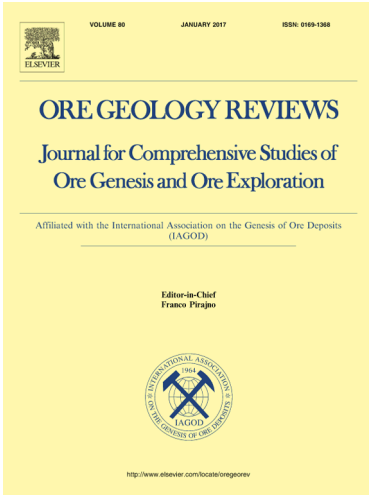

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Atypical Cu mineralisation in the Cornwallis carbonate-hosted Zn district: Storm copper deposit, Arctic Canada

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Abstract

The metallogenetically important Cornwallis Zn district, in Canada's Arctic islands, includes the past-producing Polaris mine and numerous base-metal showings, including Storm copper. Storm is unusual because it is near the southern limit of the district, is Cu- versus Zn-dominated, is overlain and underlain by red sandstone, and is hosted by Silurian strata (rather than Ordovician strata, as at Polaris). Mineralisation styles are primarily carbonate replacement and breccia, and consist of geerite, covellite, bornite, and chalcopyrite, all of which are associated with calcite and dolomite gangue. Multiple in situ micro-analytical techniques (fluid inclusion microthermometry, evaporate mound SEM-EDS, LA ICP-MS, SIMS), plus conventional Cu isotopic analysis were integrated to characterise the nature of the mineralising fluids and events. Fluid inclusions yielded low-temperature (T_h < 130°C), moderate- to low-salinity (17.0 to 0.4 wt. % NaCl equiv.) fluids. Evaporate mound SEM-EDS analysis, which quantified the solute chemistry, show a change from bimodal Na- and Na+K-dominated fluid mixture to a Na+K-dominated fluid. The $\delta^{18}O_{H2O}$ signature of the mineralising fluid involved