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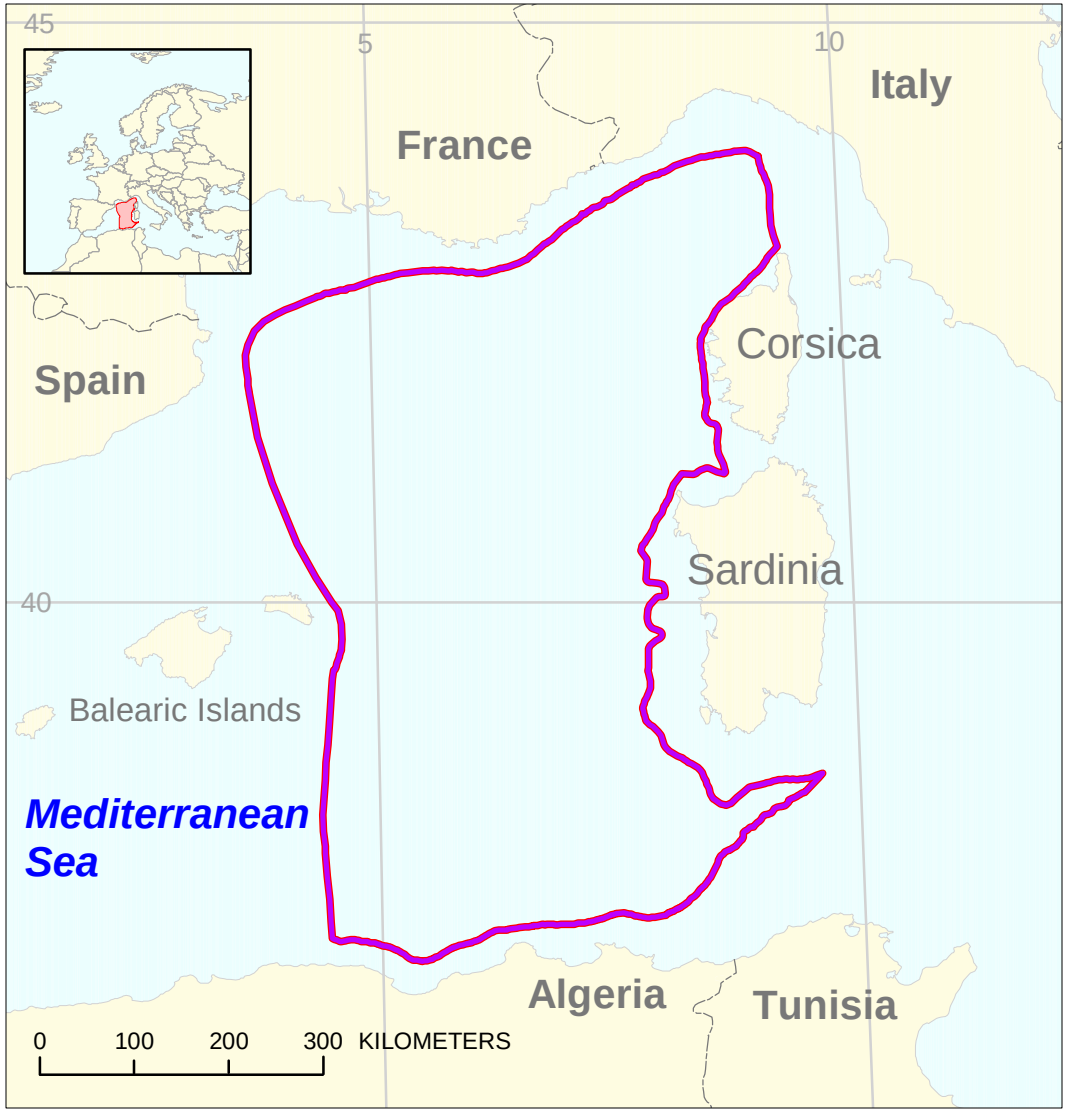
Subsalt
Assessment Unit 40680101



Subsalt Assessment Unit 40680101

Provence Basin Geologic Province 4068

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: Provence Basin (4068). **GEOLOGIST:** M.J. Pawlewicz

TOTAL PETROLEUM SYSTEM: Pre-Messinian (406801).

