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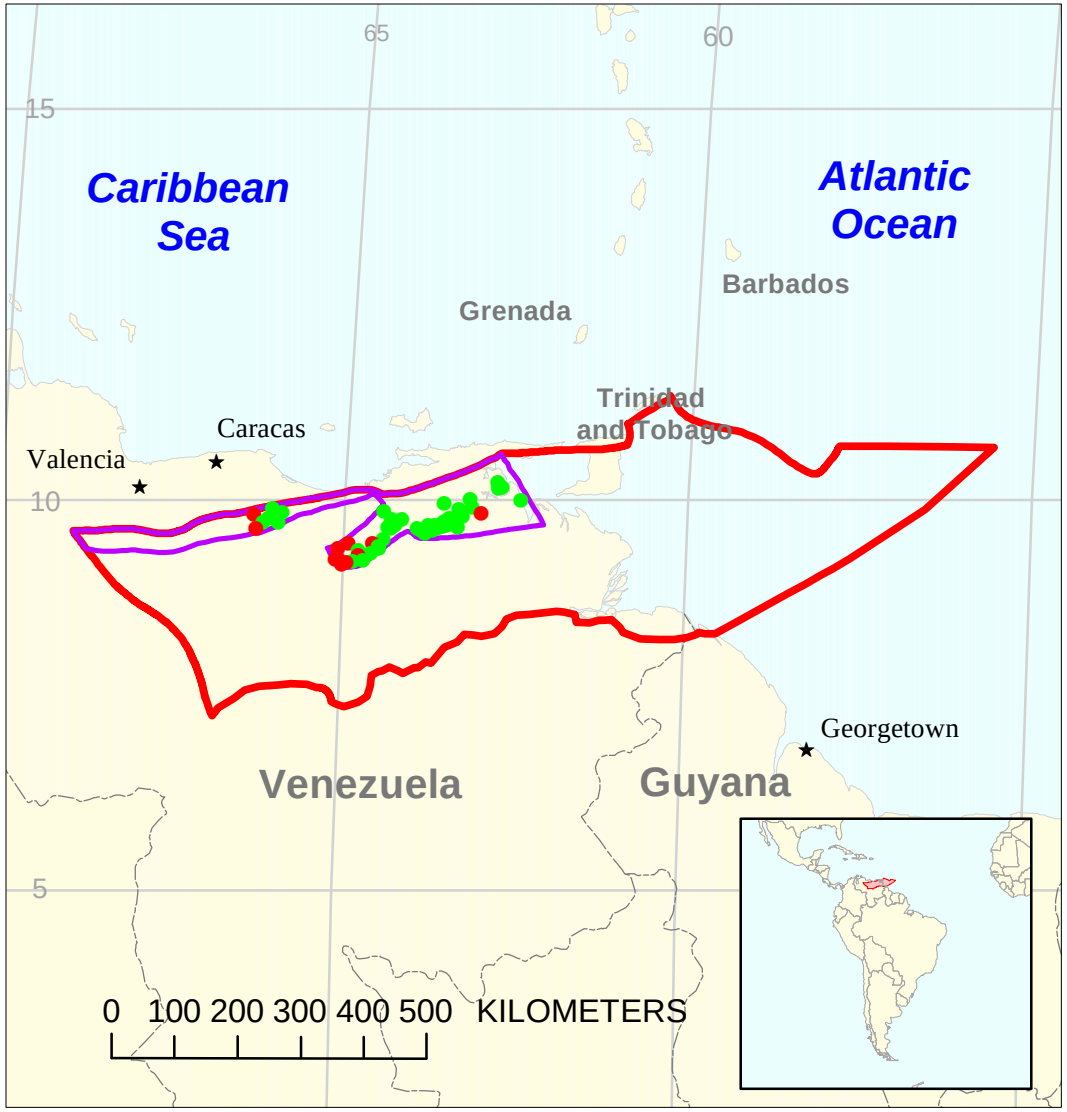
East Venezuela Fold and Thrust Belt
Assessment Unit 60980101



East Venezuela Fold and Thrust Belt Assessment Unit 60980101

East Venezuela Basin Geologic Province 6098

Geologic Summary

Detailed map of this assessment unit

Exploration/Discovery-History Data

- Plots of Known Field Sizes
- Plots of Grown Resources
- Tables

Assessment Input Data

Assessment Results

- Assessment Unit Summary
- Detailed Assessment Results
- Undiscovered Field-Size Distributions

USGS PROVINCE: East Venezuela Basin (6098) **GEOLOGIST:** C.J. Schenk

TOTAL PETROLEUM SYSTEM: Querecual (609801)

ASSESSMENT UNIT: East Venezuela Fold and Thrust Belt (60980101)

DESCRIPTION: This assessment unit encompasses the fold and thrust structures that formed in the Tertiary as a result of oblique collision between the Caribbean plate and northern South America. The Fold and Thrust belt fronts both the Guarico and Maturin sub-basins of the East Venezuela Basin.

