Challenges, Risks and Constraints of Petroleum Rights Allocation in off the coasts of Western Greece and Southern Crete

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Deep knowledge of the geological potential and specific conditions of an area allows the government to design appropriate strategies for the promotion and licensing of petroleum E&P rights, including :

- **number & delineation of blocks to be licensed**
- **licensing procedures**
- **licensing terms**

that reflect potentiality and risk profile differences of certain areas

Availability of all geological/geophysical and well data of the region

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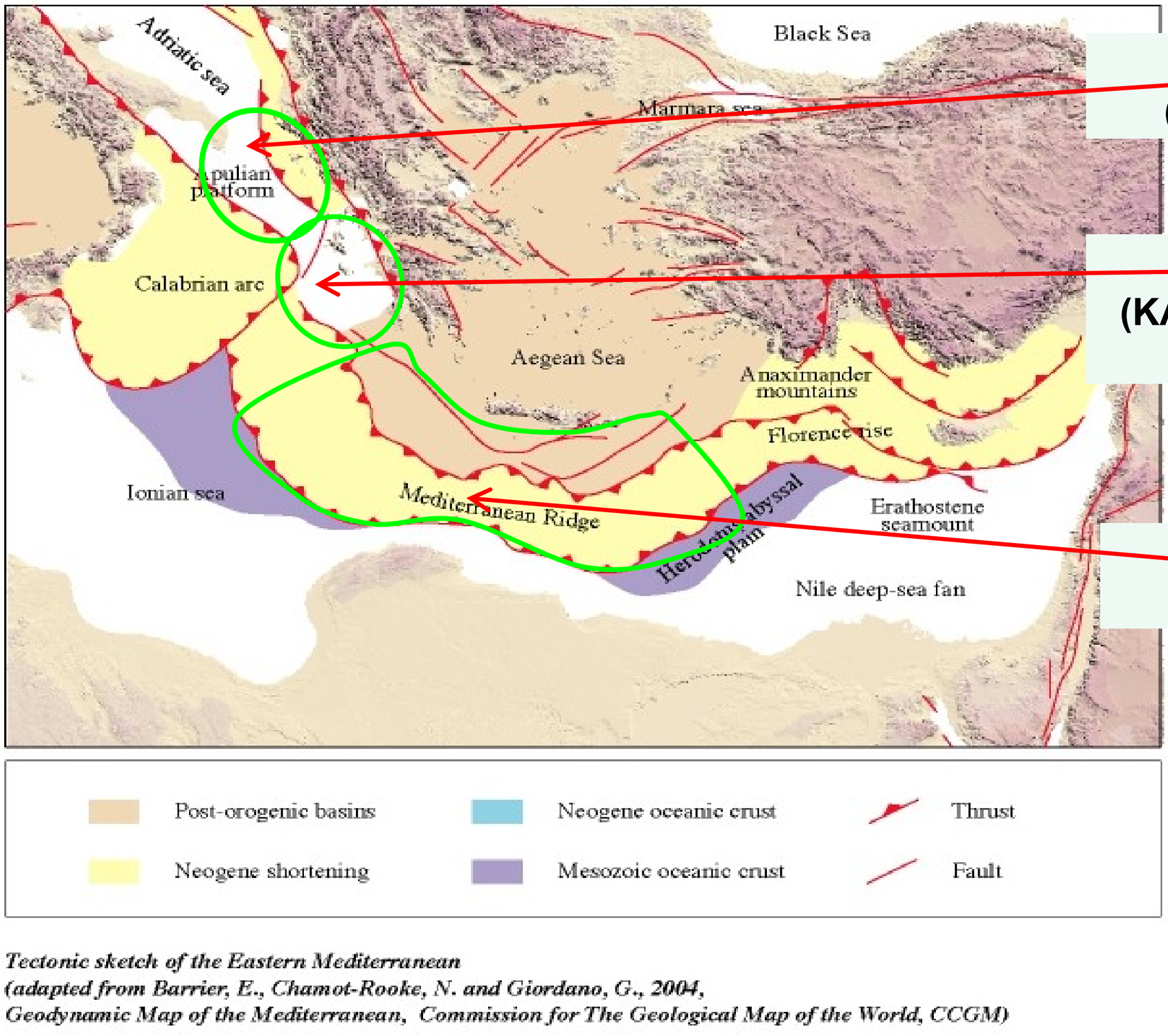
Integrated Interpretation and Assessment of the area