ASSESSMENT UNIT: Subsalt (40680101).

DESCRIPTION: This assessment unit is defined by the sediments beyond the continental shelf and below the Messinian (Uppermost Miocene) evaporites in the deep western Mediterranean between Spain, France, Corsica and Sardinia, Algeria, and the Bellearic Islands.

SOURCE ROCKS: Essentially unknown; thought to be as much as 4 km of sediments in this basin; comprised of Upper Cretaceous through Oligocene and Miocene shales from turbidites and pelagic sedimentation.

MATURATION: Due to attenuation in the crust underlying the region and the resultant higher heat flow, the Mesozoic or early Tertiary shales are thought to be in the range of highly mature to overmature with reference to the oil window.

MIGRATION: Migration probably less than 3 km, vertically into domes created by salt diapirism. Possibility of structural traps associated with grabens formed in the basement during crustal stretching and attenuation.

RESERVOIR ROCKS: Miocene and Oligocene sandstone and turbidites; Cretaceous carbonates, and possibly deltaic sandstones.

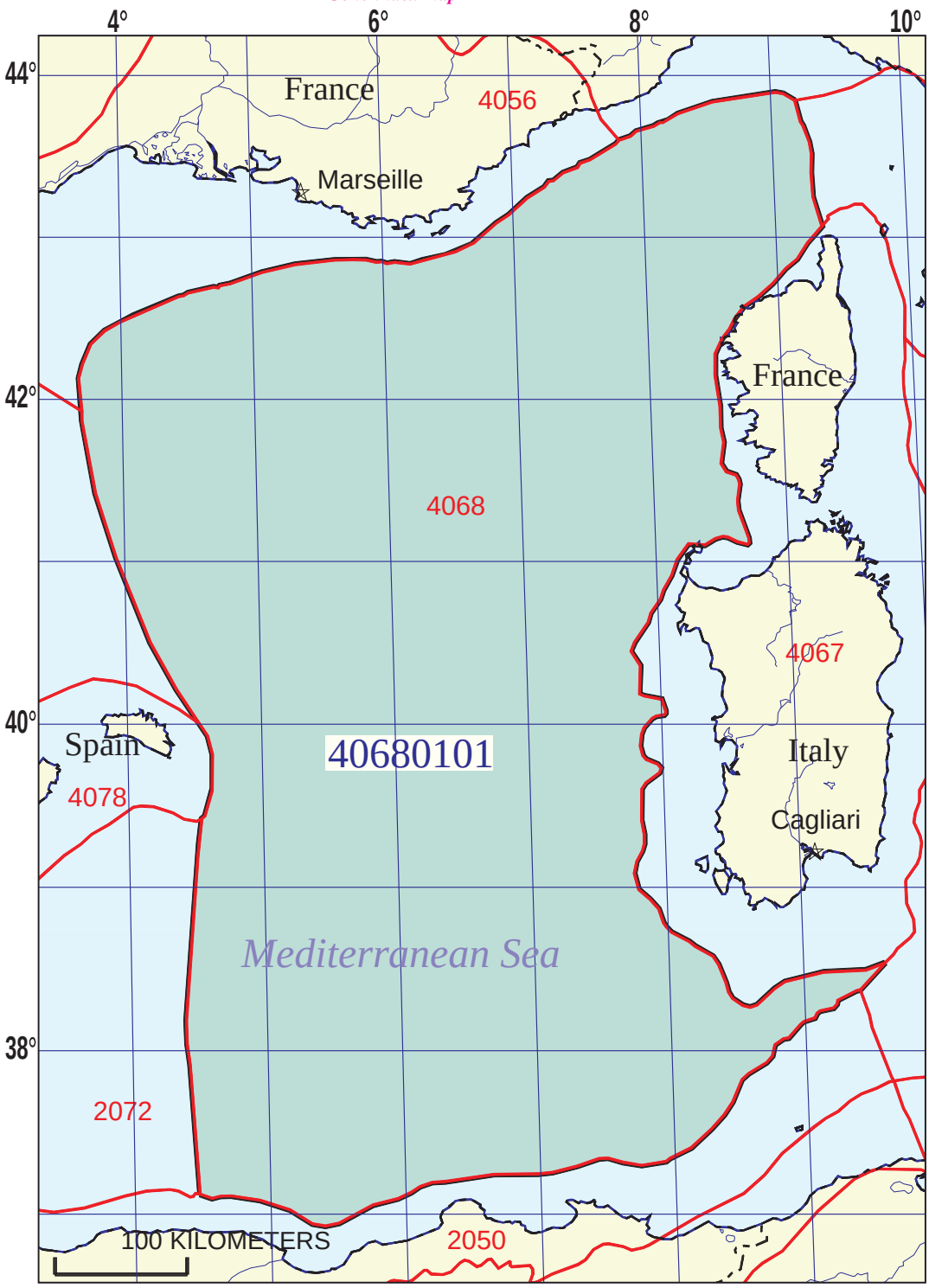
TRAPS AND SEALS: Traps are stratigraphic in turbidite sandstones, and structural in basement fault blocks. The ultimate seal for the preMiocene sediments is the 1 to 2 km thick Messinian age evaporites.

