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South Margin Subsalt
Assessment Unit 10160104

South Margin Subsalt Assessment Unit 10160104

North Caspian Basin Geologic Province 1016

Geologic Summary

Detailed map of this assessment unit

Assessment Input Data

Assessment Results

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

USGS PROVINCE: North Caspian Basin (1016) **GEOLOGIST:** G.F. Ulmishek

TOTAL PETROLEUM SYSTEM: Paleozoic North Caspian (101601)

ASSESSMENT UNIT: South Margins Subsalt (10160104)

DESCRIPTION: The assessment unit encompasses subsalt Paleozoic rocks of the southern basin margin. The boundary is drawn along contour line 7 km to the top of these rocks. The entire offshore area of the northern Caspian Sea falls in the unit. The unit includes carbonate platforms, various associated reefs, and basin slope deposits. Discovered oil and gas of the unit is contained in Lower Carboniferous-Bashkirian carbonate reservoirs.

SOURCE ROCKS: Source rocks are probably off-reef basinal black-shale facies contemporaneous with the pinnacle and barrier reefs and the back-reef carbonate platform. Geochemical characteristics of the source rocks are poorly known because of their deep occurrence.

MATURATION: Maturation mainly took place in Late Permian-Triassic time, during deposition of thick Hercynian orogenic clastics. Presently, source rocks probably occur in the lower part of oil window and in the gas window.

MIGRATION: Hydrocarbons migrated laterally from source rocks into the adjacent platform carbonates and reefs.

RESERVOIR ROCKS: Productive and potential reservoir rocks in this assessment unit are carbonates of reef and back-reef platform and lagoonal facies. Reservoir properties of the rocks vary significantly depending on sedimentary facies and diagenetic changes. Lower Permian (mainly Artinskian) sandstones are present in the southwest, along the Karpinsky foldbelt, but their reservoir properties are poor.

TRAPS: Both paleomorphic reef traps and structural traps are known.

SEAL: Thick Kungurian salt forms the regional seal. A Lower Permian shale bed directly overlies productive reservoirs and separates them from the regional seal.

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Maryenko, Yu.I., Khalimov, I.M., and Chernitsky, A.V., 1985, Geologic framework and formation of pore space in carbonate reservoir rocks of the Tengiz field: Geologiya Nefti i Gaza, no. 12, p. 25-30.

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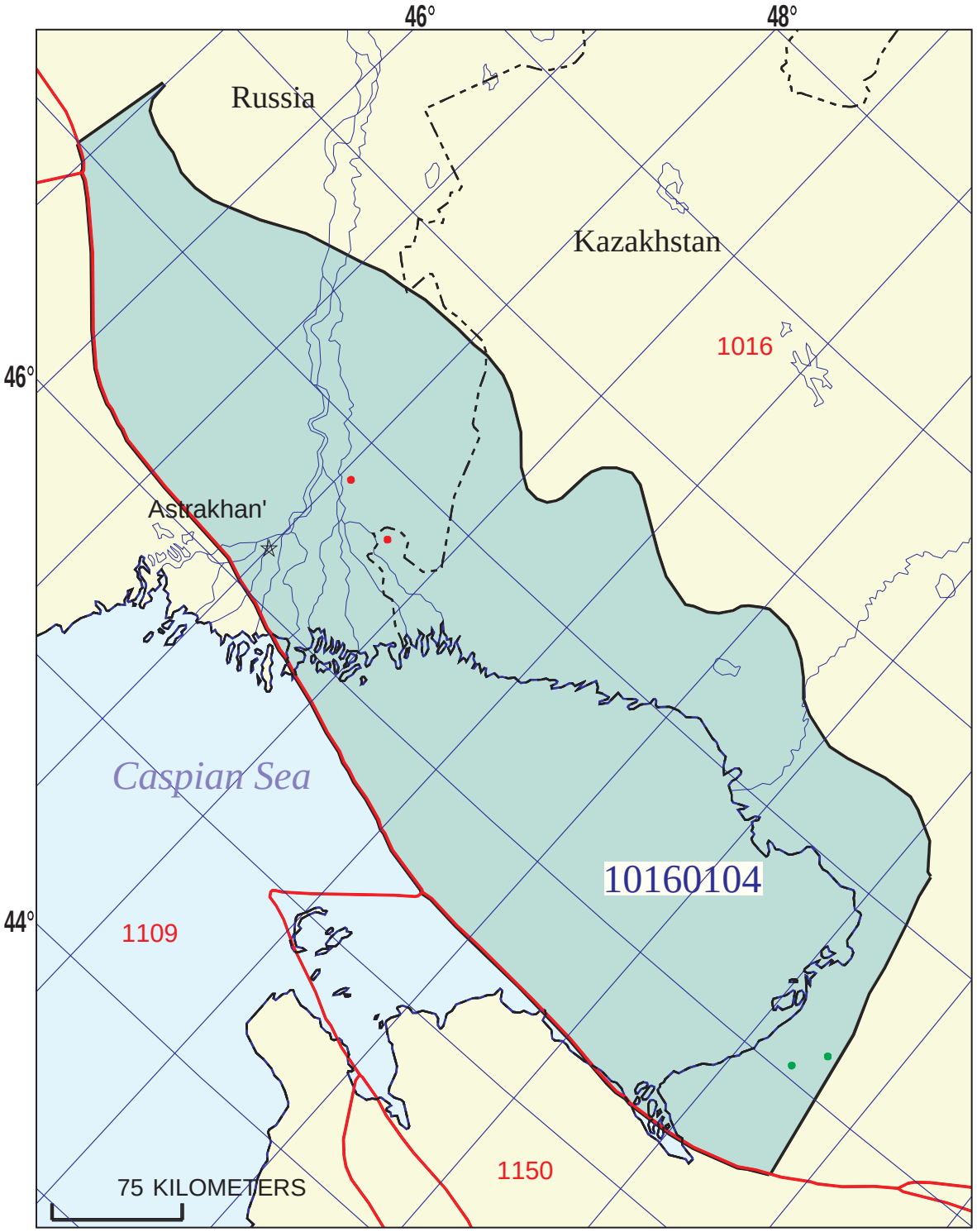
Volchegursky, L.F., Vladimirova, T.V., Kapustin, I.N., and Natapov, L.M., 1995, Evolution of the North Caspian basin in middle-late Paleozoic time: Otechestvennaya Geologiya, no. 2, p. 44-49.