Regional Geological Setting



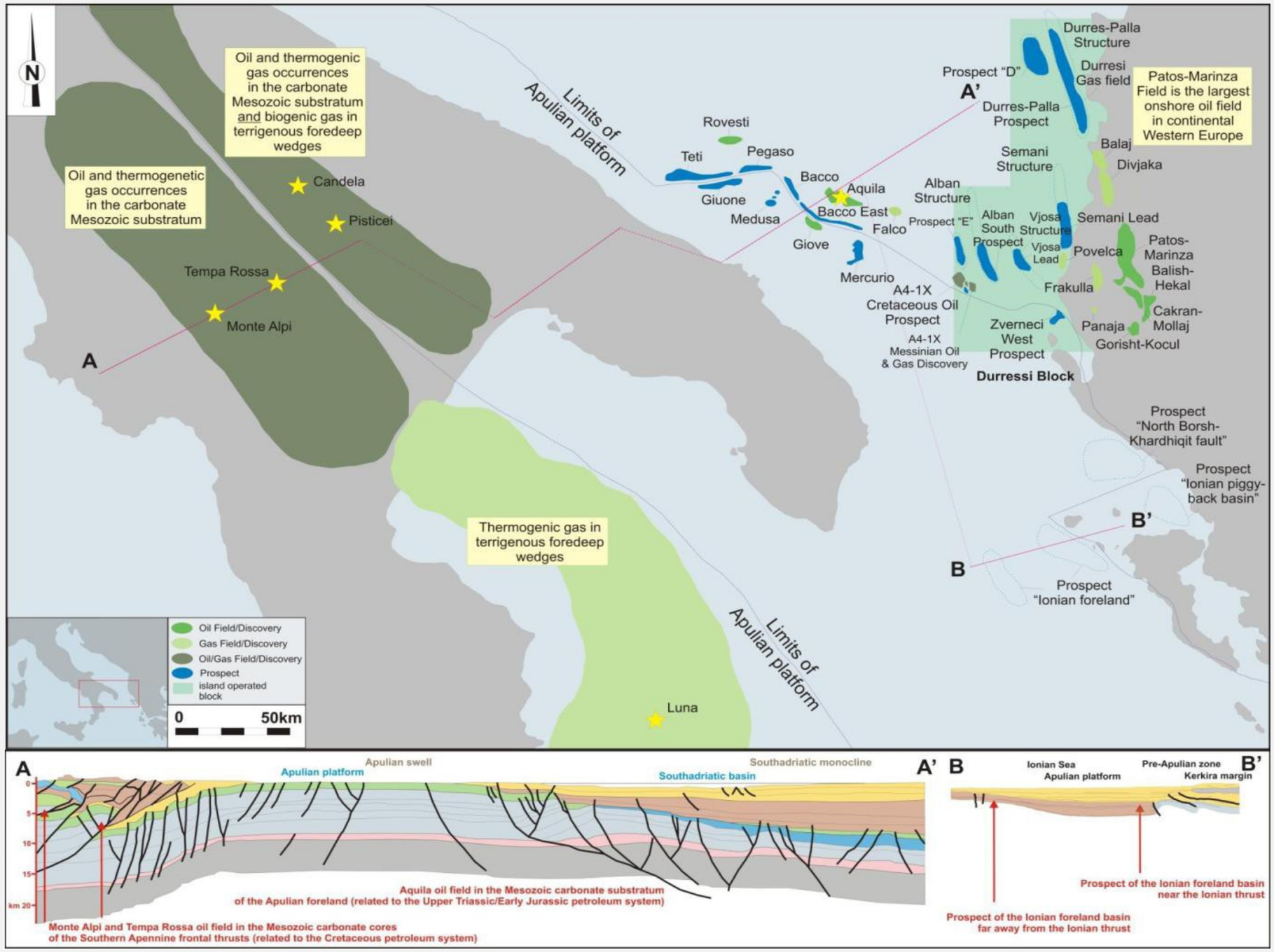
NORTH IONIAN SEA (APULIAN PLATFORM)

