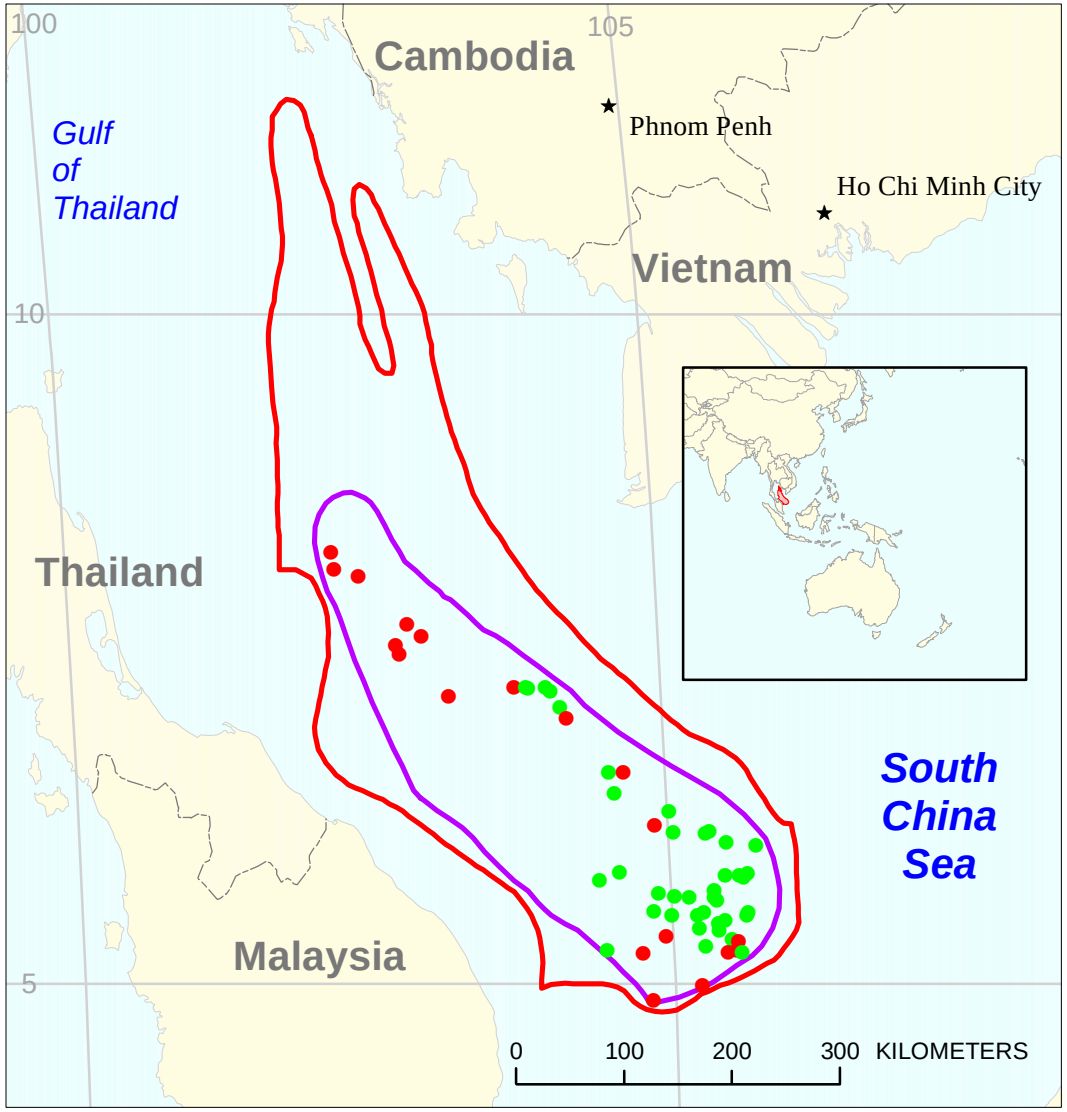
Go to Table of Contents

Go to index map

South Malay Lacustrine Assessment Unit 37030101



South Malay Lacustrine Assessment Unit 37030101

Malay Basin Geologic Province 3703

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: Malay Basin (3703) **GEOLOGIST:** M.G. Bishop

