

# Limited window of deep life in the Junggar Basin: Evidence from microfossils and geochemistry

WENXUAN HU, WENJIE ZHANG AND WENDONG LIU

Nanjing University

Presenting Author: 2251616753@qq.com

The deep biosphere is considered to occupy one-tenth of Earth's biomass and dominated the evolution of early life. However, little is known about its historical distribution and prosperity, particularly in petroliferous basins. This study reports deep biosphere microfossils in conglomerate strata in the Junggar Basin, Northwest China, and provides evidence of methanogenesis-dominated metabolism via highly positive carbon isotope anomalies (up to +20‰) recorded in calcites. The Sr isotope and fluid inclusions of these calcites revealed that the deep biosphere thrived circa 230 Mya in a vertical horizon ranging from ~1,000 m to ~2,200 m. This limited life window was controlled by regional hydrocarbon-generating events and basin subsidence. Our findings show a pattern for the prosperity of the deep biosphere in petroliferous basins and emphasise the neglected transformation of subsurface carbon and emission of methane in the basin caused by long-term activities of deep life.

