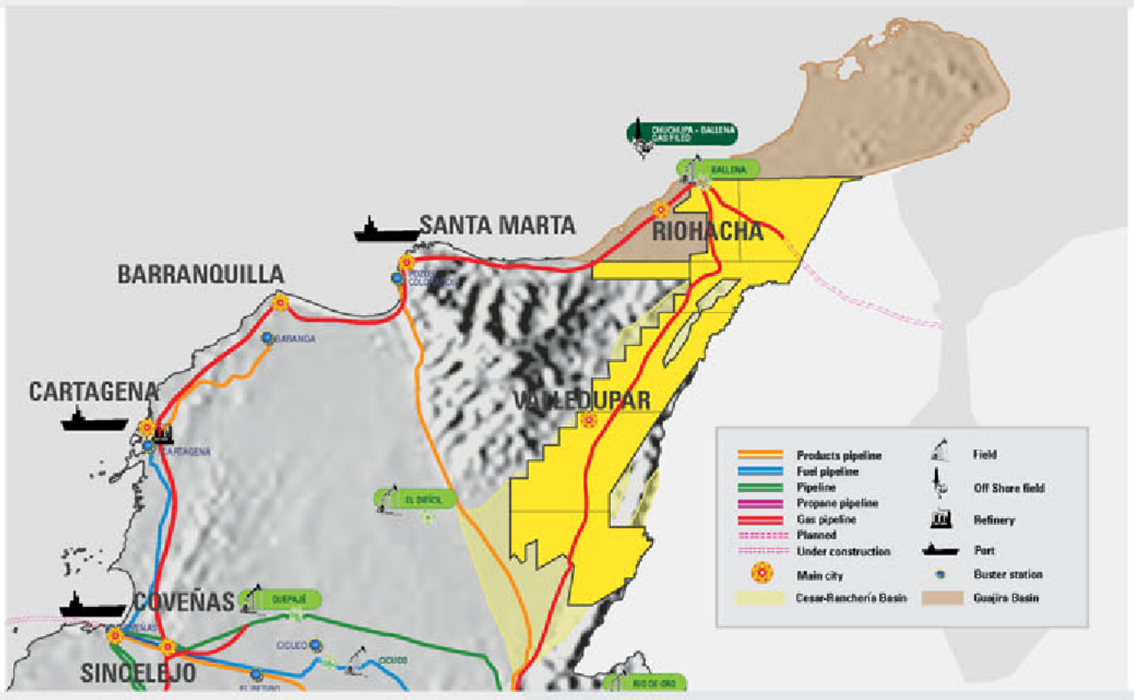
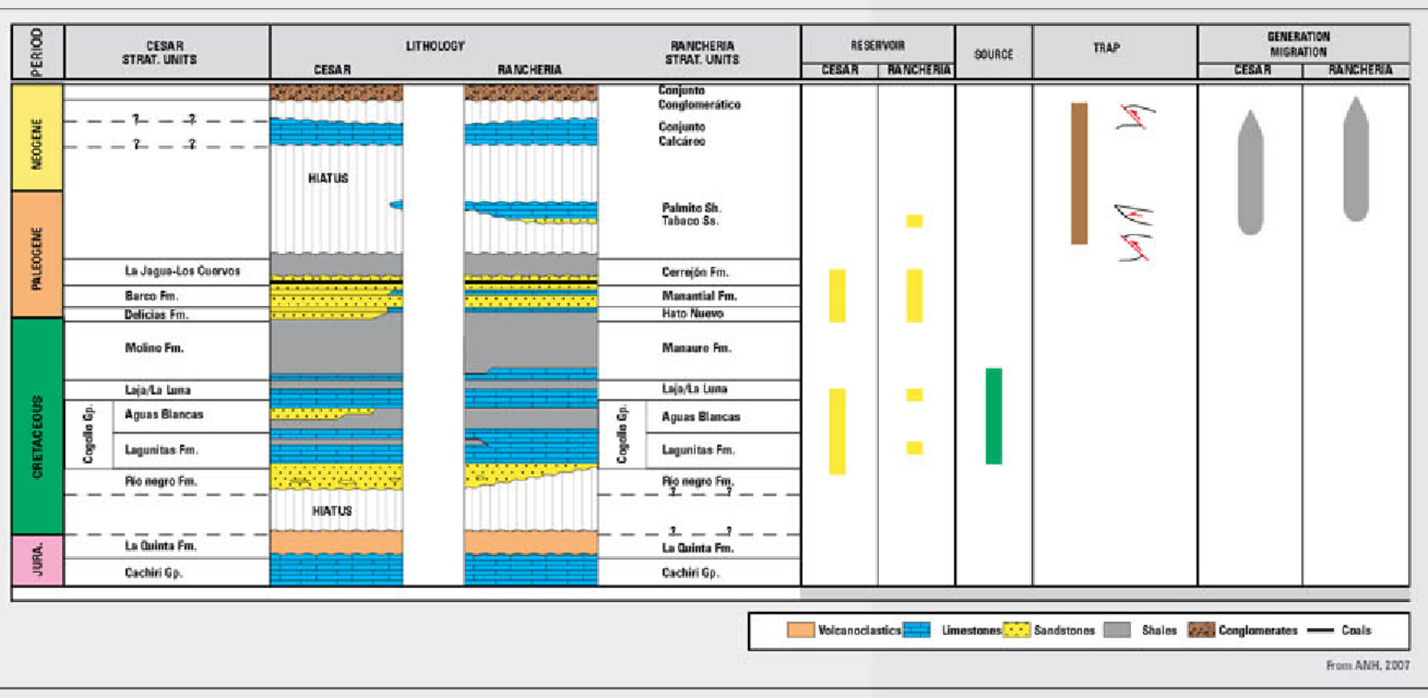
Cesar Area