TOTAL PETROLEUM SYSTEM: Oligocene-Miocene Lacustrine (370301)

ASSESSMENT UNIT: South Malay Lacustrine (37030101)

DESCRIPTION: Offshore oil and gas sourced in Paleogene transtensional, extensional, continental half-graben basins formed by plate rearrangements and fault movement due to collision of the India plate and accumulated in Neogene transpressional anticline traps. Assessment unit lies in the waters of Thailand, Vietnam, Malaysia, and Indonesia.

SOURCE ROCKS: Oligocene to Lower Miocene lacustrine source rocks deposited in a series of individual half-grabens; TOC 1 to 4 wt. %, HI as high as 750.

MATURATION: Source rocks began generating hydrocarbons in Middle Miocene time at approximately 1000 to 3500 m depth. All source rocks are overmature in the center of the basin and undermature at the edges. Oils have low pristane to phytane ratios, low oleanane content, and absence of resin-derived terpanes.

MIGRATION: Vertical migration along faults and lateral toward the margins.

RESERVOIR ROCKS: Upper Oligocene M and L Groups contain fluvial sandstones; 10 to 27 percent porosity. Upper Oligocene to Lower Miocene K Group is mostly fluvial sandstone; 10 to 30 percent porosity, permeability 500 mD. Lower Miocene J Group contains fluvial and shallow marine sandstones; porosity 11 to 30 percent, permeability 1000 mD. Lower to Middle Miocene I Group contains marine shoreline sandstones; porosity 25 to 30 percent, permeability 450 mD.

TRAPS AND SEALS: Anticlines formed during the Middle to Late Miocene transpressional tectonic inversion phase occur parallel to the faulted half grabens, involve rocks in the thickest portion of the half graben, and are the most important hydrocarbon traps. Intraformational seals and regional Middle Miocene marine transgression.

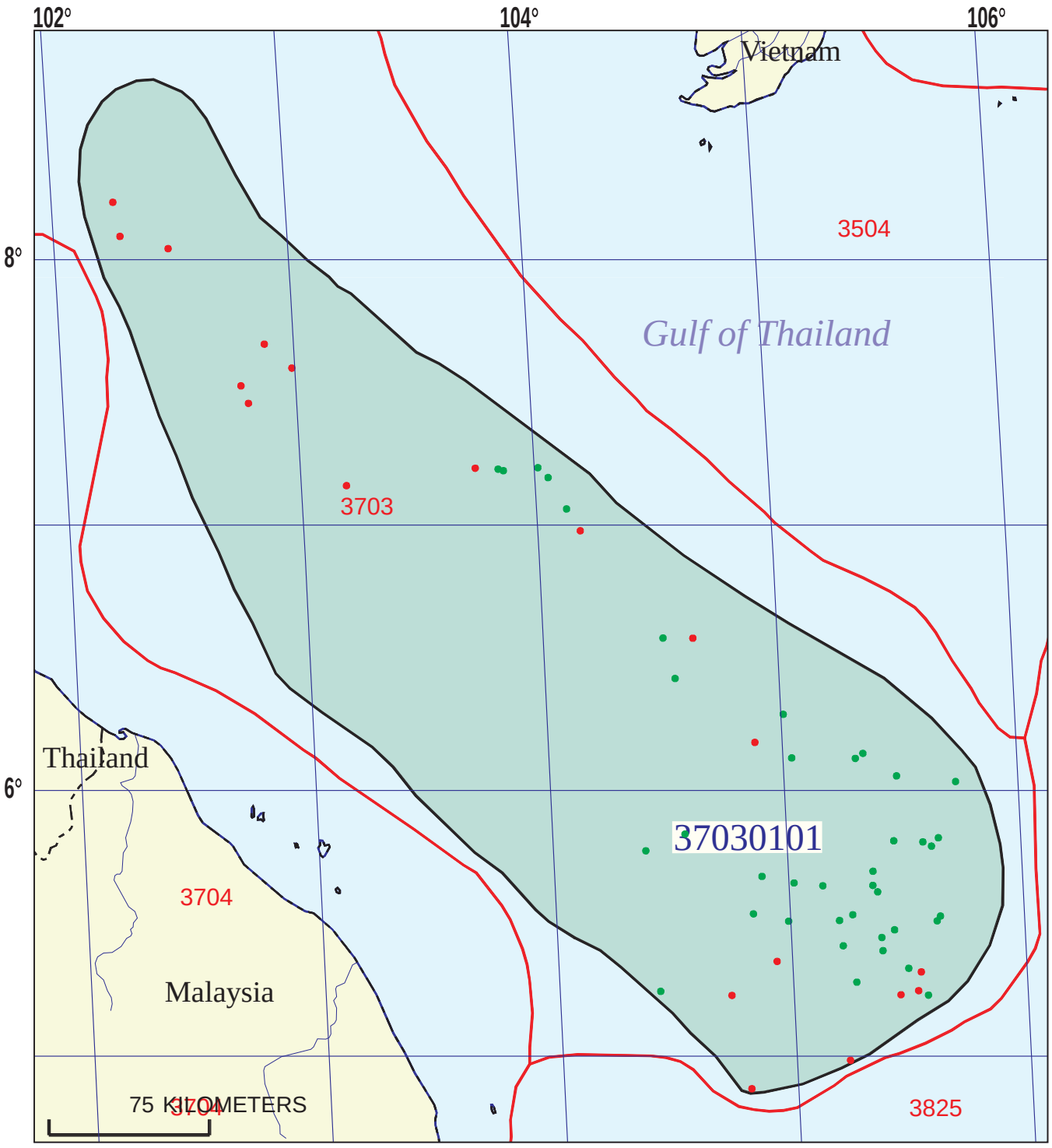
REFERENCES:

