A New Model for Epeiric Carbonate Platforms

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Epeiric carbonate platforms host some of the most prolific hydrocarbon accumulations in the world. Models for epeiric platforms were so far limited because the recent does not provide any analogues for such large, epicontinental platforms and they had to be based on interpretations of snapshots provided by ancient deposits. The availability of 3D high resolution seismic data covering large areas has enabled to investigate the internal stratal geometries of the Cretaceous of Oman, which has led to a new model for epeiric carbonate platforms.

Epeiric platforms developed during periods of high global sea level when shallow shelf seas covered large parts of the continents. This allows significant progradation of the carbonate platform margins over hundred's of kilometres, unlike the recent large platforms that are limited in their progradation by the bordering deep ocean floor. During relative rise in sea level open marine conditions prevailed on these platforms and differential carbonate growth led to a topography of shallow carbonate shoals and intra platform ‘basins' with water depths reaching several tens to 100m. These basins were progressively filled by prograding carbonate shoal complexes with depositional slopes of a few to several tens of degrees. Contrary to common belief, the carbonate ramp model, with low depositional gradients, broad facies belts and gradual facies transitions, is not appropriate to interpret epeiric depositional settings.

The differentiation between shallow and deep-water areas within these epeiric platforms has important implications for the preservation of depositional sequences. Unlike flat-topped platforms, which are exposed during relative low sea level, large areas can still be flooded during relative sea-level lowstands, and lowstand system tracts can be preserved on the platform. This has an important impact on correlation strategies, the modelling of hydrocarbon flow units and stratigraphic trapping potential.