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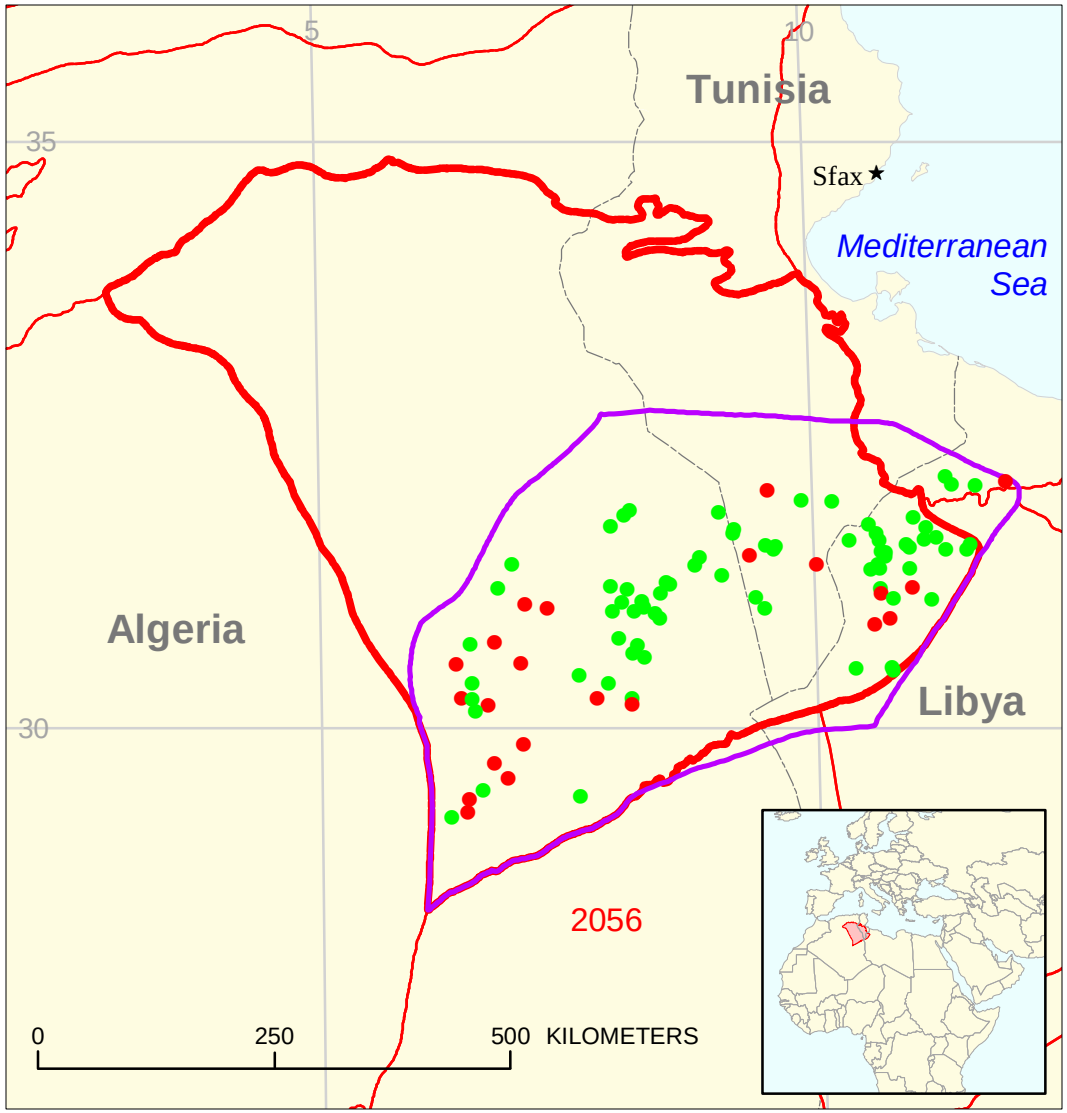
Tanezzuft-Ghadames Structural/Stratigraphic Assessment Unit 20540301



Tanezzuft-Ghadames Structural/Stratigraphic Assessment Unit 20540301
Trias/Ghadames Basin Geologic Province 2054

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: Trias/Ghadames Basin (2054) **GEOLOGIST:** T.R. Klett

TOTAL PETROLEUM SYSTEM: Tanezzuft-Ghadames (205403)

ASSESSMENT UNIT: Tanezzuft-Ghadames Structural/Stratigraphic (20540301)

DESCRIPTION: This total petroleum system and corresponding assessment unit coincide with the Ghadames (Berkine) Basin, bounded on the north by the Talemzane-Gefara Arch, on the east by the Hamra Basin, on the south by the Illizi Basin, and on the west by the Amguid-Hassi Touareg structural axis.