South Margin Subsalt Assessment Unit - 10160104

EXPLANATION

- Hydrography
- Shoreline
- 1016 — Geologic province code and boundary
- Country boundary
- Gas field centerpoint
- Oil field centerpoint
- 10160104 — Assessment unit code and boundary

Projection: Equidistant Conic. Central meridian: 100. Standard Parallel: 58 30

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

Date:……..	1/12/99		
Assessment Geologist:……..	G.F. Ulmishek		
Region:……..	Former Soviet Union	Number:	1
Province:……..	North Caspian Basin	Number:	1016
Priority or Boutique:……..	Priority		
Total Petroleum System:……	Paleozoic North Caspian	Number:	101601
Assessment Unit:……..	South Margin Subsalt	Number:	10160104
* Notes from Assessor	In Tengiz Field, about 20% of associated gas is H_2S. A high content of H_2S in both associated and free gas can be expected in the entire assessment unit.		

CHARACTERISTICS OF ASSESSMENT UNIT

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

What is the minimum field size?…… 20 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: 2 Gas: 1
Established (>13 fields) _____ Frontier (1-13 fields) X Hypothetical (no fields) _____

Median size (grown) of discovered oil fields (mmboe):
1st 3rd _____ 2nd 3rd _____ 3rd 3rd _____
Median size (grown) of discovered gas fields (bcfg):
1st 3rd NA 2nd 3rd NA 3rd 3rd NA

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)	5	median no.	30	max no.	50
Gas fields:……	min. no. (>0)	5	median no.	30	max no.	50

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	20	median size	150	max. size	25000
Gas in gas fields (bcfg):……	min. size	120	median size	300	max. size	80000

Assessment Unit (name, no.)
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AVERAGE RATIOS FOR UNDISCOVERED FIELDS, TO ASSESS COPRODUCTS

(uncertainty of fixed but unknown values)

Oil Fields:	minimum	median	maximum
Gas/oil ratio (cfg/bo)……	1500	2000	3000
NGL/gas ratio (bngl/mmcfg)……	30	60	90

Gas fields:	minimum	median	maximum
Liquids/gas ratio (bngl/mmcfg)……	15	25	35
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)……	40	47	50
Sulfur content of oil (%)……	0.5	0.7	2
Drilling Depth (m) ……	4000	5000	7000
Depth (m) of water (if applicable)……	0	15	25

Gas Fields:	minimum	median	maximum
Inert gas content (%)……	0.2	1	2.5
CO_2 content (%)……	4	8	20
Hydrogen-sulfide content (%)……	4	8	20
Drilling Depth (m)……	4000	4500	5500
Depth (m) of water (if applicable)……	0	15	25

Assessment Unit (name, no.)
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ALLOCATION OF UNDISCOVERED RESOURCES IN THE ASSESSMENT UNIT TO COUNTRIES OR OTHER LAND PARCELS (uncertainty of fixed but unknown values)

1. Kazakhstan represents 60 areal % of the total assessment unit

Oil in Oil Fields:	minimum	median	maximum
Richness factor (unitless multiplier):……			
Volume % in parcel (areal % x richness factor):…		90	
Portion of volume % that is offshore (0-100%)……		85	

