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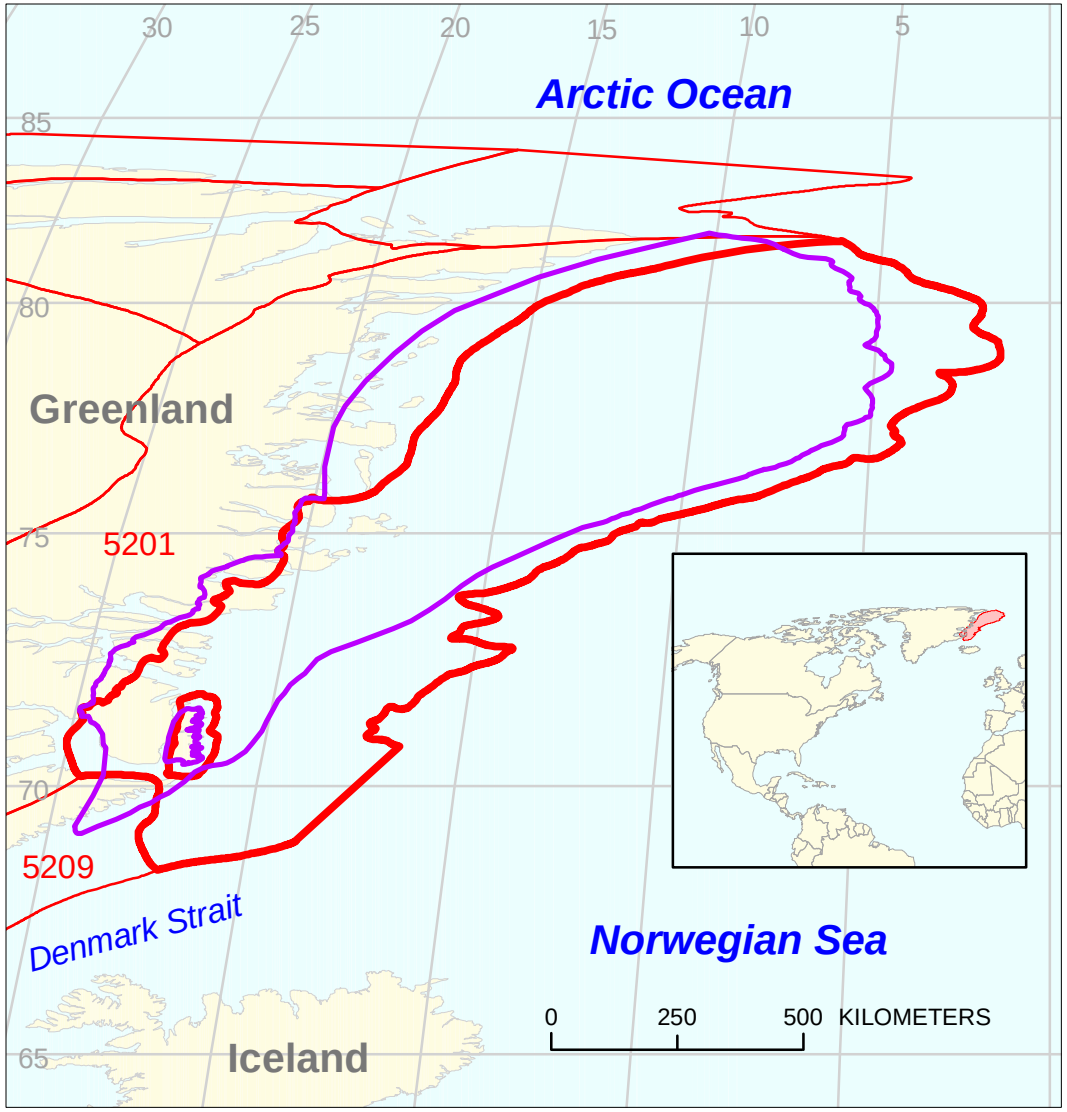
Northeast Greenland Shelf Rift Systems
Assessment Unit 52000101



Northeast Greenland Shelf Rift Systems Assessment Unit 52000101
East Greenland Rift Basins Geologic Province 5200
Other geologic province boundary

Geologic Summary

Detailed map of this assessment unit

Assessment Input Data

Assessment Results

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

USGS PROVINCES: Northeast Greenland Rift Basins (5200) **GEOLOGIST:** M.E. Henry

TOTAL PETROLEUM SYSTEM: Permian/Upper Jurassic Composite (520001)

ASSESSMENT UNIT: Northeast Greeenland Shelf Rift Systems (52000101)

DESCRIPTION: This assessment unit includes the continental margin off eastern and northeastern Greenland and is almost entirely offshore. The eastern boundary extends to the approximate position of the boundary between continental and oceanic crust, the northern boundary separates this province from the Wandell Sea Basin, the southern boundary is placed near lat. 70 N. and the western boundary is drawn to include the nearshore deep sub-basins on the shelf that have been interpreted from geophysical data.

