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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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1 **Ca. 850 Ma magmatic events in the Tarim Craton: age, geochemistry**
2 **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
12 is crucial for deciphering geodynamic transition and continental crust growth processes. However,
13 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
15 the Cryogenian Qiaoenbrak Group. Zircon U-Pb age determination revealed crystallization age at ca.
16 850 Ma. Detrital zircon crystals within Cryogenian to Ediacaran clastic rocks and schists of the
17 basement Aksu Group also contain a major population having crystallized at ca. 860-840 Ma. Thus,
18 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 SiO₂
20 (73.1-75.7 wt%), alkali oxides (Na₂O + K₂O = 7.8-8.7 wt%) and Na₂O/K₂O (avg. 1.3 wt%), and
21 low values of P₂O₅ (≤ 0.04 wt%) and A/CNK (0.87-1.01), together with Rb, Th, U and K
22 enrichment, and depletion in Nb, Ta, Sr, P, Ti and Eu, negative Eu anomalies (δEu = 0.21–0.74) and
23 fairly low Ga/Al ratios. Including detrital crystals, ca. 850 Ma zircon crystals display a large range
24 of εHf(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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