Neoproterozoic (post-900Ma) cratonization of the Tarim Craton and its role in assembly of the Rodinia supercontinent

Pan Zhao\textsuperscript{1,2} and Jinyou He\textsuperscript{3}

\textsuperscript{1}Institute of Geology and Geophysics, Chinese Academy of Science, China (panzhao@mail.iggcas.ac.cn)
\textsuperscript{2}Innovation Academy for Earth Science, Chinese Academy of Sciences, Beijing 100029, China
\textsuperscript{3}School of Energy Resources, China University of Geosciences, Beijing 100083, China

In the paleogeographic reconstruction of the Rodinia supercontinent, the Tarim Craton is placed either on the periphery of the supercontinent to the northwestern Australia or in the heart of the supercontinent between Australia and Laurentia. The mystery of the Tarim Craton is caused by the lack of paleomagnetic data, especially during the Rodinia assembly. We present here new primary paleomagnetic data from ca. 900 Ma volcanic strata in the Aksu region of the northeastern Tarim Craton. Rock magnetic investigations reveal magnetite and hematite as the main magnetic carriers. Characteristic remanent magnetizations isolated from 15 sites show both normal and reverse polarities. A site-mean direction is calculated at $D_g/I_g = 155.2^\circ/47.5^\circ$ ($k_g = 11.6$, $\alpha_{95g} = 11.7^\circ$) in geographic coordinate and $D_s/I_s = 205.2^\circ/64.0^\circ$ ($k_s = 24.4$, $\alpha_{95s} = 7.9^\circ$) after tilt-correction. The site-mean direction passes fold tests and a ~900 Ma paleomagnetic pole is calculated at $\lambda/\phi = -0.5^\circ N/62.3^\circ E$ ($A_{95} = 11.8^\circ$) corresponding to a paleolatitude of 45.7° N. The data reveal a ~20° latitude difference between the northern Tarim (N-Tarim) and southern Tarim (S-Tarim) terranes. Together with the late Meso- to early Neo-proterozoic arc magmatism identified both in the central Tarim Basin and along the north margin of the Tarim Craton, a post-900 Ma cratonization of the Tarim Craton resulting from a dual subduction system is proposed. Finally, a new paleogeographic reconstruction of the Rodinia supercontinent is made with the Tarim Craton being placed to the northwestern Australia and cratonization of the Tarim Craton may occur during the Rodinia assembly.