CENTRAL IONIAN SEA (KATAKOLON - PATRAIKOS GULF)

SOUTH IONIAN and SOUTH CRETE AREA

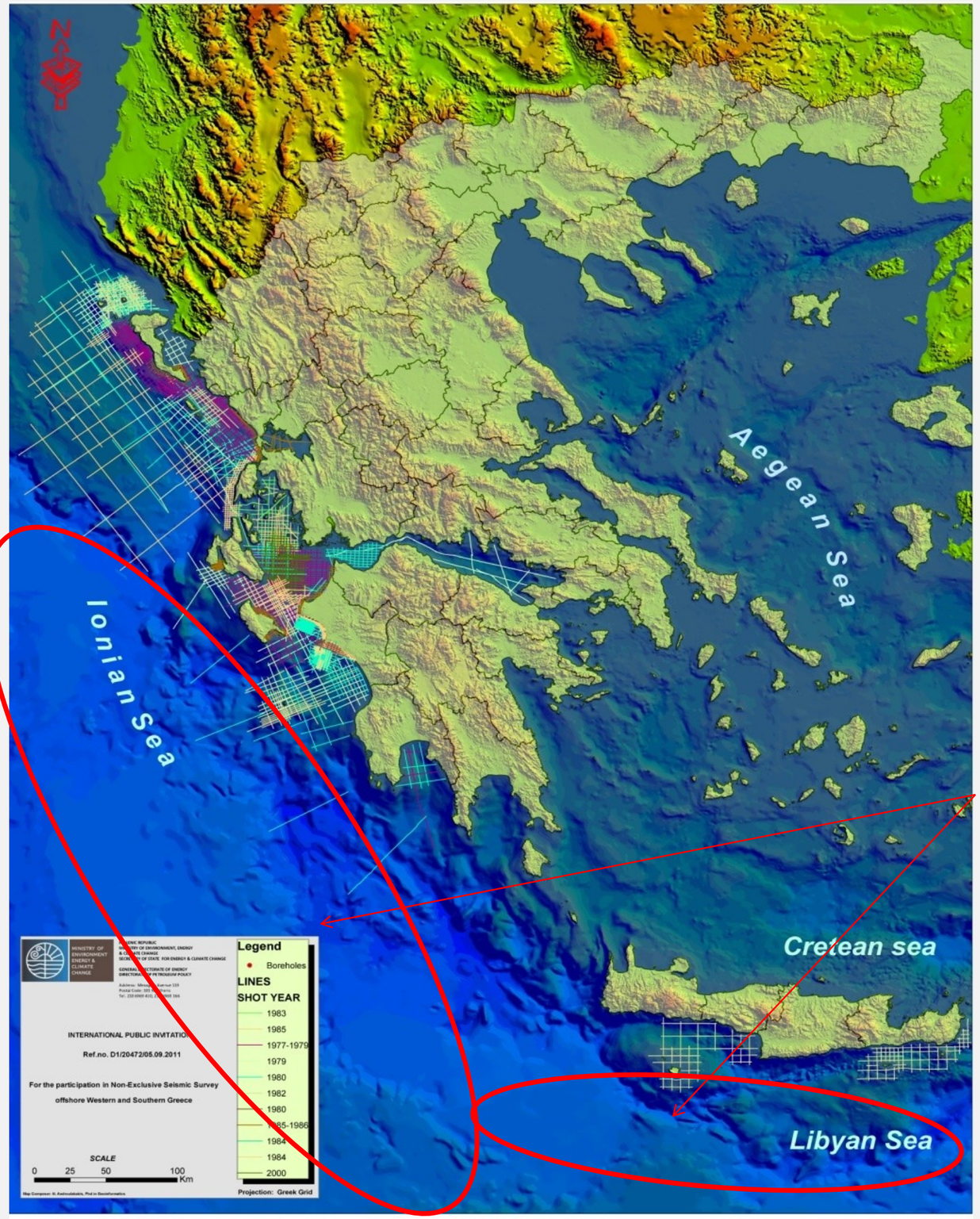
Tectonic sketch of the Eastern Mediterranean
(adapted from Barrier, E., Chamot-Rooke, N. and Giordano, G., 2004,
Geodynamic Map of the Mediterranean, Commission for The Geological Map of the World, CCGM)

