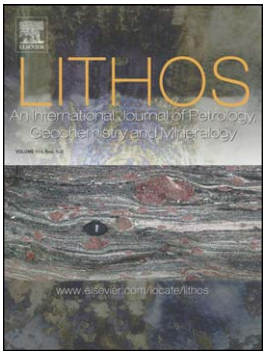

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Late Carboniferous to early Permian partial melting of the metasedimentary rocks and crustal reworking in the Central Asian Orogenic Belt: Evidence from garnet-bearing rhyolites in the Chinese South Tianshan

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ABSTRACT: Peraluminous granitic rocks provide important insights on crustal reworking processes. Here we study the garnet-bearing rhyolites of the Early Permian Xiaotikanlike Formation exposed in the Heiyingshan region located in the South Tianshan region in Xinjiang, NW China. Two layers of garnet-bearing rhyolites were recognized, which discordantly overly the strongly deformed Late Carboniferous strata. The rocks generally display porphyritic texture with alkali-feldspar, quartz, plagioclase, biotite and garnet as the major phenocryst phases. Zircon LA-ICP-MS U-Pb analyses yields ages of 281.5±0.7Ma for the upper layer of rhyolite (ULR) and 299.9±1.9Ma for the lower layer (LLR). The ULR shows SiO_2 in narrow range of 71.08 to 72.39wt.%, and Fe_2O_3 from 0.99 to 1.69 wt.% with Fe_2O_3/FeO ranging from 1.68 to 2.68. The normalized trace element patterns are characterized by prominent troughs for Nb, Ta, Sr, P and Ti and relatively sloping rare earth element patterns. They have radioactive Sr-Nd isotopic compositions [$(^{87}Sr/^{86}Sr)_i$ = 0.7128 to 0.7131 and ε_{Nd} = -13.09 to -12.44] and negative $\varepsilon_{Hf(t)}$ values of -9.97 to -1.27. The LLR exhibits similar trace and rare earth element patterns, ε_{Nd} (-12.68 to -