SOURCE ROCKS: The main source rocks are mudstones of the Upper Cretaceous Querecual Formation, a stratigraphic equivalent of the La Luna Formation.

MATURATION: Maturation of Upper Cretaceous Querecual mudstones began in the Oligocene, and continued through the Miocene.

MIGRATION: Most of the hydrocarbons from the Querecual mudstones in this assessment unit migrated to the south to form the Orinoco heavy oil and tar belt. Structures formed during collision received only a small portion of the hydrocarbons generated from the Querecual Formation.

RESERVOIR ROCKS: Reservoirs range in age from Upper Cretaceous to Pliocene, but most are fluvial-deltaic sandstones in the Miocene section.

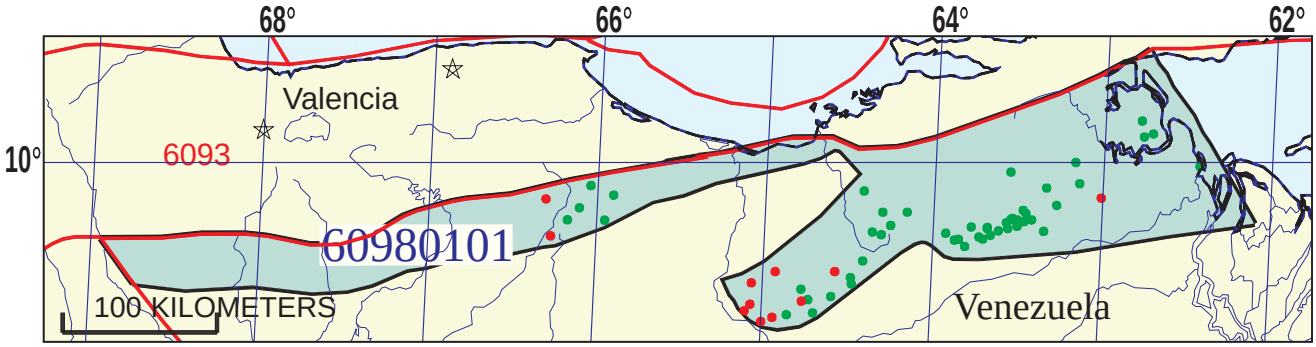
TRAPS AND SEALS: Traps are dominantly structural, and were formed during the collision of the Caribbean plate with northern South America. The collision was transgressive, in that the structures in the west are older than structures in the east.

REFERENCES:

Erlich, R.N., and Barrett, S.F., 1992, Petroleum geology of the eastern Venezuela foreland basin, *in* Macqueen, R.W., and Leckie, D.A., eds., Foreland basins and fold belts: American Association of Petroleum Geologists Memoir 55, p. 341-362.

Lugo, J., and Audemard, F., 1997, Petroleum geology of Venezuela: American Association of Petroleum Geologists Short Course, Dallas, Texas, April 5-6, 1997, unpaginated.

Parnaud, F., Gou, Y., Pascual, J-C., Truskowski, I., Gallango, O., Passalacqua, H., and Roure, F., 1995, Petroleum geology of the central part of the eastern Venezuelan basin, *in* Tankard, A.J., Suarez S., R., and Welsink, H.J., eds., Petroleum basins of South America: American Association of Petroleum Geologists Memoir 62, p. 741-756.



East Venezuela Fold and Thrust Belt Assessment Unit - 60980101

EXPLANATION

- Hydrography
- Shoreline
- 6098 Geologic province code and boundary
- Country boundary
- Gas field centerpoint
- Oil field centerpoint
- 60980101 Assessment unit code and boundary

Projection: Robinson. Central meridian: 0

SEVENTH APPROXIMATION
NEW MILLENNIUM WORLD PETROLEUM ASSESSMENT
DATA FORM FOR CONVENTIONAL ASSESSMENT UNITS

Date:……..	7/6/99		
Assessment Geologist:……..	C.J. Schenk		
Region:……..	Central and South America	Number:	6
Province:……..	East Venezuela Basin	Number:	6098
Priority or Boutique……	Priority		
Total Petroleum System:……	Querecual	Number:	609801
Assessment Unit:……..	East Venezuela Fold and Thrust Belt	Number:	60980101
* Notes from Assessor	Lower 48 growth factor.		