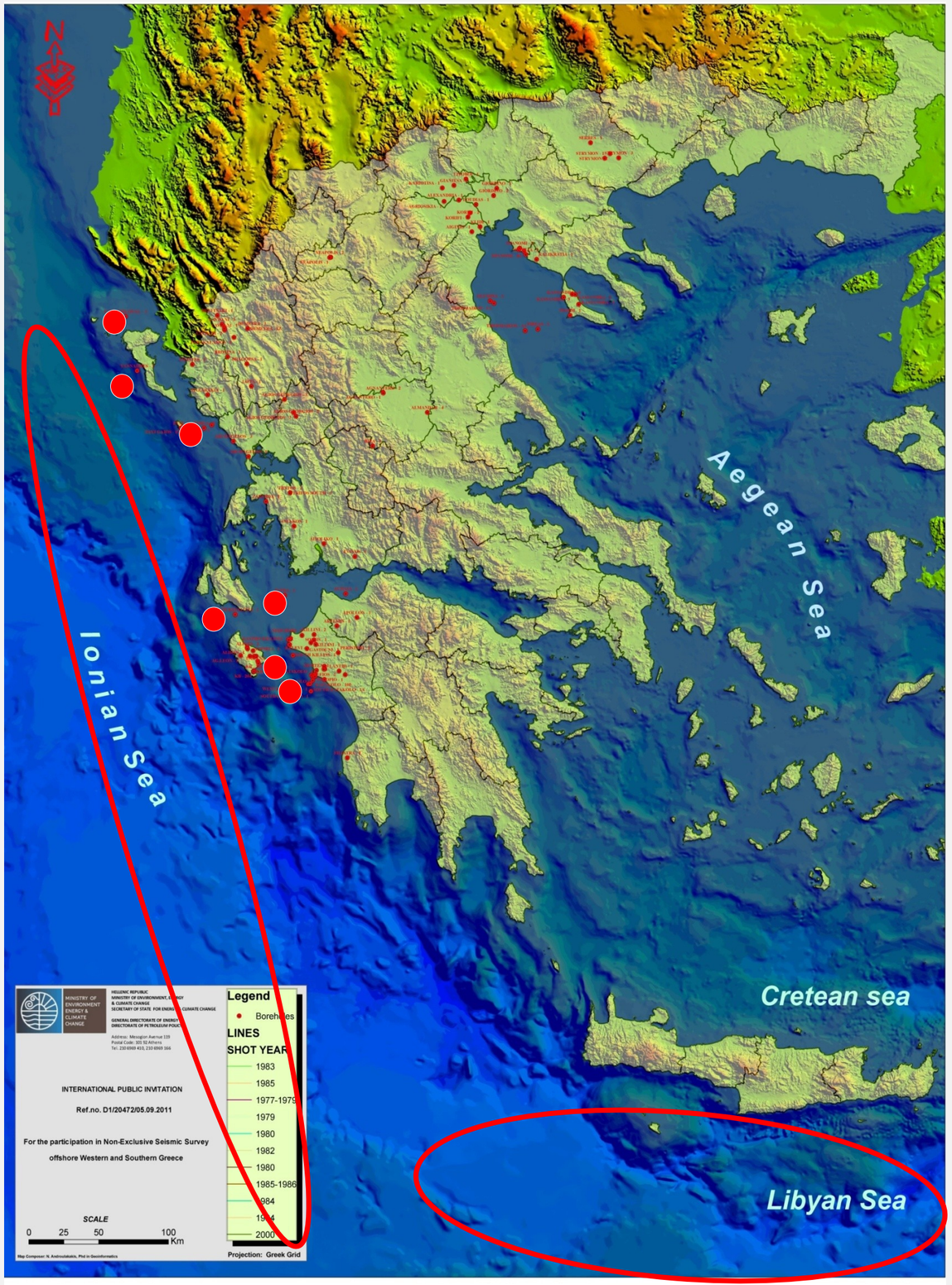
Analogs of neighbouring countries



Synthetic sketch map showing Italian and Albanian hydrocarbon plays with an attempt for correlation with the northwestern part of Greece. (A Zelilidis et all)

