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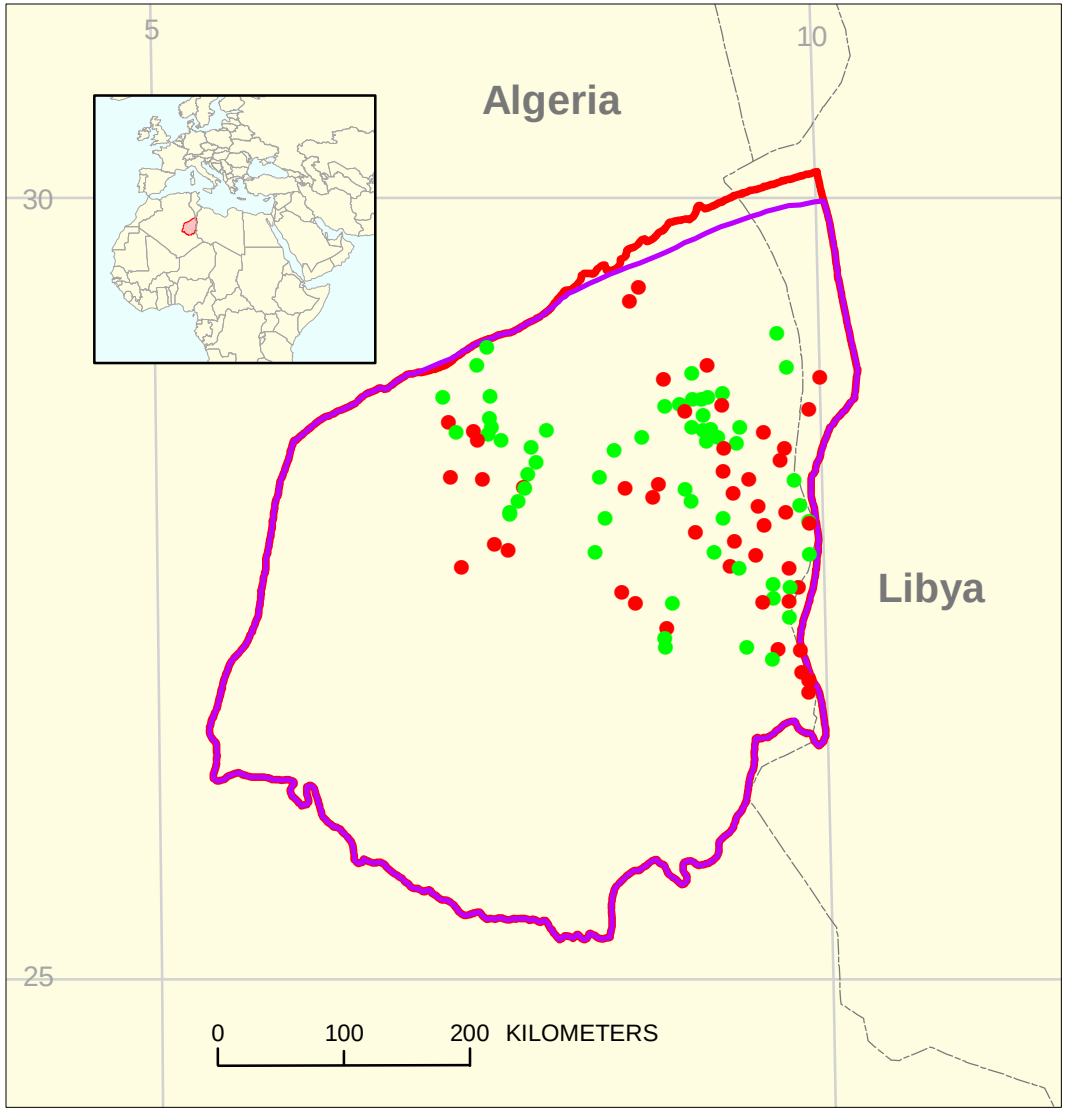
Tanezzuft-Illizi Structural/Stratigraphic Assessment Unit 20560101



Tanezzuft-Illizi Structural/Stratigraphic Assessment Unit 20560101

Illizi Basin Geologic Province 2056

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: Illizi Basin (2056) **GEOLOGIST:** T.R. Klett

TOTAL PETROLEUM SYSTEM: Tanezzuft-Illizi (205601)

ASSESSMENT UNIT: Tanezzuft-Illizi Structural/Stratigraphic (20560101)

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

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

MATURATION: In the northern and eastern portions of the total petroleum system, peak generation occurred from the Middle Jurassic to the Eocene. In the southern and western portions of the total petroleum system, generation from both Silurian and Middle to Upper Devonian source rocks probably started and peaked in the Carboniferous but was halted during the Hercynian deformational event.

