
Thinking outside the Pond: Benchmarking Performance Expectations for Deep-Water Reservoirs Using Analog Data from the Gulf of Mexico

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ABSTRACT

Industry has a considerable knowledge base from the central Gulf of Mexico slope, yet to what extent can this database provide valid analogues for other slope systems? The Gulf of Mexico is viewed as an end-member above-grade ponded slope system. This end-member status in our conceptual models leads to both a de-emphasis of the value of applying knowledge derived from the Gulf of Mexico elsewhere and the value of applying knowledge from other slope systems to the Gulf of Mexico. But, the Gulf of Mexico slope contains examples of both a) ponded reservoirs (where receiving basin topography trapped entire flow volumes transported by variable flow sizes) and b) cases where flows of variable size and volume were far less affected by confining topography and hence have potential as partial analogues for comparable (dimensions, grain size) systems in less topographically confined settings.

The slope geometry and stratigraphic architecture for the upper fill of a typical Gulf of Mexico intraslope basin are similar to those observed across stepped-slope profiles documented from many continental margins including the Niger Delta, NW Borneo, SE Brazil, Lower Congo and Tanzania. Because a primary control on reservoir distribution and architecture across varied slope profiles is the interaction between local gradient change and flow/grain size, analogous stratigraphic architectures may be developed at different absolute slope positions. Therefore there is potential to use the quantitative data from the Gulf of Mexico, after careful selection of appropriate analogues, to help constrain a) net/gross distributions for use in STOIP (stock tank oil initially in place) estimates from calibrated seismic facies and b) expectations of reservoir performance and reserves estimates in other basins.