SOURCE ROCKS: The major source rocks are the Silurian Tanezzuft Formation and Middle to Upper Devonian mudstone. Frasnian-aged mudstone is the richest among Devonian source rocks.

MATURATION: Petroleum generation from Silurian source rocks started as early as the Carboniferous, was interrupted by the Hercynian event, and then peaked from the Late Jurassic to the middle Cretaceous. Generation from Middle to Upper Devonian source rocks started as early as the Late Triassic and peaked from the Early Cretaceous to the early Tertiary.

MIGRATION: Petroleum migrated laterally into adjacent or juxtaposed reservoirs and vertically along faults or fractures.

RESERVOIR ROCKS: Known reservoir rocks include Cambrian-Ordovician fluvial to marine sandstone, Ordovician to Silurian paralic and marine sandstone, Upper Silurian nearshore to marine sandstone, Devonian and Carboniferous deltaic to marine sandstone, and Triassic fluvial sandstone.

TRAPS AND SEALS: Most of the known accumulations are within anticlines, faulted anticlines, or fault blocks. Some combination traps are present. Triassic to Jurassic evaporites, mudstone, and carbonate rocks provide a regional top seal. Intraformational Paleozoic marine mudstone provides the primary seal for some reservoirs.

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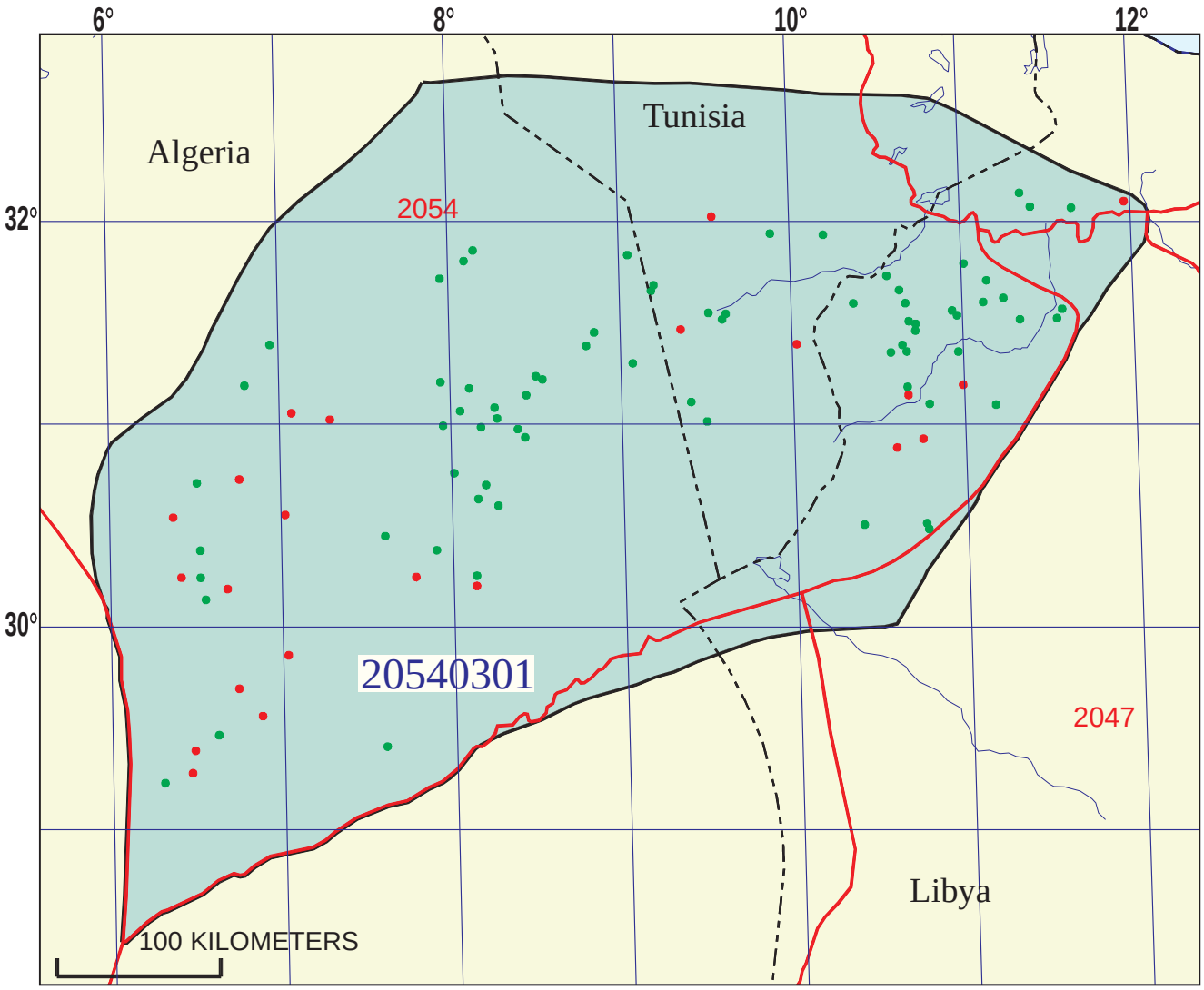
Boote, D.R.D., Clark-Lowes, D.D., and Traut, M.W., 1998, Palaeozoic petroleum systems of North Africa, *in* Macgregor, D. S., Moody, R.T.J., and Clark-Lowes, D.D., eds., Petroleum geology of North Africa: London, Geological Society, Special Publication No. 132, p. 7-68.