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 and glacial sandstone, Devonian paralic to marine sandstone, and Carboniferous deltaic to marine sandstone.

TRAPS AND SEALS: Most of the known accumulations are in anticlines and faulted anticlines. Some accumulations are present in combination traps. Hydrodynamic traps may also be present. Intraformational Paleozoic marine mudstone is the primary seal.

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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.

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.

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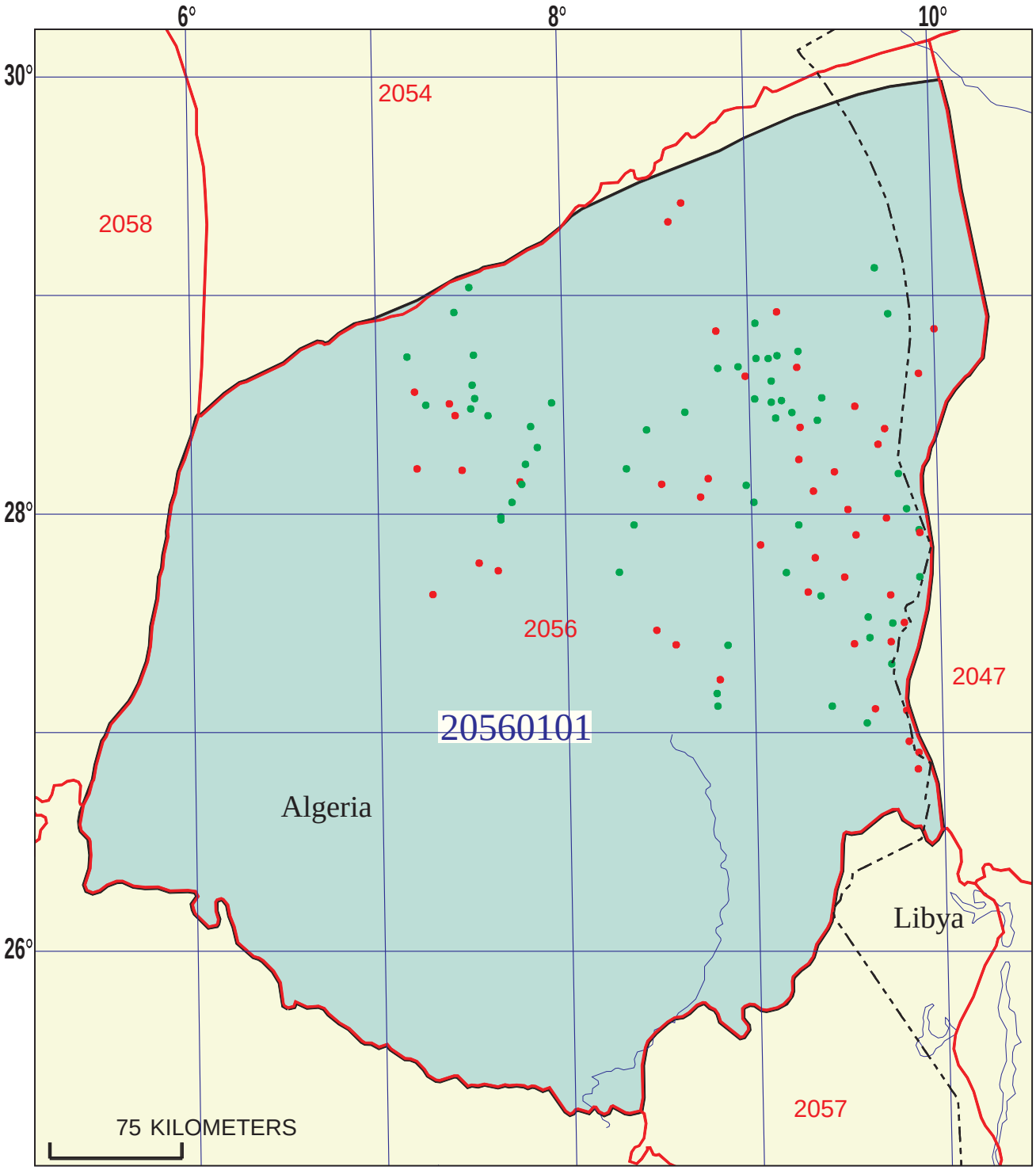