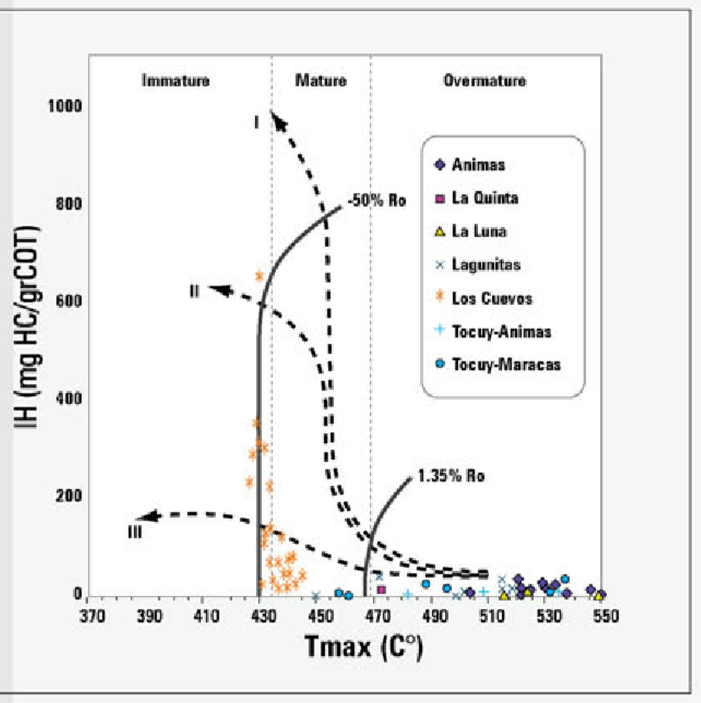
COLOMBIA round 08



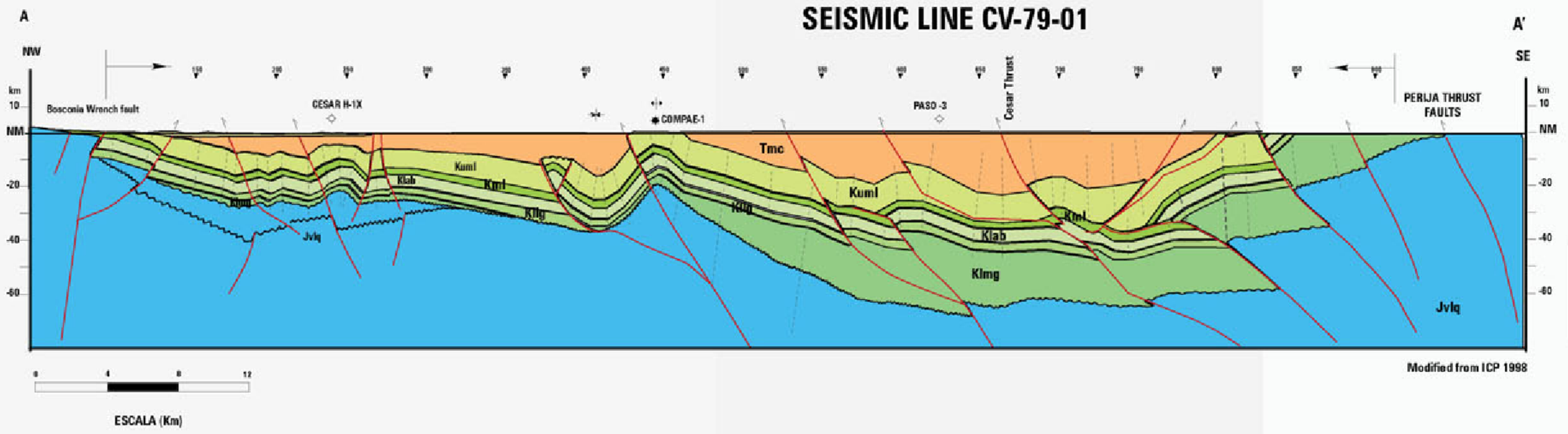
Stratigraphic chart and petroleum system



