

## **Petrological and geochemical constrains on the newly discovery Neoproterozoic Diamictite and Cap Dolomite (DCC) in the Middle Helan Mountain, North China**

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Post-Gaskiers glacial deposits were preserved in the Helan Mountain, North China Block. Based on field work, micro-structure identifies, whole rock geochemistry, accompany with our published carbon isotope analyses, Deposit environment and seawater condition of the first diamictite and cap carbonates (DCC) in North China Block are present in this study. The cap carbonates consists of layered-laminated carbonates in the lower part and thick layered carbonates in the upper part with 140 cm thickness, directly overlie on the underlay diamictite succession. Diamictite succession and basal cap carbonates (layer 4-6, 4.66-11.92 m) contain high REE value, slight LREE-depletion, slight negative La anomalies, slight negative Ce anomalies, slight positive Eu anomalies and lower Y/Ho ratio (approach to ratio of PAAS) which indicated deposited paleo-environment as lacustrine and estuarine water condition. In the other hand, the second layer cap carbonates succession (layer 7, 12.12 m to 12.28 m) samples comprise relatively lower REE content, uniform LREE depletion, flat HREE, obvious Ce negative anomalies, slightly Eu positive anomalies and higher Y/Ho ratio, demonstrated formed in an oxygenated brackish water environment. These finding indicate that Zhengmuguan Formation cap carbonates did not precipitate from contemporaneous seawater, however, the basal cap carbonates were deposited in oxidation, relatively pure deglacial meltwater then gradually to the oxidation brackish water and precipitate the upper cap carbonates. This is consistent with the Doushantuo Formation cap carbonates modal and the proposed sequence of events after the meltdown of Marinoan glacial, indicated that deposit environment of post-Gaskiers deposit in North China Block could be similar to that of the Marinoan deposit.