

FACIES AND OXYGEN ISOTOPE STRATIGRAPHY OF THE STANTON CYCLOTHEM ACROSS THE MIDCONTINENT SHELF, USA

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Abstract

Delineating the extent of hydrocarbon resources requires detailed knowledge of the stratigraphic architecture of the basin and the effects of glacioeustatic fluctuations on the regional and lateral variability of the Midcontinent shelf deposits. In order to fulfill this requirement, I propose to develop high-resolution (10^4 yr-scale) sequence stratigraphic and oxygen isotope records from outcrops of the Stanton cyclothem in three locations across the Midcontinent shelf. The localities selected in Iowa and Kansas represent deposition in locations distal to proximal relative to the Panthlaskan Ocean. Combined evaluation of these records will reveal which portions of Pennsylvanian glacial-interglacial cycles are documented at specific parts of the platform, as well as the timing and nature of transgression and regression across the shelf. The ocean-proximal records are expected to be more complete, whereas less time will be in the mid-shelf and distal records. Additionally, oxygen isotope stratigraphies from both conodonts and brachiopods will be constructed, and the magnitudes of isotope shifts will be used to estimate meters of glacioeustatic change. Thin (5 to 20 cm) stratigraphic samples will enable investigation of rapid changes in the regional climate and depositional environment, which have the potential to be a finer-scaled chronometer. Truncated ocean-distal and possibly mid-shelf sequences are hypothesized to record periodic freshwater influx due to orbitally forced regional climate change. The results of this work will improve our knowledge of the stratal architecture of the Midcontinent Basin and icehouses in general.

AAPG Search and Discovery Article #90249 © 2016 AAPG Foundation 2015 Grants-in-Aid Projects