Detachments and Structures in the Cuban Overthrust Belt

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The cuban overthrust belt, outcropping onshore and in the southern part of offshore of the island, is formed by the different tectono-stratigraphic units (TSU). They are named,from south to north, Placetas, Carrajuani and Colorados, and are composed of pelagic and slope carbonates. Cayo Cocos and Remedios, however, were deposited in shallow water environment at the same time.

The rocks of the TSU Placetas are best known from wells and seismic sections. They have different levels of detachments and structures which contain deposits of oil and gas.

The main levels of detachments are associated with rocks of the Santa Teresa Formation (Aptian-Albian), Ronda Formation (Tithonian) and to the bottom of the Constancia Formation (Oxfordian-Kimmeridgian). The secondary detachments are associated with the rocks of the Lower Cretaceous and to the top and middle part of the Constancia Formation.

The presence of other detachment levels inside the complex of syncrogenic rocks (Campanian-Middle Eocene) is under discussion. They are associated with clay strata.

The stratigraphic section of the Placetas unit with the detachment levels is shown. TSU detachment levels in the base of seismic sections is proposed to others and deep wells add control.

Models for the Development of Listric Normal Faults and Fault Seals

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Previous models for constructing, restoring and forward modeling of listric normal faults have used either vertical or inclined, antithetic simple shear. Although these models have been successfully applied in some cases, they fail to account for important attributes of major Gulf Coast listric normal faults, such as synthetic faults, fault smear, "normal" drag folding and displacement gradients from as little as zero at the top layer to a maximum at depth. The new model contains two active deformation zones or zones of shearing in the hanging wall. One active deformation zone is antithetic to the main fault and is fixed in space at bends in the fault plane. As the rocks move through the fault bend, they are sheared according to the existing model of inclined shear. The other active deformation zone is also fixed in space at fault bends, but it is synthetic to the main fault. As the rocks pass through this zone, they are sheared both synthetically and antithetically. When the dip on the synthetic zone of shearing approaches the dip on a segment of the main fault, the method simulates the development of synthetic faults and/or fault smear. Application of this method may lead to a better prediction of fault seals, zones of porosity and fault closure.