TG04
The Structural Evolution of the Dolphin Field, and its Relevance to the Evolution of the Columbus Basin

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Abstract

The structural evolution of the Dolphin Field, offshore ECMA Trinidad, was investigated by using the structural restoration software GEOSEC 2D on several interpreted and depth converted lines from the Dolphin 3D seismic survey. The restorations were intended to help understand the relationship between faulting and shale diapirism, and the potential control on sedimentary architecture.

The results of the Dolphin restorations clearly show that the diapir is an early structure, well developed by the late Pliocene with a series of strongly rotated seismic markers on its up-dip flank. Its shape has not been modified greatly during the Pleistocene. The Pleistocene is characterised, by initial crestal collapse faulting of the diapir followed by the dominance of a single fault along the eastern flank**.**

Restorations using the same techniques on a regional section derived from seismic line IADH 112 show similar structural and stratigraphic relationships to those seen locally in the Dolphin area. Diapirs appear to be early structures, with development restricted basinward of the shelf edge break and well developed prior to down to basin faulting. Indeed, it is suggested that much of the basinward rotation of the Pliocene section (seen here and in Dolphin) is the result of progressive shale withdrawal rather than the development of discrete counter-regional faults. Faulting is demonstrably later, generally down to basin, restricted to the shelf or shelf edge break region and unrelated to the diapiric mobile phase.

From these results a model for much of the Columbus Basin based on the sequential development of early mobile shale movement and diapir evolution on the shelf slope, followed by the development of faulting on the shelf is presented.

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