

Oligocene Marine incursion driving climatic wetting in the Qaidam Basin, NE Tibetan Plateau

CONG LIN¹, CHAODONG WU¹, XUTONG GUAN¹ AND GRAHAM A. SHIELDS²

¹Peking University

²University College London

Driving mechanism behind lacustrine expansion and climatic wetting in the Qaidam Basin and western China during the Oligocene remain elusive in light of the progressive Cenozoic aridification of Central Asia. To unravel this conundrum, our study integrates aragonite U-Pb ages, strontium isotopes, and mineralogical data from lacustrine rocks of the SW Qaidam Basin. Aragonite was separated from the lacustrine rocks for in-situ carbonate U-Pb dating and strontium isotope analysis. The aragonite U-Pb ages in this study constrain the timing of two marine incursions that were revealed previously from marine biomarker data at ca. 35.5 Ma and ca. 30 Ma^[1], respectively. The dolomite content increased during and after the marine incursion, attributable to the influx of magnesium-rich seawater. Increasing (Smectite + Illite and Smectite mixed layers) / Illite and ⁸⁷Sr/⁸⁶Sr ratios indicate a relatively humid climate and high weathering intensity during the marine incursions. Considering these new ages, we suggest that the incursion of the Proto-Paratethys Sea during the Oligocene enhanced water vapor transport and led to a more humid climate in the Qaidam Basin and its adjacent area. This study illustrates the importance of the Proto-Paratethys Sea in driving climate changes in Central Asia during the Cenozoic Era.

[1] Ma J, Wu C.D, Uveges B.T, Ding W.M, Summons R.E & Cui X.Q (2022), Organic Geochemistry 166, 104380.

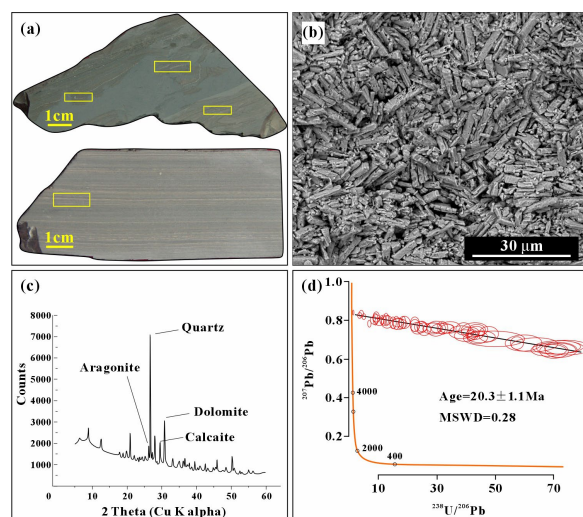


Figure 1. (a) Hand specimen of lacustrine rocks in the SW Qaidam Basin, the yellow frame show the aragonite with light colour; (b) Needle-like and rod-like aragonite under the SEM; (c) Typical peak of the minerals in the lacustrine rocks, the aragonite was identified with a peak at 26.192° (2 theta); (d) Tera-Wassburg for the aragonite U-Pb dating data, The orange lines are Concordia curves, ellipses are 95% confidence level.