Gas in Gas Fields:	minimum	median	maximum
Richness factor (unitless multiplier):……			
Volume % in parcel (areal % x richness factor):…		20	
Portion of volume % that is offshore (0-100%)……		75	

2. Russia represents 40 areal % of the total assessment unit

Oil in Oil Fields:	minimum	median	maximum
Richness factor (unitless multiplier):……			
Volume % in parcel (areal % x richness factor):…		10	
Portion of volume % that is offshore (0-100%)……		80	

Gas in Gas Fields:	minimum	median	maximum
Richness factor (unitless multiplier):……			
Volume % in parcel (areal % x richness factor):…		80	
Portion of volume % that is offshore (0-100%)……		85	

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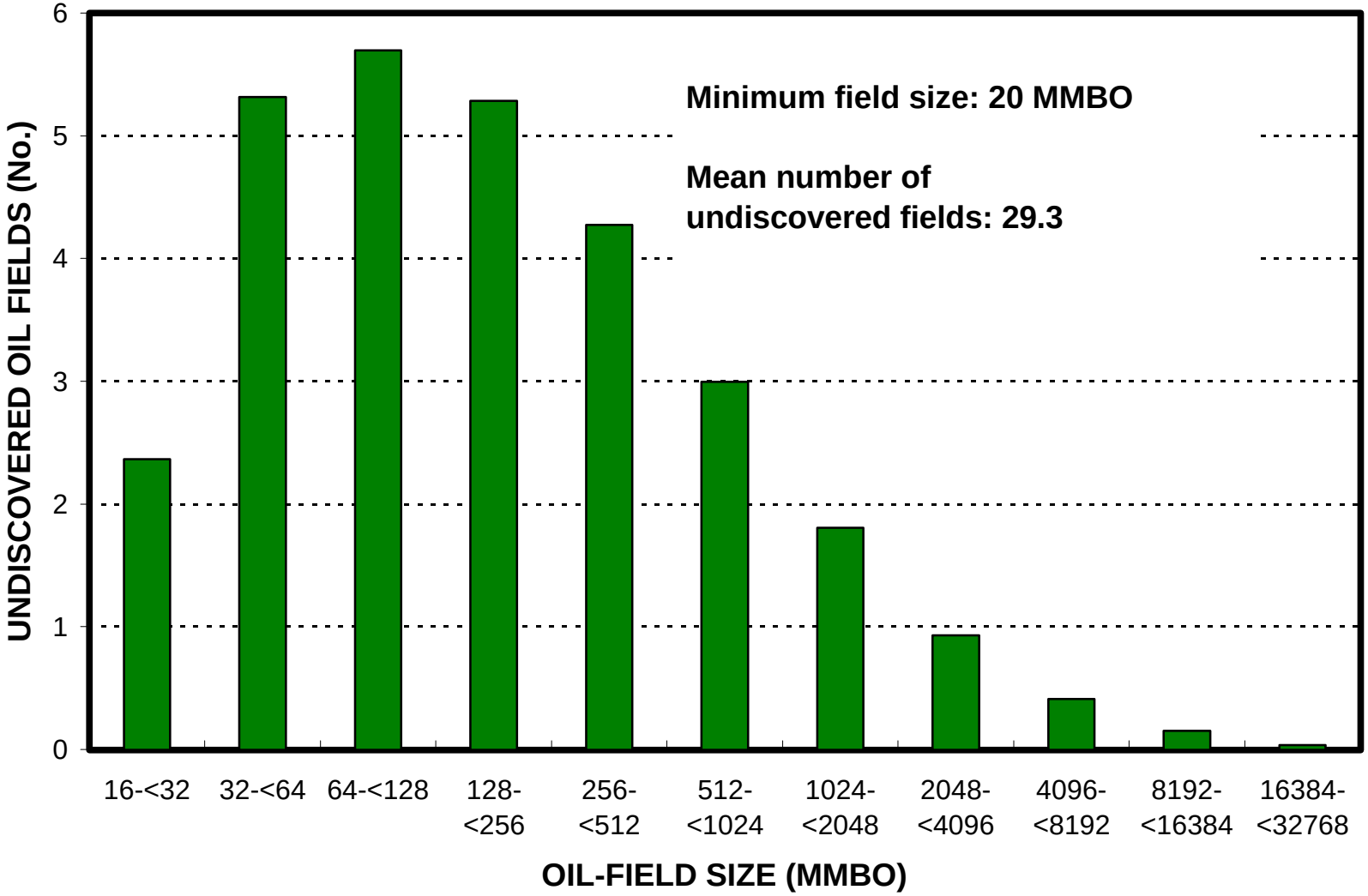
Undiscovered Field-Size Distribution



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Undiscovered Field-Size Distribution