Tanezzuft-Illizi Structural/Stratigraphic Assessment Unit - 20560101

EXPLANATION

- Hydrography
- Shoreline
- 2056 Geologic province code and boundary
- Country boundary
- Gas field centerpoint
- Oil field centerpoint
- 20560101 Assessment unit code and boundary

Projection: Robinson. Central meridian: 0

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

Date:……..	6/29/98		
Assessment Geologist:……..	T.R. Klett		
Region:……..	Middle East and North Africa	Number:	2
Province:……..	Illizi Basin	Number:	2056
Priority or Boutique……	Priority		
Total Petroleum System:……	Tanezzuft-Illizi	Number:	205601
Assessment Unit:……..	Tanezzuft-Illizi Structural/Stratigraphic	Number:	20560101
* 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?……. 10 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: 27 Gas: 27

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
104.7	39.8	40.6

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

1st 3rd	2nd 3rd	3rd 3rd
628.3	408.8	418.9

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)	10	median no.	67	max no.	200
Gas fields:……min. no. (>0)	8	median no.	45	max no.	84

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	10	median size	25	max. size	500
Gas in gas fields (bcfg):……	min. size	60	median size	200	max. size	4800

Assessment Unit (name, no.)
Tanezzuft-Illizi Structural/Stratigraphic, 20560101

AVERAGE RATIOS FOR UNDISCOVERED FIELDS, TO ASSESS COPRODUCTS

(uncertainty of fixed but unknown values)

Oil Fields:	minimum	median	maximum
Gas/oil ratio (cfg/bo)……	2350	4700	7050
NGL/gas ratio (bngl/mmcfg)……	11	22	33

Gas fields:	minimum	median	maximum
Liquids/gas ratio (bngl/mmcfg)……	20	40	60
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)……	39	43	55
Sulfur content of oil (%)……			
Drilling Depth (m) ……	1500	2200	3000
Depth (m) of water (if applicable)……			

Gas Fields:	minimum	median	maximum
Inert gas content (%)……			
CO_2 content (%)……			
Hydrogen-sulfide content (%)……			
Drilling Depth (m)……	1000	2000	3100
Depth (m) of water (if applicable)……			

Assessment Unit (name, no.)
Tanezzuft-Illizi Structural/Stratigraphic, 20560101

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

1. Province 2056 represents 99.97 areal % of the total assessment unit

Oil in Oil Fields:	minimum	median	maximum
Richness factor (unitless multiplier):.....			
Volume % in parcel (areal % x richness factor):...		99.97	
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):...		99.97	
Portion of volume % that is offshore (0-100%).....		0	

2. Province 2054 represents 0.03 areal % of the total assessment unit

Oil in Oil Fields:	minimum	median	maximum
Richness factor (unitless multiplier):.....			
Volume % in parcel (areal % x richness factor):...		0.03	
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):...		0.03	
Portion of volume % that is offshore (0-100%).....		0	

3. Algeria represents 92 areal % of the total assessment unit

Oil in Oil Fields:	minimum	median	maximum
Richness factor (unitless multiplier):.....			
Volume % in parcel (areal % x richness factor):...		92	
Portion of volume % that is offshore (0-100%).....		0	