Creaney, S., Hussein, A.H., Curry, D.J., Bohacs, K.M., and Hassan, R., 1994, Source facies and oil families of the Malay Basin, Malaysia: American Association of Petroleum Geologists Bulletin 78, p. 1139.

McCaffrey, M.A., Abolins, P., Hoesni, M.J., and Huizinga, B.J., 1998, Geochemical characterization of Malay Basin oils–some insight into the effective petroleum systems: GEOSEA '98, Geological Society of Malaysia, program and abstracts, p. 149.

Petroconsultants, 1996, Petroleum exploration and production database: Petroconsultants, Inc., P.O. Box 740619, 6600 Sands Point Drive, Houston TX 77274-0619, USA or Petroconsultants, Inc., P.O. Box 152, 24 Chemin de la Mairie, 1258 Perly, Geneva, Switzerland.

Tjia, H.D., 1994, Inversion tectonics in the Malay Basin–evidence and timing of events; Geological Society of Malaysia Bulletin 36, p 119-126.



South Malay Lacustrine Assessment Unit - 37030101

EXPLANATION

- Hydrography
- Shoreline
- 3703 — Geologic province code and boundary
- Country boundary
- Gas field centerpoint
- Oil field centerpoint
- 37030101 — Assessment unit code and boundary

Projection: Robinson. Central meridian: 0

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

Date:……..	9/28/99		
Assessment Geologist:……..	P.J. McCabe		
Region:……..	Asia Pacific	Number:	3
Province:……..	Malay Basin	Number:	3703
Priority or Boutique……	Priority		
Total Petroleum System:……	Oligocene-Miocene Lacustrine	Number:	370301
Assessment Unit:……	South Malay Lacustrine	Number:	37030101
* Notes from Assessor	MMS growth function.		

