



Lower Cambrian cherts in the northern Tarim Basin, China: implication for the sedimentary environments and tectonic history

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Phosphorus-bearing shale and cherts are widely distributed in the lower Cambrian and record significant information about the basin evolution and the tectonic history. We investigated the Lower Cambrian cherts in the northern Tarim Basin to decode their origin and the tectonic evolution. Field observation shows that chert are layered, layeroid and lens-shaped. Bedded chert are underlain, overlain and interbedded with layered dolomite demonstrating that the cherts were deposited in the shallow marine depositional environment, near the storm wave base. Major and rare earth elements geochemistry of lower Cambrian cherts were performed from 2 profiles in the northern Tarim Basin. They are characterized by very high SiO_2 (average $> 90\%$) low TiO_2 ($\leq 0.01\%$) and low $\text{Al}/(\text{Al}+\text{Fe}+\text{Mn})$ ratio (avg. 0.26 and 0.16). Samples plotted in the Al-Fe-Mn diagram show that most of the cherts were influenced by hydrothermal fluids. All the cherts have low ΣREE (avg. 22.56 and 19.04), intermediate negative Ce anomaly (avg. 0.59 and 0.58) and slight to intermediated negative Eu anomaly (0.85 and 0.73), low shale-normalized La/Ybn values (avg. 0.51 and 0.51) and intermediate La/Ybn values (avg. 1.92 and 1.91). These indicate that the cherts were deposited in the open marine modified by the hydrothermal influence. Shallow-water deposition from the field observation contradicted from the deep-water deposition from the geochemistry signature. Combined with previous studies, We suggest that the cherts in the lower Cambrian of the northern Tarim Basin were deposited in a shallow-water shelf influenced by the hydrothermal fluids from the upwelling, carrying the deep water information. The hydrothermal fluids probably came from the South Tianshan Ocean, indicating its opening from the Neoproterozoic rift to the early Cambrian mature ocean.