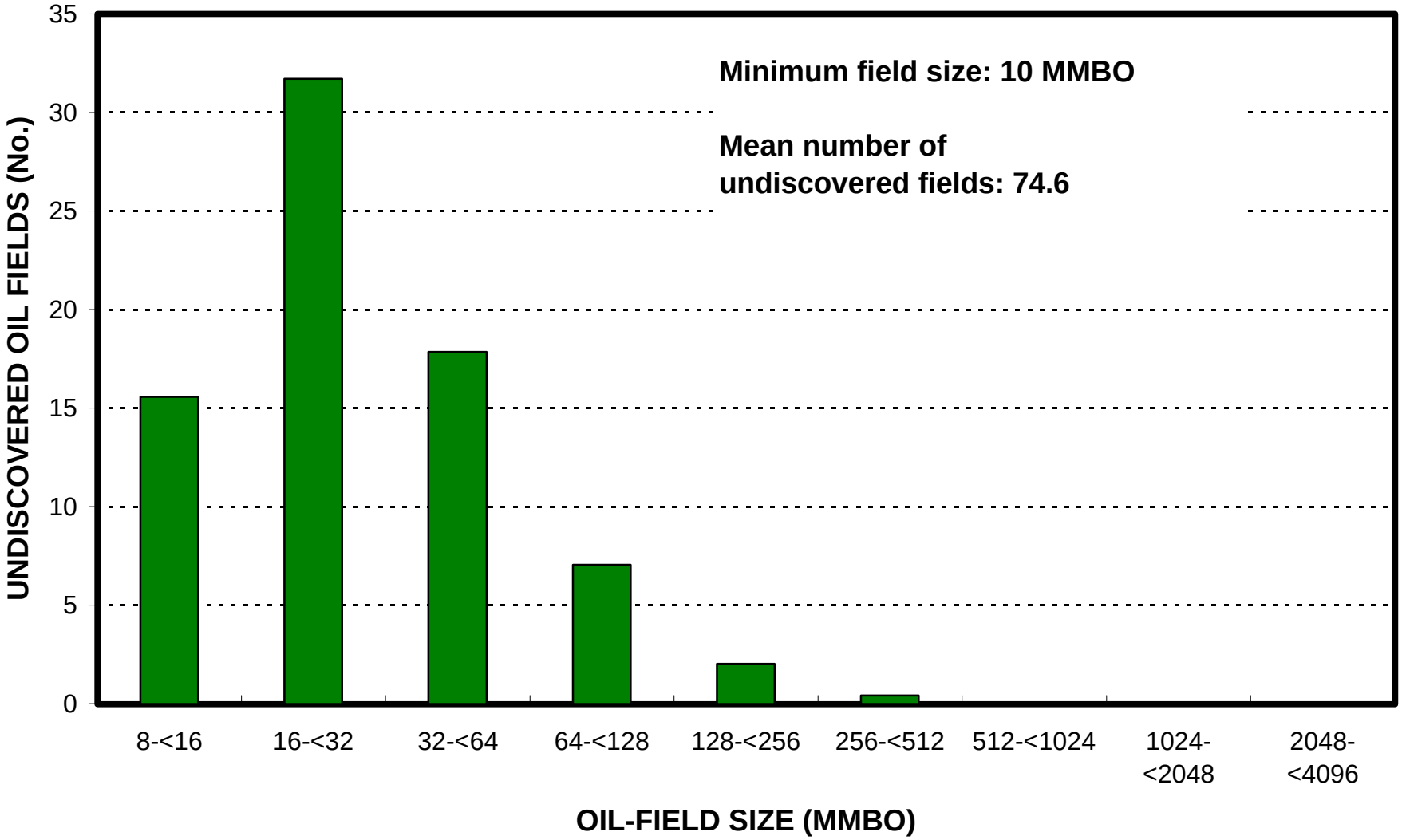
Gas in Gas Fields:	minimum	median	maximum
Richness factor (unitless multiplier):.....			
Volume % in parcel (areal % x richness factor):...		92	
Portion of volume % that is offshore (0-100%).....		0	

4. Libya represents 8 areal % of the total assessment unit

Oil in Oil Fields:	minimum	median	maximum
Richness factor (unitless multiplier):.....			
Volume % in parcel (areal % x richness factor):...		8	
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):...		8	
Portion of volume % that is offshore (0-100%).....		0	

Tanezzuft-Illizi Structural/Stratigraphic, AU 20560101
Undiscovered Field-Size Distribution



Tanezzuft-Illizi Structural/Stratigraphic, AU 20560101
Undiscovered Field-Size Distribution