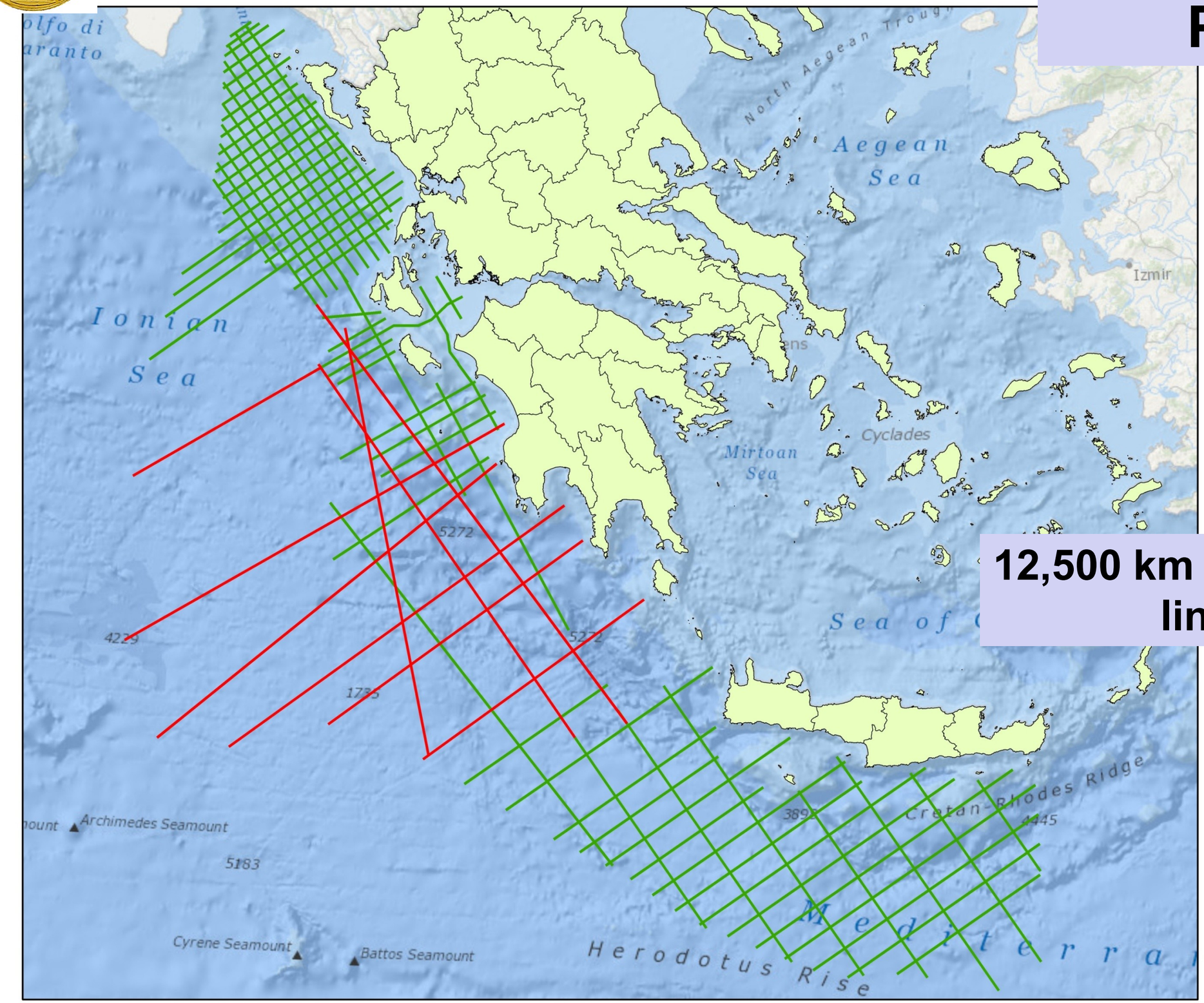
Data available
Legacy Seismic & Well Data





