Controls on Seismic-Scale Reservoir Architecture of Mixed Carbonate-Siliciclastic Platform Margins: Example from the Triassic Yangtze Platform, South China

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Comparative analysis of platform evolution recorded in three continuous, two-dimensional, platform-to-basin transects of the Triassic Yangtze carbonate shelf, south China, indicates that laterally-variable tectonic subsidence, local faulting, and rate of basinal clastic deposition at the toe of slope controlled the evolution, large-scale architecture, and geometry of the platform margin and slope. Lateral and temporal changes in these three parameters, and their various combinations during the Middle and early Late Triassic, were responsible for the remarkable along-strike variability in the observed platform architecture. Aggradation and progradation patterns were controlled by local tectonic subsidence. Margin backsteps and retreats resulted from local faulting. Different slope geometries and margin types were controlled by degree and timing of basinal siliciclastic influx. Eustasy, in contrast, had very little influence on platform morphology and large-scale architecture.

Evolution, architecture, and time of drowning of several isolated platforms to the south, in the adjacent Nanpanjiang foreland basin, reflect the south-to-north onset of rapid subsidence and basin fill.

The evolution and large-scale architecture of carbonate platforms in south China represents an important analog for understanding, quantifying, and predicting lateral variability in seismic-scale characteristics of carbonate reservoir systems. The evaluation of controls on carbonate-platform evolution suggests that, given subsidence history and basinal siliciclastic dispersal pattern, the basin-wide, seismic-scale evolution of carbonate accumulations is predictable. Resulting models can be used to help exploration of carbonate reservoirs in frontier or under-explored basins.