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A REMAINING OPEN PALEO GEOGRAPHY OF PALEO-ASIAN OCEAN BY EARLY PERMIAN: PALEOMAGNETIC CONSTRAINTS FROM THE PERMIAN VOLCANIC ROCKS IN MIDDLE-EAST INNER MONGOLIA, NE CHINA

Donghai Zhang, Baochun Huang

Key Laboratory of Orogenic Belt and Crust Evolution, Ministry of Education, School of Earth and Space
Sciences, Peking University, Beijing 100871, China

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We report a paleomagnetic investigation on Permian volcanic rocks in the middle-east Inner Mongolia, NE China, aiming to puzzle out the timing and position of the final closure of the eastern Paleo-Asian ocean (PAO) and further to better understand tectonic evolution of the Central Asian Orogenic Belt (CAOB). Two pre-folding characteristic components are isolated from the Sanmianjing and Elitu formations (~283–266 Ma) in the northern margin of the North China block (NMNCB) and the Dashizhai Formation (~280 Ma) in the Songliao-Xilinhot block (SXB), respectively. Characteristic remanences from 24 sites at the Sanmianjing and Elitu formations are predominated by a unique reversed po-

larity with one site from the Elitu Fm yielding normal polarity. Similarly, available 14 site-mean directions from the Dashizhai volcanic rocks are also predominated by reversed polarity with 3 out of 7 site from section E yielding normal polarity. Together with the appearance of geomagnetic reversal and the occurrence of sedimentary interbeds within the sampled volcanic units, the positive fold and reversal tests suggest these remanences have a primary origin. Two Early-Middle Permian corresponding paleomagnetic poles (66.2° N, 328.1° E, $A_{95}=4.1^\circ$ for the NMNCB and 41.6° N, 246.1° E, $A_{95}=7.5^\circ$ the SXB) indicate paleolatitudes of $23.6^\circ\pm 4.2^\circ$ N for the NMNCB and of $4.9^\circ\pm 7.5^\circ$ N for

the SXB at a reference site of 43° N, 114° E. As the inclination flattening-corrected Mesozoic APWP for the NCB indicates a rapid northward drift from Early Permian ($9.2^{\circ}\pm 10.8^{\circ}$ N) across Middle Permian ($23.6^{\circ}\pm 4.2^{\circ}$ N) to Early Triassic (~ 250 Ma, $31.8^{\circ}\pm 7.1^{\circ}$ N), the NNW-SSE orientation of the present northern boundary of the NCB during Early Permian negates the traditional verdict of the closure of an ancient ocean by simply paleolatitudinal comparison. Taking the brachiopod coevolution initiation during the middle Permian and post-

orogenic granite occurrence during the Early Triassic into account, we argue the existence of a small remnant oceanic basin (the Solonker ocean) between the NCB and SXB during middle Permian; whilst the much higher paleolatitudes ($\sim 35\text{--}60^{\circ}$ N) suggested by Late Carboniferous – Early Permian paleomagnetic data from Mongolia indicate the width of the Hegenshan Ocean is >2800 km during the Early Permian and >1200 km during the Middle Permian.