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Ca. 850 Ma magmatic events in the Tarim Craton: age, geochemistry and implications for assembly of Rodinia supercontinent

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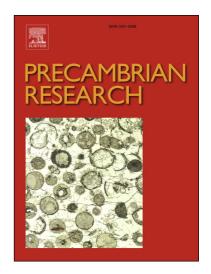
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# **ACCEPTED MANUSCRIPT**

### 1 Ca. 850 Ma magmatic events in the Tarim Craton: age, geochemistry

## and implications for assembly of Rodinia supercontinent

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- 11 **Abstract:** The origin of magmatic episodes between final assembly and initial breakup of Rodinia
- is crucial for deciphering geodynamic transition and continental crust growth processes. However,
- few igneous rocks were identified during the quiescent time from 900 Ma to 830 Ma in the Tarim
- 14 Craton. Along its northwestern margin, our field investigations identified abundant granitic debris in
- the Cryogenian Qiaoenbrak Group. Zircon U-Pb age determination revealed crystallization age at ca.
- 850 Ma. Detrital zircon crystals within Cryogenian to Ediacaran clastic rocks and schists of the
- basement Aksu Group also contain a major population having crystallized at ca. 860-840 Ma. Thus,
- we suggest that a hitherto unknown major magmatic event occurred ca. 850 Ma ago in northern
- 19 Tarim. Granite gravels exhibit typical fractionated granite features, with high values of SiO<sub>2</sub>
- 20 (73.1-75.7 wt%), alkali oxides (Na<sub>2</sub>O + K<sub>2</sub>O = 7.8-8.7 wt%) and Na<sub>2</sub>O/K<sub>2</sub>O (avg. 1.3 wt%), and
- low values of  $P_2O_5$  ( $\leq 0.04$  wt%) and A/CNK (0.87-1.01), together with Rb, Th, U and K
- enrichment, and depletion in Nb, Ta, Sr, P, Ti and Eu, negative Eu anomalies ( $\delta Eu = 0.21-0.74$ ) and
- fairly low Ga/Al ratios. Including detrital crystals, ca. 850 Ma zircon crystals display a large range
- of  $\varepsilon$ Hf(t) values from -17.0 up to +11.6. Elemental and zircon Hf isotopes suggest that granites were
- 25 derived from melting of juvenile lower crust, with addition of reworked upper crust and

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