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Paleomagnetic Evidence for Tectonic Setting of Paleoproterozoic Dyke Swarms in the North China Craton, China

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In order to investigate the tectonic setting of 1.77-1.78 Ga dyke swarms emplaced into the central North China Craton (NCC), we carried out a paleomagnetic and magnetic fabric study on the well geochronologically dated basic dyke swarms outcropped in the Fengzhen, Lvliang, and Fuping areas of northern NCC. Rock magnetic experiments indicate that all dykes are magnetically predominated by magnetite with the coarsest magnetite grains in Fengzhen and the finest ones in Lvliang. Available characteristic remanent magnetization (ChRM) is directionally consistent with previous studies, and a group mean direction of the ChRM is computed of $D=37.1^\circ$, $I=-3.7^\circ$ ($\alpha_{95}=2.6^\circ$), corresponding to a paleomagnetic pole at 36.0°N , 245.2°E ($A_{95}=2.0^\circ$). The preliminary 1.8-1.3 Ga apparent polar wander path for the NCC indicates that this craton should be a member of the Columbia supercontinent during 1.8-1.3 Ga and it was very likely sited adjacent to the Siberia and India cratons. The anisotropy of magnetic susceptibility (AMS) ellipsoids in the Fengzhen and Fuping areas are occupied

with oblate ones whilst the prolate ones dominate the dykes in the Lvliang area. According to the imbrication angle between the maximum principal AMS axis (Kmax) of dyke margin samples and dyke trend, the magma was postulated to flow from south to north in Fuping and from east to west in Lvliang. Meanwhile, the Kmax axes of the AMS are usually vertical to nearly vertical in the Fuping area whereas low angle or nearly horizontal in Lvliang and Fengzhen respectively. Noting that the Kmax can generally represent the flow lineation, we postulate that the dykes in the Fuping area are the closest to the magma chamber, and the emplacement of the 1.77-1.78 Ga dyke swarms was related to a post-orogenic extensional setting after the 1.85 Ga collision between the western and eastern blocks of the NCC. Collapse of the orogenic belt resulted in the magma flowing upward in the central orogeny (Fuping), and large amounts of magma flowing in a low angle in the surrounding areas (Lvliang and Fengzhen areas).

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