REFERENCES:

Peterson, J.A., 1994, Regional geology and hydrocarbon resource potential, the Mediterranean Sea region: US Geological Survey Open-File Report, 65 p.

Burollet, P.F., 1984, Deep Mediterranean basins and their oil potential, *in* Halbouty, M.L., ed., Future Petroleum Provinces of the World: American Association of Petroleum Geologists Memoir 40, p. 545-557.

Burrus, J., 1984, Contribution to a geodynamic synthesis of the Provençal Basin (North-Western Mediterranean): Marine Geology, v. 55, p. 247-269.



Subsalt
Assessment Unit - 40680101

EXPLANATION

- Hydrography
- Shoreline
- 4068 — Geologic province code and boundary
- Country boundary
- Gas field centerpoint
- Oil field centerpoint
- 40680101 — Assessment unit code and boundary

Projection: Robinson. Central meridian: 0

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

Date:……..	12/9/99		
Assessment Geologist:……..	M.J. Pawlewicz		
Region:……..	Europe	Number:	4
Province:……..	Provence Basin	Number:	4068
Priority or Boutique……	Boutique		
Total Petroleum System:……	Pre-Messinian	Number:	406801
Assessment Unit:……..	Subsalt	Number:	40680101
* Notes from Assessor			

CHARACTERISTICS OF ASSESSMENT UNIT

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

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……	0.6
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):…….. 0.6

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)	1	median no.	6	max no.	15
Gas fields:……min. no. (>0)	1	median no.	60	max no.	140

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	50	max. size	2500
Gas in gas fields (bcfg):……min. size	120	median size	600	max. size	36000

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)……	1100	2200	3300
NGL/gas ratio (bngl/mmcfg)……	30	60	90

Gas fields:	minimum	median	maximum
Liquids/gas ratio (bngl/mmcfg)……	22	44	66
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)……			
Sulfur content of oil (%)……			
Drilling Depth (m) ……	4500	5000	8000
Depth (m) of water (if applicable)……	2000	2500	2800

Gas Fields:	minimum	median	maximum
Inert gas content (%)……			
CO_2 content (%)……			
Hydrogen-sulfide content (%)……			
Drilling Depth (m)……	4500	6000	8000
Depth (m) of water (if applicable)……	2000	2500	2800

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. France represents 25 areal % of the total assessment unit

Oil in Oil Fields:	minimum	median	maximum
Richness factor (unitless multiplier):.....			
Volume % in parcel (areal % x richness factor):...		80	
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):...		40	
Portion of volume % that is offshore (0-100%).....		100	

2. Spain represents 25 areal % of the total assessment unit

Oil in Oil Fields:	minimum	median	maximum
Richness factor (unitless multiplier):.....			
Volume % in parcel (areal % x richness factor):...		20	
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):...		35	
Portion of volume % that is offshore (0-100%).....		100	

