

Linking Tarim between South China and North India in the periphery of Supercontinent Rodinia

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The location of Tarim during the assembly and breakup of the Rodinia supercontinent remains enigmatic, with different models proposing a Tarim-Australia connection (Li et al., 2008) or a location at the heart of Rodinia between Australia and Laurentia (Wen et al. 2017). Provenance reconstruction for sedimentary rocks by using U-Pb ages and Hf isotopes of detrital zircons have been widely applied to constrain paleotectonic relationships between major tectonic units (Andersen, 2005). In this contribution, zircon U-Pb dating results first revealed middle Neoproterozoic sedimentary rocks in the Altyn Tagh orogen in southeastern Tarim, northwestern China. These middle Neoproterozoic sedimentary rocks were deposited between ca. 880 and 750 Ma, related to a rifting-related setting slightly prior to the breakup of the Rodinia supercontinent at ca. 750 Ma. A compilation of Neoproterozoic geological records indicates that the Altyn Tagh orogen in southeastern Tarim underwent ca. 1.0-0.9 Ga collision and ca. 850-600 Ma rifting related to the assembly and breakup of Rodinia, respectively. In order to locate Tarim in the reconstruction of Rodinia, detrital zircon U-Pb ages and Hf isotopes from Meso- to Neoproterozoic sedimentary rocks in relevant Rodinia blocks are compared. A close linkage among southeastern Tarim, Cathaysia, and North India is indicated based on comparable detrital zircon ages (at ca. 0.9, 1.3-1.1, and 1.7 Ga) and Hf isotopes. On the other hand, a North or West Australian affinity is excluded for Tarim because of their inconsistent detrital zircon U-Pb ages and Hf isotopes. In addition, detrital zircons from northern Tarim display a marked age population at ca. 830 Ma with minor distributions at ca. 1.9 and 2.5 Ga but lack Mesoproterozoic ages, which are comparable to northern and western Yangtze. Combined with coherent geological responses to the assembly and breakup of Rodinia, we advocate a new model of linking Tarim between South China and North India in the periphery of the Rodinia supercontinent (Figure 1).

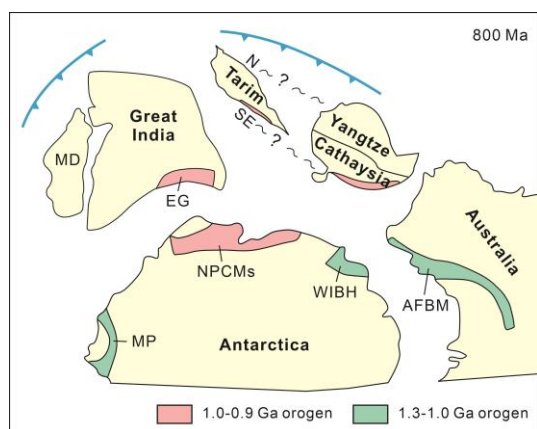


Figure 1. Location of Tarim with respect to the Rodinia supercontinent at ca. 800 Ma (modified from Yu et al., 2008). The wavy lines with “?” indicate possible linkages between southeastern Tarim and Cathaysia and between northern Tarim with Yangtze. SE = Southeastern Tarim, N= Northern Tarim, MD= Madagascar, EG= Eastern Ghats belt, NPCMs= Northern Prince Charles Mountains, MP= Maud Province, WIBH= Windmill Island/Bunger Hills, AFBM= Albany-Fraser belt/Musgrave block.

References

- Andersen, T., Detrital zircons as tracers of sedimentary provenance: Limiting conditions from statistics and numerical simulation, *Chemical Geology*, 216(3-4), 249-270, 2005.
- Li, Z.X. Bogdanova, S.V. Collins, A.S. Davidson, A. Waele, B.D. Ernst, R.E. Fitzsimons, I.C.W. Fuck, R.A. Gladkochub, D.P. Jacobs, J. Karlstrom, K.E. Lu, S. Natapov, L.M. Pease, V. Pisarevsky, S.A. Thrane, K. and Vernikovskiy, V., Assembly, configuration, and break-up history of Rodinia: A synthesis, *Precambrian Research*, 160(1-2), 179-210, 2008.
- Wen, B. Evans, D.A.D. and Li, Y.X., Neoproterozoic paleogeography of the Tarim Block: An extended or alternative “missing-link” model for Rodinia?, *Earth and Planetary Science Letter*, 458(15), 92-106, 2017.
- Yu, J.H. O’Reilly, S.Y. Wang, L.J. Griffin, W.L. Zhang, M. Wang, R.C. Jiang, S.Y. and Shu, L.S., Where was South China in the Rodinia supercontinent?: Evidence from U-Pb geochronology and Hf isotopes of detrital zircons, *Precambrian Research*, 164(1-2), 1-15, 2008.