Geophysical Research Abstracts
Vol. 20, EGU2018-19318, 2018
EGU General Assembly 2018

Accommodation Succession Method applied to carbonate systems: reef complex development during lowstand progradation

Vitor Abreu (1) and Dallas Dunlap (2)

(1) Abreu Consulting and Training, (2) Bureau of Economic Geology

Reef complex development during transgression is a well-accepted concept in carbonate sequence stratigraphy. In fact, some authors believe that the best time for reef development is during the transgressive systems tract (TST). In this paper, we will present seismic and well data from the Tertiary of the Browse Basin, Australia, where a well-developed mixed system is clearly imaged in seismic reflection profiles. Extensive 2-D and 3-D seismic surveys had allowed us to define a robust sequence stratigraphic framework, based on the accommodation succession method. A composite sequence was interpreted encompassing most of the Miocene, bounded at the base by a composite sequence boundary, Aquitanian in age. Using a hierarchical framework based solely in the physical relationship of strata, it was possible to break this composite sequence into 3 sequence sets: lowstand, transgressive and highstand. Lowstand regression is well-marked by a progradational to aggradational wedge developed during Early to Middle Miocene, followed by strong transgression in the Middle Miocene (Langhian). Reef development starts during the aggradational phase of the lowstand sequence set, also being developed during the transgressive and early highstand sequence sets. Initial conditions for reef development therefore requires a high rate of accommodation creation (a fast relative-rise in sea level). In the Browse Basin, this condition was achieved during regression, persisting during transgression when the rate of accommodation creation finally overwhelmed sedimentation rate. Final reef development occurred during the late Miocene, with development of a reef complex atop the composite maximum flooding surface, eventually buried by early highstand progradation. Reef complexes developed during late lowstand are similar in size and geometry to the ones developed during transgression and highstand.