CHARACTERISTICS OF ASSESSMENT UNIT

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

What is the minimum field size?……. 5 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: 36 Gas: 18
Established (>13 fields) X Frontier (1-13 fields) _____ Hypothetical (no fields) _____

Median size (grown) of discovered oil fields (mmboe):
1st 3rd 121.7 2nd 3rd 61.3 3rd 3rd 73.2
Median size (grown) of discovered gas fields (bcfg):
1st 3rd 1884 2nd 3rd 454 3rd 3rd 700

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.	80
Gas fields:……min. no. (>0)	5	median no.	50	max no.	120

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	5	median size	20	max. size	400
Gas in gas fields (bcfg):……min. size	30	median size	175	max. size	6000

Assessment Unit (name, no.)
South Malay Lacustrine, 37030101

AVERAGE RATIOS FOR UNDISCOVERED FIELDS, TO ASSESS COPRODUCTS

(uncertainty of fixed but unknown values)

Oil Fields:	minimum	median	maximum
Gas/oil ratio (cfg/bo)……	2400	4800	7200
NGL/gas ratio (bngl/mmcfg)……	7	14	21

Gas fields:	minimum	median	maximum
Liquids/gas ratio (bngl/mmcfg)……	10	20	30
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)……	29	40	53
Sulfur content of oil (%)……			
Drilling Depth (m) ……	800	1600	3500
Depth (m) of water (if applicable)……	40	60	100

Gas Fields:	minimum	median	maximum
Inert gas content (%)……			
CO_2 content (%)……	1	5	70
Hydrogen-sulfide content (%)……			
Drilling Depth (m)……	700	1800	5000
Depth (m) of water (if applicable)……	40	60	100

Assessment Unit (name, no.)
South Malay Lacustrine, 37030101

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

1. Malaysia represents 41 areal % of the total assessment unit

Oil in Oil Fields:	minimum	median	maximum
Richness factor (unitless multiplier):.....			
Volume % in parcel (areal % x richness factor):...		82	
Portion of volume % that is offshore (0-100%).....		100	

Gas in Gas Fields:	minimum	median	maximum
Richness factor (unitless multiplier):.....			
Volume % in parcel (areal % x richness factor):...		82	
Portion of volume % that is offshore (0-100%).....		100	

2. Vietnam represents 22 areal % of the total assessment unit

Oil in Oil Fields:	minimum	median	maximum
Richness factor (unitless multiplier):.....			
Volume % in parcel (areal % x richness factor):...		4.4	
Portion of volume % that is offshore (0-100%).....		100	

Gas in Gas Fields:	minimum	median	maximum
Richness factor (unitless multiplier):.....			
Volume % in parcel (areal % x richness factor):...		3.3	
Portion of volume % that is offshore (0-100%).....		100	

3. Thailand represents 18 areal % of the total assessment unit

Oil in Oil Fields:	minimum	median	maximum
Richness factor (unitless multiplier):.....			
Volume % in parcel (areal % x richness factor):...		3.6	
Portion of volume % that is offshore (0-100%).....		100	

Gas in Gas Fields:	minimum	median	maximum
Richness factor (unitless multiplier):.....			
Volume % in parcel (areal % x richness factor):...		5.4	
Portion of volume % that is offshore (0-100%).....		100	

4. Joint Thailand/Malaysia represents 17 areal % of the total assessment unit

Oil in Oil Fields:	minimum	median	maximum
Richness factor (unitless multiplier):.....			
Volume % in parcel (areal % x richness factor):...		8.5	
Portion of volume % that is offshore (0-100%).....		100	