SOURCE ROCKS: The principal source rock for this unit is expected, primarily by analogy with the Norwegian shelf and the Viking Graben of the North Sea, to be Late Jurassic shales of the Hareelv Formation. Other potential source rocks probably exist in the unit and include, in order of expected importance, the Upper Permian Ravenfjeld Formation, Upper Carboniferous lacustrine shales, the Lower Jurassic Kap Stewart Formation, and other Devonian and Triassic beds.

MATURATION: Little published data exits in the offshore area regarding thermal maturity of these likely sources. Considering the probable depths of the source rocks in the numerous sub-basins that exist on the shelf, which are as deep as 10 km, thermal maturity for petroleum generation must have been reached at least locally in these depressions.

MIGRATION: Because of the nature of structural deformation in this unit lateral migration may be rather limited but vertical migration could have been important.

RESERVOIR ROCKS: Principal reservoir rocks are expected to be sandstones of the Middle Jurassic Vardekløft and Olympen Formations. Other important reservoir units include carbonate build-ups in the Upper Permian and sands of the Lower Jurassic Kap Stewart and Neill Klintner Formations.

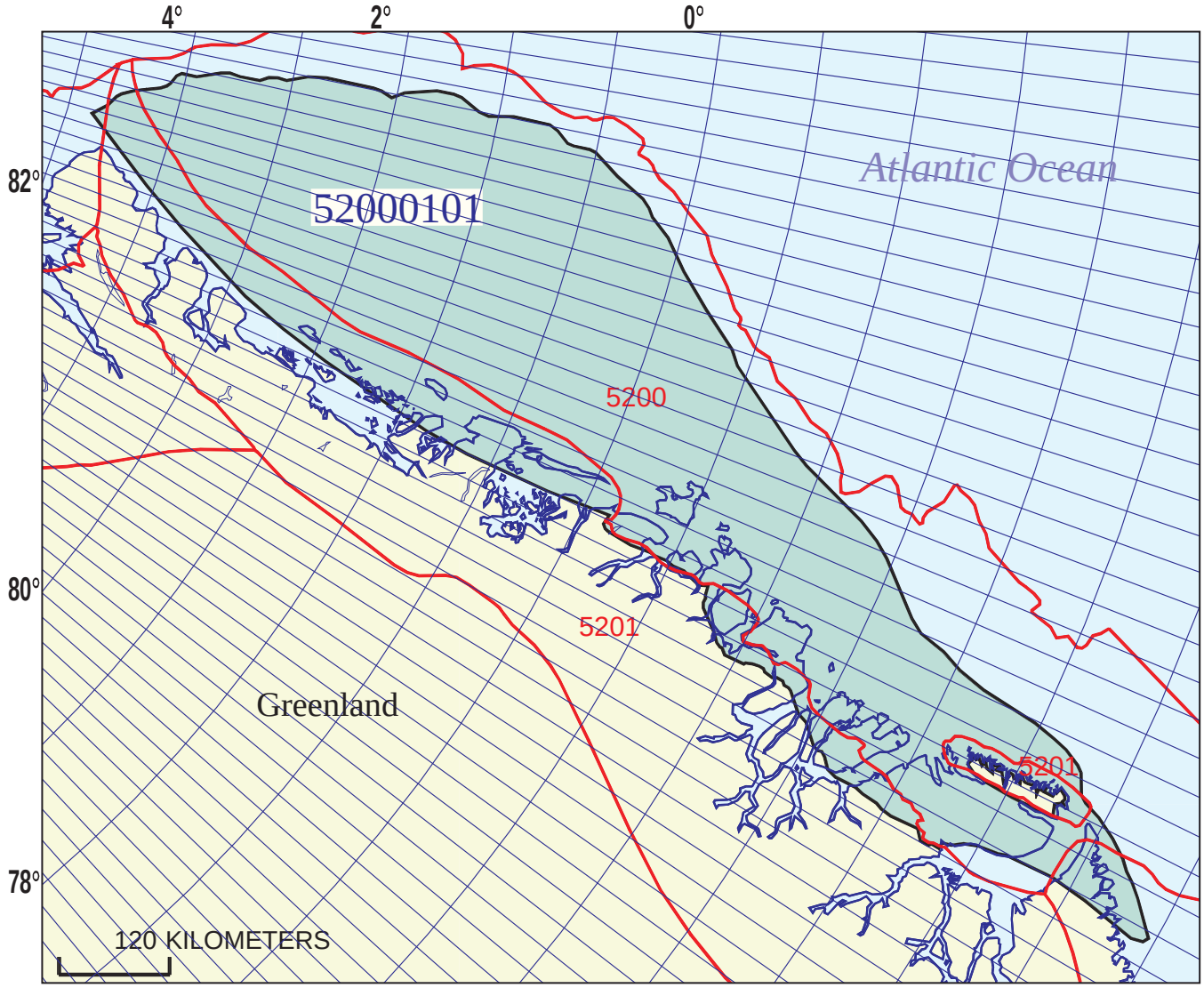
TRAPS AND SEALS: The system of fault blocks, rotated generally landward, lead to the expectation that major traps are likely to be found in the uplifted side of the blocks and that faulting will be important in trap formation. Overlying shales will form top seals for many traps.