Boudjema, A., 1987, Evolution structurale du bassin petrolier «Triasique» du Sahara Nord Oriental (Algerie): Thèse a l'Universite de Paris-Sud, Centre d'Orsay, 290 p.

Daniels, R. P., and Emme, J. J., 1995, Petroleum system model, easteren Algeria, from source rock to accumulation: when, where, and how? Proceedings of the Seminar on Source Rocks and Hydrocarbon Habitat in Tunisia: Entreprise Tunisienne d'Activites Petrolieres Memoir 9, p. 101-124.



Tanezzuft-Ghadames Structural/Stratigraphic Assessment Unit - 20540301

EXPLANATION

- Hydrography
- Shoreline
- 2054 — Geologic province code and boundary
- Country boundary
- Gas field centerpoint
- Oil field centerpoint
- 20540301 — Assessment unit code and boundary

Projection: Robinson. Central meridian: 0

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

Date:……..	6/16/98		
Assessment Geologist:……..	T.R. Klett		
Region:……..	Middle East and North Africa	Number:	2
Province:……..	Trias/Ghadames Basin	Number:	2054
Priority or Boutique……	Priority		
Total Petroleum System:……	Tanezzuft-Ghadames	Number:	205403
Assessment Unit:……..	Tanezzuft-Ghadames Structural/Stratigraphic	Number:	20540301
* Notes from Assessor			

CHARACTERISTICS OF ASSESSMENT UNIT

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

What is the minimum field size?……. 1 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: 66 Gas: 21

Established (>13 fields)	Frontier (1-13 fields)	Hypothetical (no fields)
X		

Median size (grown) of discovered oil fields (mmboe):

1st 3rd	2nd 3rd	3rd 3rd
15.7	14.4	26.9

Median size (grown) of discovered gas fields (bcfg):

1st 3rd	2nd 3rd	3rd 3rd
701.7	287.4	143.7

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)	14	median no.	73	max no.	202
Gas fields:……min. no. (>0)	6	median no.	38	max no.	105

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	1	median size	16	max. size	2488
Gas in gas fields (bcfg):…… min. size	6	median size	70	max. size	3110

Assessment Unit (name, no.)
Tanezzuft-Ghadames Structural/Stratigraphic, 20540301

AVERAGE RATIOS FOR UNDISCOVERED FIELDS, TO ASSESS COPRODUCTS

(uncertainty of fixed but unknown values)

Oil Fields:	minimum	median	maximum
Gas/oil ratio (cfg/bo)……	686	1372	2058
NGL/gas ratio (bngl/mmcfg)……	20	40	60

Gas fields:	minimum	median	maximum
Liquids/gas ratio (bngl/mmcfg)……	56	112	168
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)……	30	42	52
Sulfur content of oil (%)……			
Drilling Depth (m) ……	1200	2800	4500
Depth (m) of water (if applicable)……			

Gas Fields:	minimum	median	maximum
Inert gas content (%)……			
CO_2 content (%)……			
Hydrogen-sulfide content (%)……			
Drilling Depth (m)……	1000	3050	7000
Depth (m) of water (if applicable)……			

Assessment Unit (name, no.)
Tanezzuft-Ghadames Structural/Stratigraphic, 20540301

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

1. Algeria represents 62.5 areal % of the total assessment unit

Oil in Oil Fields:		median	maximum
Richness factor (unitless multiplier):……			
Volume % in parcel (areal % x richness factor):…		62.5	
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):…		62.5	
Portion of volume % that is offshore (0-100%)……		0	

2. Tunisia represents 18.75 areal % of the total assessment unit

Oil in Oil Fields:	minimum	median	maximum
Richness factor (unitless multiplier):……			
Volume % in parcel (areal % x richness factor):…		18.75	
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):…		18.75	
Portion of volume % that is offshore (0-100%)……		0	

3. Libya represents 18.75 areal % of the total assessment unit

Oil in Oil Fields:	minimum	median	maximum
Richness factor (unitless multiplier):……			
Volume % in parcel (areal % x richness factor):…		18.75	
Portion of volume % that is offshore (0-100%)……		0	

