

BIOTHEMS: SEQUENCE STRATIGRAPHIC UNITS AND THEIR IMPLICATIONS FOR REGIONAL TECTONO-STRATIGRAPHIC INTERPRETATIONS

LANE, H. R., Amoco Production Co., Houston, TX; FRYE, M. W., Mitre Corporation, San Antonio, TX; and COUPLES, G. D., University of Glasgow, Glasgow, Scotland

Biothems are regional wedge- or lens-shaped bodies of strata that are: bounded shelfward or cratonward by paleontologically recognizable unconformities; generally thicken on marine shelves, where they are typically conformable with underlying and overlying biothems; are commonly thinner or represent "starved" sequences further basinward; and in their most basinward extent, are either bounded by biostratigraphically recognizable unconformities or are conformable with underlying and overlying biothems. Biothems are practical units whose definition and degree of refinement are dependent on the quality and availability of biostratigraphic control. As recognized to date, biothems have a logical distribution of faunal and floral components, as well as facies groupings that represent internally consistent and logical sequences of depositional environments. The use of biothems as primary sequence stratigraphic units places the emphasis on relative time in a stratigraphic framework.

A west-to-east transect within the North American Mississippian System, which extends from the Basin and Range Province, across the Transcontinental Arch (TA) and into the Anadarko Basin, was constructed to demonstrate the regional distribution and tectono-stratigraphic significance of biothems relative to the axis of the TA. The relationships portrayed on the transect, tied to an understanding of North American Mississippian paleogeography, imply that biothems deposited during relative highstand events on one flank of the TA are time-equivalent to biothems deposited during relative lowstand events on the opposite flank of the TA. This distribution is interpreted to have been controlled by intraplate tectonic events that formed "piano-key" basins along the flanks of the TA. The spatial patterns of these basins are not consistent with published models of basin evolution. A further conclusion is that the lack of transgressive or regressive coincident Mississippian biothems on either flank of the TA suggests that it is inadvisable to impose the Mississippi Valley-derived eustasy curve on western flank depositional sequences.