REFERENCES:

Christiansen, F.G., Dam, G., Piasecki, S., and Stemmerick, L., 1992, A review of Upper Paleozoic and Mesozoic source rocks from onshore East Greenland, *in* Spencer, A.M., ed., Generation, accumulation and production of Europe's hydrocarbons II, Special Publication of the European Association of Petroleum Geoscientists 2: Berlin, Springer-Verlag, p. 151-161.

Larsen, H.C., 1990, The east Greenland shelf, *in* Grantz, A., Johnson, L., and Sweeney, J.F., eds., The Arctic Ocean region: Geological Society of America, The Geology of North America, v. L, p. 185-210.

Price, S.P., and Whitham, A.G., 1997, Exhumed hydrocarbon traps in east Greenland–analogs for the Lower-Middle Jurassic play of northwest Europe: American Association of Petroleum Geologists Bulletin , v. 81, p. 196-221.



Northeast Greenland Shelf Rift Systems Assessment Unit - 52000101

EXPLANATION

- Hydrography
- Shoreline
- 5200 Geologic province code and boundary
- Country boundary
- Gas field centerpoint
- Oil field centerpoint
- 52000101 Assessment unit code and boundary

Projection: Lambert. Standard parallels: 49 and 77. Central meridian: -92

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

Date:……..	12/13/99		
Assessment Geologist:……..	M.E. Henry		
Region:……..	North America	Number:	5
Province:……..	East Greenland Rift Basins	Number:	5200
Priority or Boutique……	Boutique		
Total Petroleum System:……	Permian/Upper Jurassic Composite	Number:	520001
Assessment Unit:……	Northeast Greenland Shelf Rift Systems	Number:	52000101
* Notes from Assessor	Analog to Viking Graben (40250101), and Haltenbanken (40170101), and the presence of four exhumed fields. All four exhumed fields contain highly altered bitumen.		

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: 0 Gas: 0
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 _____
Median size (grown) of discovered gas fields (bcfg):
1st 3rd _____ 2nd 3rd _____ 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…… 0.7

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)	1	median no.	250	max no.	500
Gas fields:……min. no. (>0)	1	median no.	50	max no.	100

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	85	max. size	12000
Gas in gas fields (bcfg):……min. size	120	median size	500	max. size	20000

Assessment Unit (name, no.)
Northeast Greenland Shelf Rift Systems, 52000101

AVERAGE RATIOS FOR UNDISCOVERED FIELDS, TO ASSESS COPRODUCTS

(uncertainty of fixed but unknown values)

Oil Fields:	minimum	median	maximum
Gas/oil ratio (cfg/bo)……	500	1000	1500
NGL/gas ratio (bngl/mmcfg)……	30	60	90

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)……	15	40	55
Sulfur content of oil (%)……	0.3	0.8	1.5
Drilling Depth (m) ……	2000	3500	5000
Depth (m) of water (if applicable)……	0	350	1000

Gas Fields:	minimum	median	maximum
Inert gas content (%)……			
CO_2 content (%)……			
Hydrogen-sulfide content (%)……			
Drilling Depth (m)……	2000	3500	5000
Depth (m) of water (if applicable)……	0	350	1000