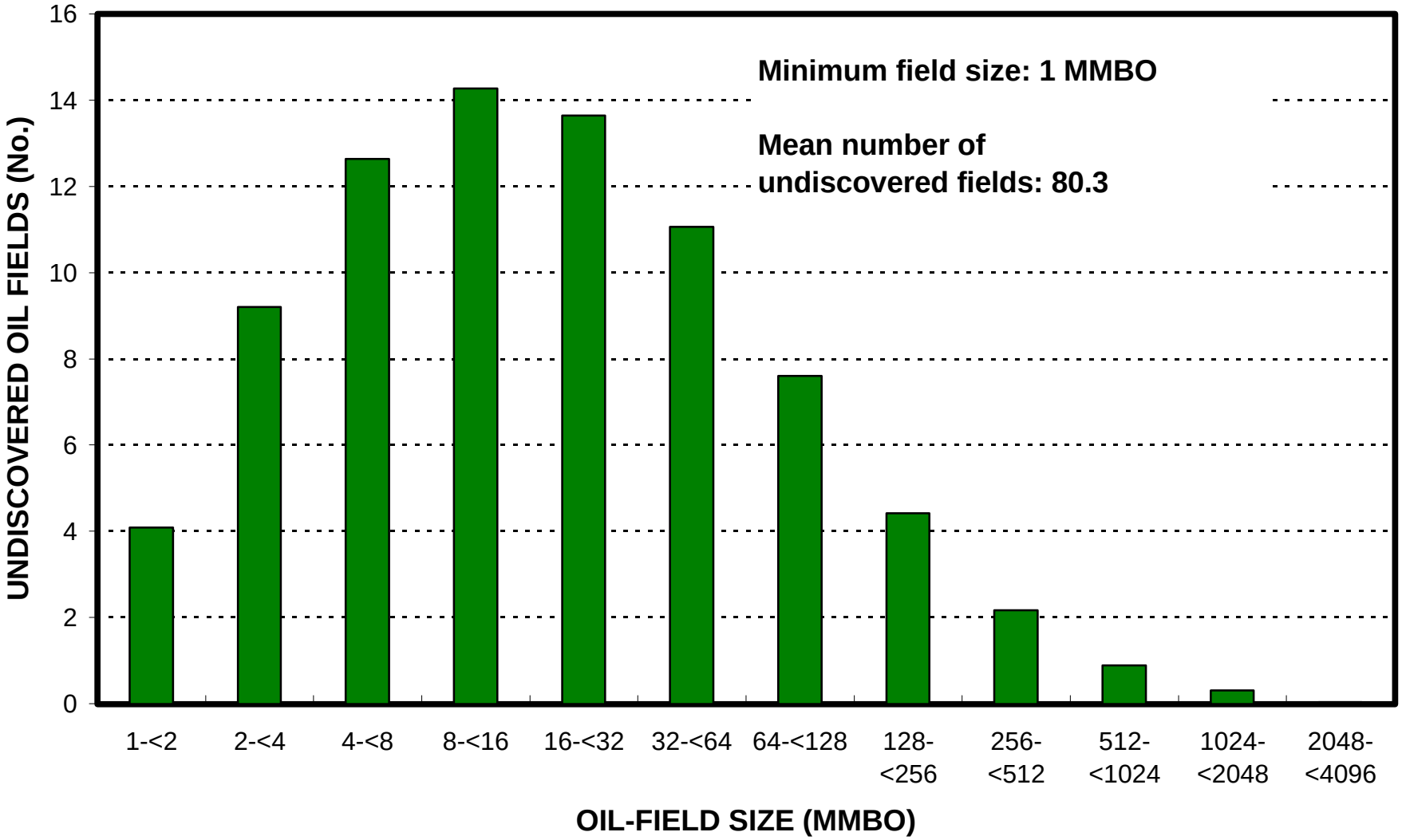
Gas in Gas Fields:	minimum	median	maximum
Richness factor (unitless multiplier):……			
Volume % in parcel (areal % x richness factor):…		18.75	
Portion of volume % that is offshore (0-100%)……		0	

4. Province 2054 represents 91 areal % of the total assessment unit

Oil in Oil Fields:	minimum	median	maximum
Richness factor (unitless multiplier):……			
Volume % in parcel (areal % x richness factor):…		91	
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):…		91	
Portion of volume % that is offshore (0-100%)……		0	

Tanezzuft-Ghadames Structural/Stratigraphic, AU 20540301
Undiscovered Field-Size Distribution



Tanezzuft-Ghadames Structural/ Stratigraphic, AU 20540301
Undiscovered Field-Size Distribution