CHARACTERISTICS OF ASSESSMENT UNIT

Oil (<20,000 cfg/bo overall) **or** Gas (≥20,000 cfg/bo overall):… Oil

What is the minimum field size?……. 4 mmboe grown (≥1mmboe)
(the smallest field that has potential to be added to reserves in the next 30 years)

Number of discovered fields exceeding minimum size:…… Oil: 35 Gas: 6
Established (>13 fields) X Frontier (1-13 fields) Hypothetical (no fields)

Median size (grown) of discovered oil fields (mmboe):
1st 3rd 234 2nd 3rd 15.5 3rd 3rd 271
Median size (grown) of discovered gas fields (bcfg):
1st 3rd 1919 2nd 3rd 49.7 3rd 3rd

Assessment-Unit Probabilities:

Attribute	Probability of occurrence (0-1.0)
1. **CHARGE:** Adequate petroleum charge for an undiscovered field ≥ minimum size……	1.0
2. **ROCKS:** Adequate reservoirs, traps, and seals for an undiscovered field ≥ minimum size……	1.0
3. **TIMING OF GEOLOGIC EVENTS:** Favorable timing for an undiscovered field ≥ minimum size	1.0

Assessment-Unit GEOLOGIC Probability (Product of 1, 2, and 3):…… 1.0

4. **ACCESSIBILITY:** Adequate location to allow exploration for an undiscovered field ≥ minimum size…… 1.0

UNDISCOVERED FIELDS

Number of Undiscovered Fields: How many undiscovered fields exist that are ≥ minimum size?:
(uncertainty of fixed but unknown values)

Oil fields:……min. no. (>0)	7	median no.	50	max no.	120
Gas fields:……min. no. (>0)	2	median no.	35	max no.	80

Size of Undiscovered Fields: What are the anticipated sizes (**grown**) of the above fields?:
(variations in the sizes of undiscovered fields)

Oil in oil fields (mmbo)……min. size	4	median size	20	max. size	6000
Gas in gas fields (bcfg):……min. size	24	median size	110	max. size	12000

Assessment Unit (name, no.)
East Venezuela Fold and Thrust Belt, 60980101

AVERAGE RATIOS FOR UNDISCOVERED FIELDS, TO ASSESS COPRODUCTS

(uncertainty of fixed but unknown values)

Oil Fields:	minimum	median	maximum
Gas/oil ratio (cfg/bo)……	1000	2000	3000
NGL/gas ratio (bngl/mmcfg)……	30	60	90

Gas fields:	minimum	median	maximum
Liquids/gas ratio (bngl/mmcfg)……	22	44	66
Oil/gas ratio (bo/mmcfg)……			

SELECTED ANCILLARY DATA FOR UNDISCOVERED FIELDS

(variations in the properties of undiscovered fields)

Oil Fields:	minimum	median	maximum
API gravity (degrees)……	20	35	50
Sulfur content of oil (%)……			
Drilling Depth (m) ……	1000	3000	6000
Depth (m) of water (if applicable)……			

Gas Fields:	minimum	median	maximum
Inert gas content (%)……			
CO_2 content (%)……			
Hydrogen-sulfide content (%)……			
Drilling Depth (m)……	1000	3500	6000
Depth (m) of water (if applicable)……			

Assessment Unit (name, no.)
East Venezuela Fold and Thrust Belt, 60980101

ALLOCATION OF UNDISCOVERED RESOURCES IN THE ASSESSMENT UNIT TO COUNTRIES OR OTHER LAND PARCELS (uncertainty of fixed but unknown values)

1. Venezuela represents 100 areal % of the total assessment unit

Oil in Oil Fields:	minimum	median	maximum
Richness factor (unitless multiplier):……			
Volume % in parcel (areal % x richness factor):…		100	
Portion of volume % that is offshore (0-100%)……		0	

Gas in Gas Fields:	minimum	median	maximum
Richness factor (unitless multiplier):……			
Volume % in parcel (areal % x richness factor):…		100	
Portion of volume % that is offshore (0-100%)……		0	

East Venezuela Fold and Thrust Belt, AU 60980101
Undiscovered Field-Size Distribution