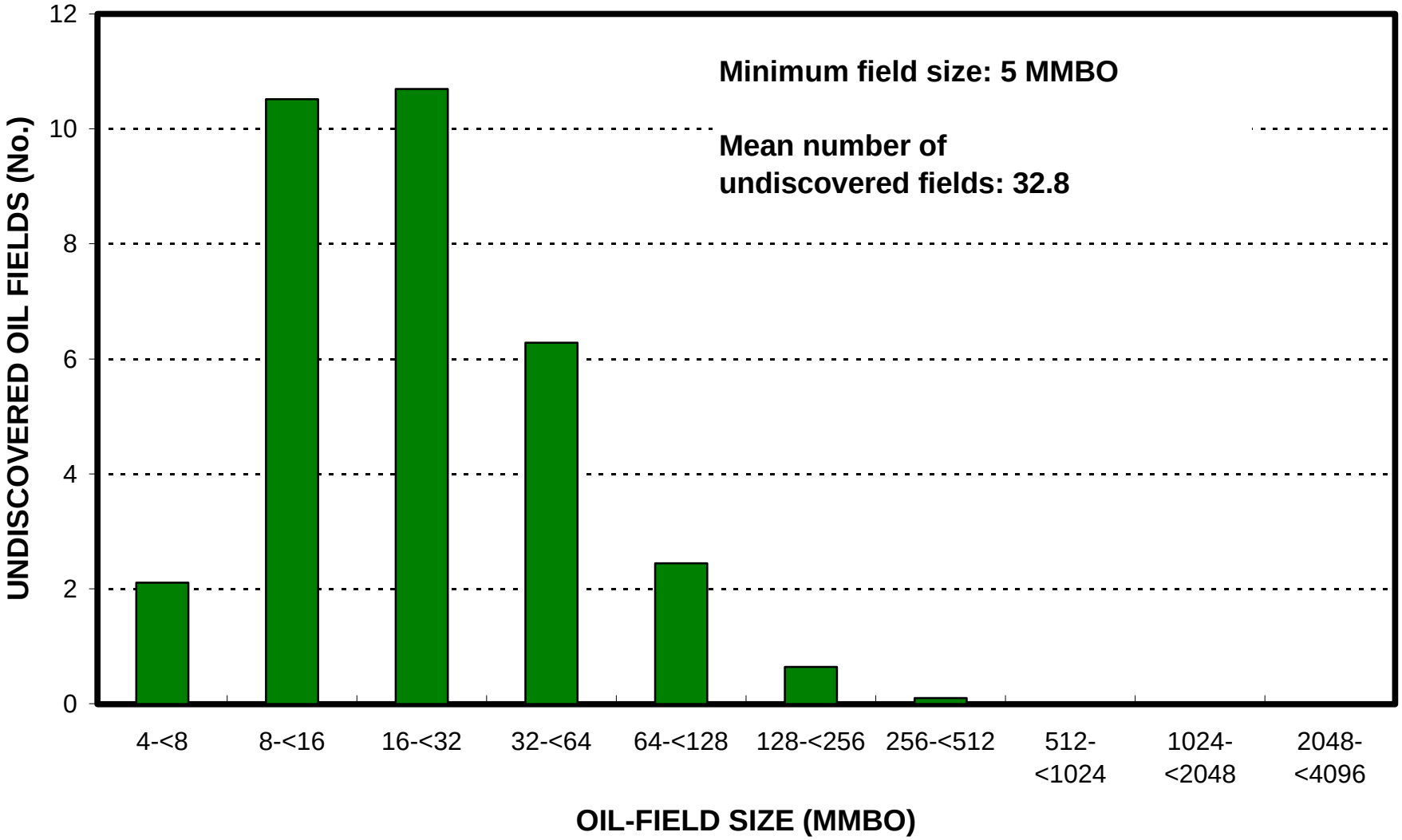
Gas in Gas Fields:	minimum	median	maximum
Richness factor (unitless multiplier):.....			
Volume % in parcel (areal % x richness factor):...		8.5	
Portion of volume % that is offshore (0-100%).....		100	

5. Indonesia represents 2 areal % of the total assessment unit

Oil in Oil Fields:	minimum	median	maximum
Richness factor (unitless multiplier):……			
Volume % in parcel (areal % x richness factor):…		1.5	
Portion of volume % that is offshore (0-100%)……		100	

Gas in Gas Fields:	minimum	median	maximum
Richness factor (unitless multiplier):……			
Volume % in parcel (areal % x richness factor):…		0.8	
Portion of volume % that is offshore (0-100%)……		100	

South Malay Lacustrine, AU 37030101
Undiscovered Field-Size Distribution



South Malay Lacustrine, AU 37030101
Undiscovered Field-Size Distribution