Van Krevelen diagram

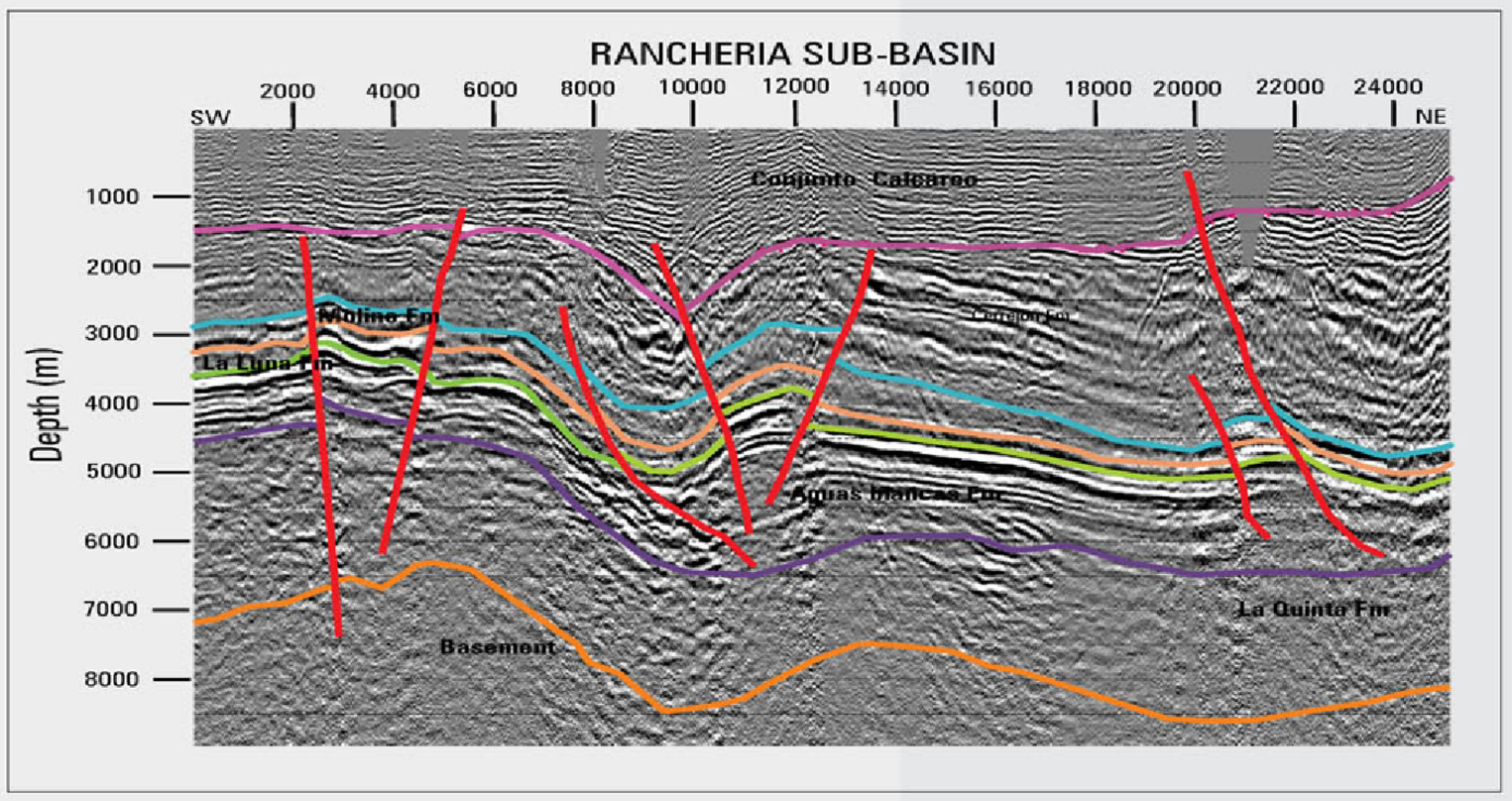


Geological cross-section (Cesar sub-basin)