3. Algeria represents 20 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	
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	
Portion of volume % that is offshore (0-100%).....		100	

4. Italy represents 30 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	
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):...		20	
Portion of volume % that is offshore (0-100%).....		100	

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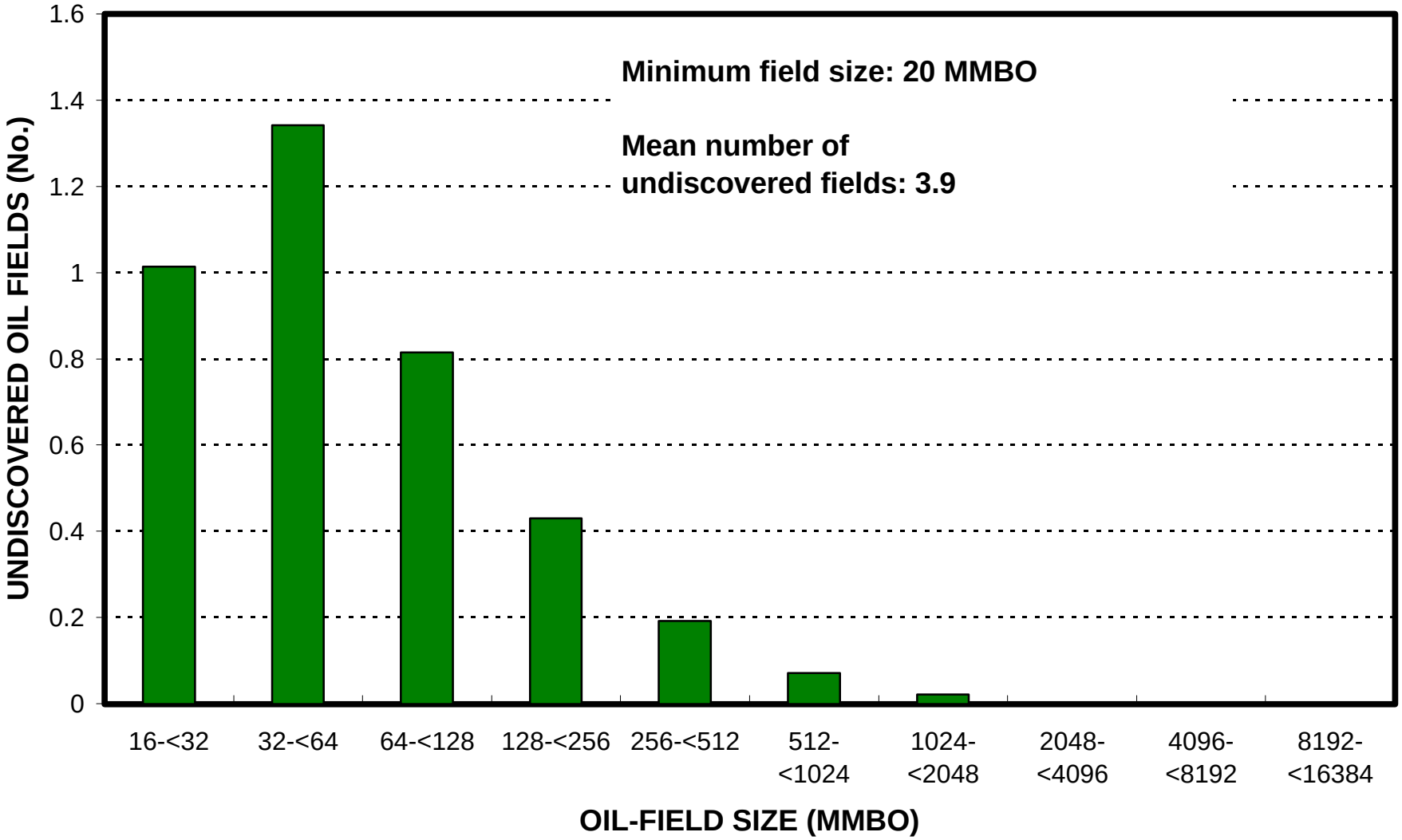
Undiscovered Field-Size Distribution



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Undiscovered Field-Size Distribution