

Accepted Manuscript

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PII: S1342-937X(18)30164-3
DOI: doi:[10.1016/j.gr.2018.05.010](https://doi.org/10.1016/j.gr.2018.05.010)
Reference: GR 1991
To appear in: *Gondwana Research*
Received date: 31 October 2017
Revised date: 19 May 2018
Accepted date: 19 May 2018

Please cite this article as: Jiuyang Jiang, Yongfeng Zhu , Characterization of anhydrous to hydrous paragenetic sequence from pyroxene-bearing and pyroxene-absent variants of the late Carboniferous Baobei pluton in west Junggar of China. *Gr* (2018), doi:[10.1016/j.gr.2018.05.010](https://doi.org/10.1016/j.gr.2018.05.010)

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Characterization of anhydrous to hydrous paragenetic sequence from pyroxene-bearing and pyroxene-absent variants of the late Carboniferous Baobei pluton in west Junggar of China

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Abstract:

The Baobei pluton in west Junggar, composed of an earlier pyroxene-bearing granitoid and a variety of later pyroxene-absent hornblende–biotite-bearing granitoids (quartz diorite, granodiorite, monzogranite), intrudes early Carboniferous volcano–sedimentary rocks. Zircons separated from the granodiorite provide a U–Pb age of 306.5 ± 2.6 Ma, which represents the age of magma emplacement. The pyroxene-bearing granitoid is porphyritic with phenocrysts of orthopyroxene and plagioclase. Two types of orthopyroxene (Mg-rich Opx-1, Fe-rich Opx-2) occur in the pyroxene-bearing granitoid. Both the Opx-1 and Opx-2 show depletions of light REE and enrichments of heavy REE with negative Eu anomalies. The evolved melt in equilibrium with the Opx-2 contains higher light REE concentrations compared with the parental melt in equilibrium with the Opx-1 based on geochemical modeling. The pyroxene-bearing and pyroxene-absent variants of the pluton record the progression from the anhydrous orthopyroxene–clinopyroxene assemblage to the hydrous

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