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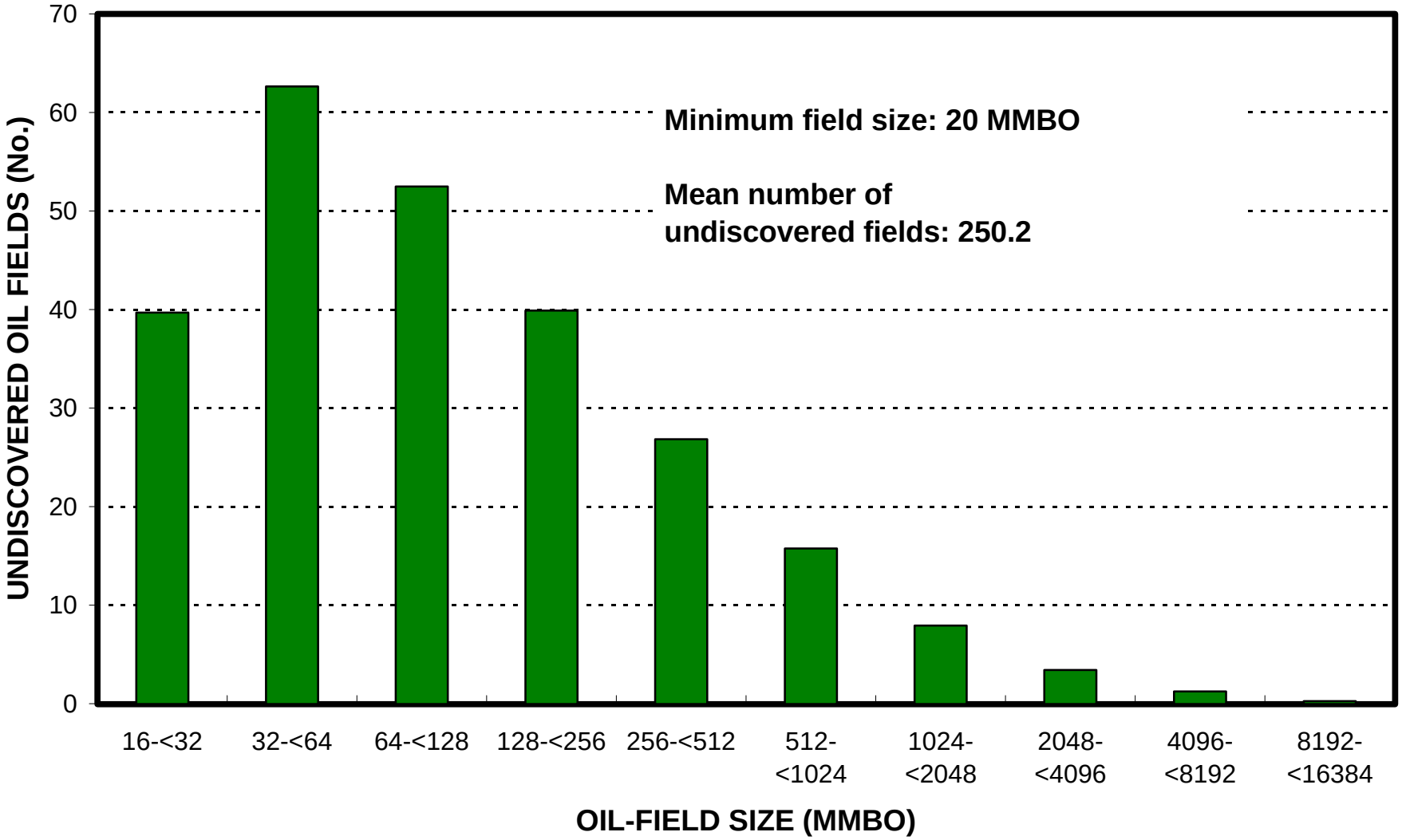
ALLOCATION OF UNDISCOVERED RESOURCES IN THE ASSESSMENT UNIT TO COUNTRIES OR OTHER LAND PARCELS (uncertainty of fixed but unknown values)

1. Greenland 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%)……		98	

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%)……		98	

Northeast Greenland Shelf Rift Systems, AU 52000101
Undiscovered Field-Size Distribution



Northeast Greenland Shelf Rift Systems, AU 52000101
Undiscovered Field-Size Distribution