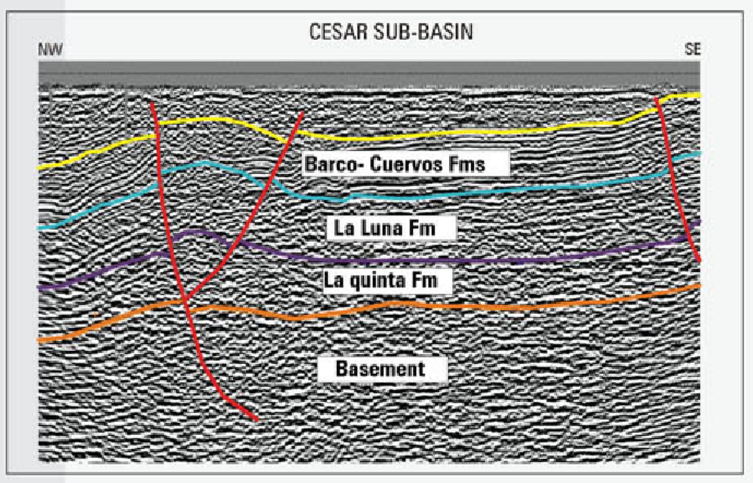


Types of plays

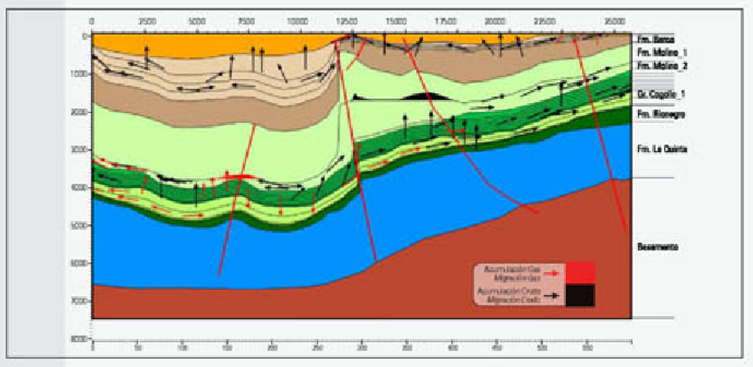
Folds and thrust faults in the Rancheria sub-basin. Line CV89-1100.



Pop-up structure in the Cesar sub-basin



2D geochemical model of migration and accumulation



PETROLEUM GEOLOGY

HYDROCARBON EVIDENCES

The Cesar-Ranchería is considered a frontier basin that has been explored since 1947 when several wildcat wells were drilled. Seismic exploration just began in 1979; a total of 14 wells have been drilled in this basin. Four wells showed important oil and gas production.

In the Cesar sub-basin, the El Paso-3 well presented oil production from the Molino Formation. The Cesar F-1X well drilled on 1980, showed gas production from the Aguas Blancas Formation. In the Ranchería sub-basin the Molino-1X well showed non-commercial gas production from the Hato Nuevo Formation. The Papayal-1 well presented oil and gas shows in the La Luna and Lagunitas formations. DST tests recovered oil crude samples with 27° to 42° API gravities.

SOURCE ROCKS

The Cretaceous Molino, La Luna and Aguas Blancas formations constitute excellent source rocks, due to the high content of type II and III kerogene. TOC values range between 1 and 4.5%; the vitrinite reflectance values fluctuate between 1 and 2%.

MIGRATION

According to the geochemical modeling, the hydrocarbon migration started during the Oligocene and has continued until present time. Pathways of migration are thrust faults that cross the Cretaceous-Cenozoic sequence.

RESERVOIR

The main reservoirs are the fractured limestones of the La Luna Formation and Cogollo Group, that have shown oil and gas production during DST tests. The Paleogene Cuervos and Cerrejón coal-bearing formations contain thick Coal Bed Methane (CBM) reservoirs.

SEAL ROCKS

The Molino, Cerrejón and Cuervos formations represent excellent regional seals located above the La Luna Formation source rock. Local seals consist mainly of shaly beds interbedding with the fractured limestone of the La Luna Formation and Cogollo Group.

HYDROCARBON TRAPS

According to the seismic interpretation, the main hydrocarbon traps are folded structures associated with thrust-faults. On the other hand, the unconformity between the La Luna and the Molino formations as well as the angular unconformity between the Molino and the Cerrejón-Cuervos formations can be considered potential oil and gas stratigraphic traps. Syncline structures in the center of the Cesar and Rancheria sub-basins are the structural traps for Coal Bed Methane (CBM).

PROSPECTIVITY

Two main prospective plays are identified: 1) Folded structures associated with thrust-faults that contain fractured limestones within the Cogollo Group and La Luna and Molino formations; 2) Synclines that include coal-bearing formations.