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Two Major Tectonic Events Expressed in the Tectonostratigraphic Evolution of the Caribbean, Gulf of Mexico and Sub-Andean Basins: 25 and 12 Ma

The tectonostratigraphy of 23 Caribbean, 15 Gulf of Mexico and 19 Sub-Andean basins have been synthesized, and are presented as regional geohistory summary charts.

The results of this analysis show that within the Tertiary section, two major tectonic events - ~25 and ~12Ma - are recognised; often having a fundamental influence on petroleum systems.

In the Caribbean, these two tectonic events coincide with a large number of regional geological phenomena. At ~25Ma, these include: (peak) deformation and metamorphism associated with dextral-oblique collision of the Caribbean Plate with South America; the diversion of the Oriente-Maracaibo axial-drainage system by uplift of the northern Andean and Caribbean mountain belt; and the development of the Beata Ridge as an inter-plate contractional accommodation zone between the Colombian and Venezuela microplates. At ~12Ma, these include: the start of extensional collapse of the Serrania-Central Range thrust wedge in eastern Venezuela and Trinidad; strike-slip activity along the northern Caribbean Plate boundary, creating a series of wrench-related foreland basins; this, in turn, resulted in foundering of the Nicaragua Rise and triggered the initiation of the Caribbean/Loop Currents, producing the Caribbean "carbonate crash"; and the first closure of the Central American Seaway by uplift of the Panamanian isthmus. Both events correlate with major plate reorganisation episodes: the 25Ma breakup of the Farallon Plate and the 12Ma change in motion direction of the Caribbean Plate.

The importance of the Beata Ridge System during both these tectonic events is reviewed, possibly providing an invaluable insight into oceanic plate deformational processes through time.