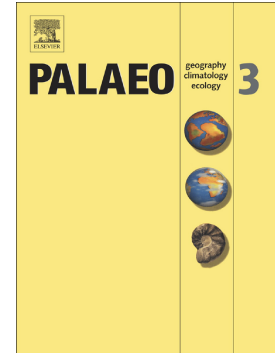


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**A basin-wide record of the Late Cambrian Steptoean Positive Carbon Isotope
Excursion (SPICE) in the Amadeus Basin, Australia**

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Abstract

The Cambrian Paibian sedimentary succession of the central Australian Amadeus Basin contains a sequence of supratidal to subtidal shallow marine siliciclastic and oolitic, stromatolitic limestones and dolostones. Basin-wide sequence stratigraphy in combination with biostratigraphy revealed the *G. stolidotus* Zone within a 3rd-order transgressive systems tract (TST). The westward transgression caused changes from a fluvial-dominated depositional environment towards a shallow-marine oolitic carbonate shoal environment. The eastern succession is dominated by stromatolitic, oolitic carbonate rocks with 2- to 5-m 5th-order shoaling upward cycles with several 4th-order cycles. The change from TST to HST (highstand systems tract) is marked by a maximum flooding surface within the Goyder Formation, which coincides with the peak of the Steptoean Positive Carbon Isotope Excursion (SPICE). The SPICE shows a facies-independent, synchronous positive $\delta^{13}\text{C}$ excursion of 5 ‰ in a 130 m interval in 8 sections across a ~460 km transect. The SPICE peak is lowest in the nearshore successions (+0.4 ‰ $\delta^{13}\text{C}$), and highest in the platform succession (+4.9 ‰ $\delta^{13}\text{C}$) and is interpreted to be related to the chemical gradient of seawater and mixing of the DIC with atmospheric CO₂-derived (i.e. terrestrial) bicarbonate. The recovery from SPICE is recorded by 4th-order shoaling upward cycles that compose the 3rd-order HST. This is the first time that sequence stratigraphy and biostratigraphy has been

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