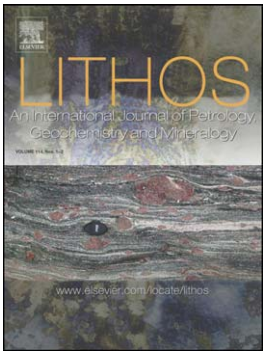

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Zircon U–Pb and Hf–O isotopes trace the architecture of polymetallic deposits: a case study of the Jurassic ore-forming porphyries in the Qin–Hang metallogenic belt, China

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Abstract: The Qin–Hang intra-continental porphyry-skarn Cu polymetallic belt (QHMB) is among the economically important metallogenic belts in South China. The significant differences in the volume and metal assemblage of the Jurassic magmatic-hydrothermal ore deposits in this belt remain as an enigma. Here we employ zircon U–Pb and Hf–O isotopes of the Tongshanling and Baoshan Cu–Pb–Zn deposits in the central part of the QHMB to investigate the contrasting metallogenic architecture. Our SIMS zircon U–Pb data indicate that the Tongshanling and Baoshan granodiorite formed at ~160 Ma. These rocks show high $Mg^{\#}$ values, and negative zircon $\varepsilon_{Hf}(t)$ and high $\delta^{18}O$ values suggesting that the magmas of the granodiorite porphyries were mainly generated through the anatexis of older crustal components triggered by the input of mantle-derived magma. The minor content of amphibole phenocrysts, low Sr/Y ratios, negative Eu anomaly, and low zircon Ce^{4+}/Ce^{3+} ratios indicate that the porphyries are relatively less oxidized with less water content compared with the ore-bearing porphyries in the Dexing and Yuanzhuding