

Geochemistry of the basal Ediacaran Tereeken cap-dolostone of the Quruqtagh Group in eastern Tianshan, northwestern China

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Geochemical and sedimentological characteristics of basal Ediacaran cap-carbonates document one of the most dramatic climatic events in Earth's history. Previous studies have shown that pene-contemporaneous seawater chemistry can be inferred from the cap-dolostones using an incremental dissolution method, and such data supported the formation of a warm freshwater pool on cold salty seawater during the meltdown of the terminal Cryogenian Marinoan glaciation.

Forty six samples of the basal Ediacaran cap-dolostone from three sections (a: ~10 m, b: ~10 m and c: ~2 m) of the basal Zhamoketi Formation in the Quruqtagh Group, eastern Tianshan of northwestern China, were carefully studied for the least-altered $\delta^{26}\text{Mg}$ value and $^{87}\text{Sr}/^{86}\text{Sr}$ ratio, as well as the element ratios including Sr/Ca, Mg/Ca and Mn/Sr, using MC-ICP-MS (Neptune) and ICP-OES, respectively, and the established step-leaching technique, in the State Key Laboratory of Geological Process and Mineral Resources, China University of Geosciences. These sections represent deposition during Marinoan deglaciation on the Tarim craton at a relatively high paleo-latitude (~50°N) between South Australia and South China cratons.

Our results show that the least-altered geochemical data from most part of sections *a* and *b* generally agree with each other within analytical uncertainty, while section *c* and top part of sections *a* and *b* apparently have experienced post-deposition alteration. More importantly, both the least-altered $\delta^{26}\text{Mg}$ values (-2.2 to -1.7‰) and $^{87}\text{Sr}/^{86}\text{Sr}$ ratios (0.7065 to 0.712) in the two sections show a similar variation trend as those observed in Nuccaleena Formation of South Australia, but with slightly greater range in $^{87}\text{Sr}/^{86}\text{Sr}$ and more oscillations in the profile. These results can be explained by their deposition in stratified glacial meltwater plume, and suggest this plume might have extended to high-latitude ocean.