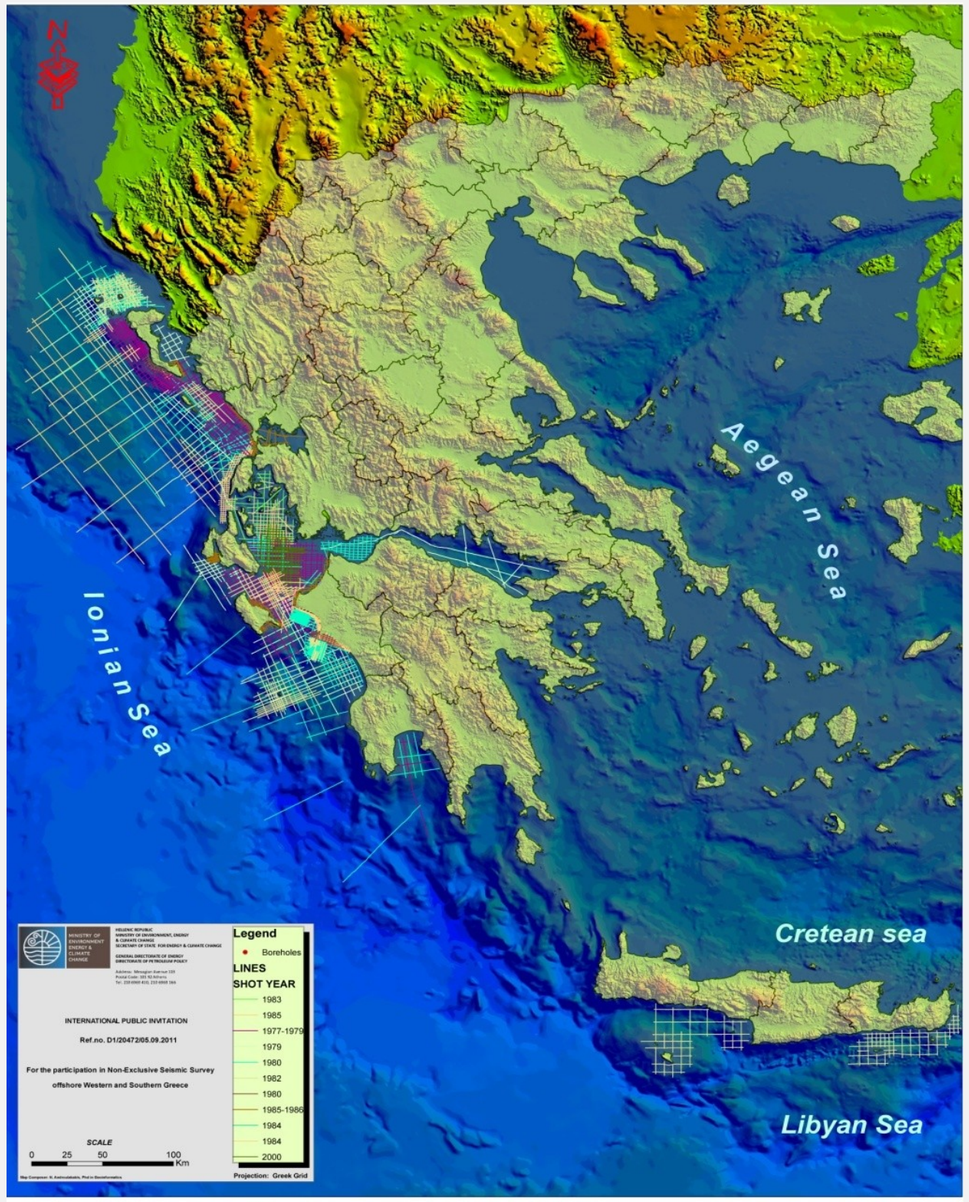
Data available - New Seismic Data

PGS



12,500 km of seismic lines

“Ionian Mega Project”



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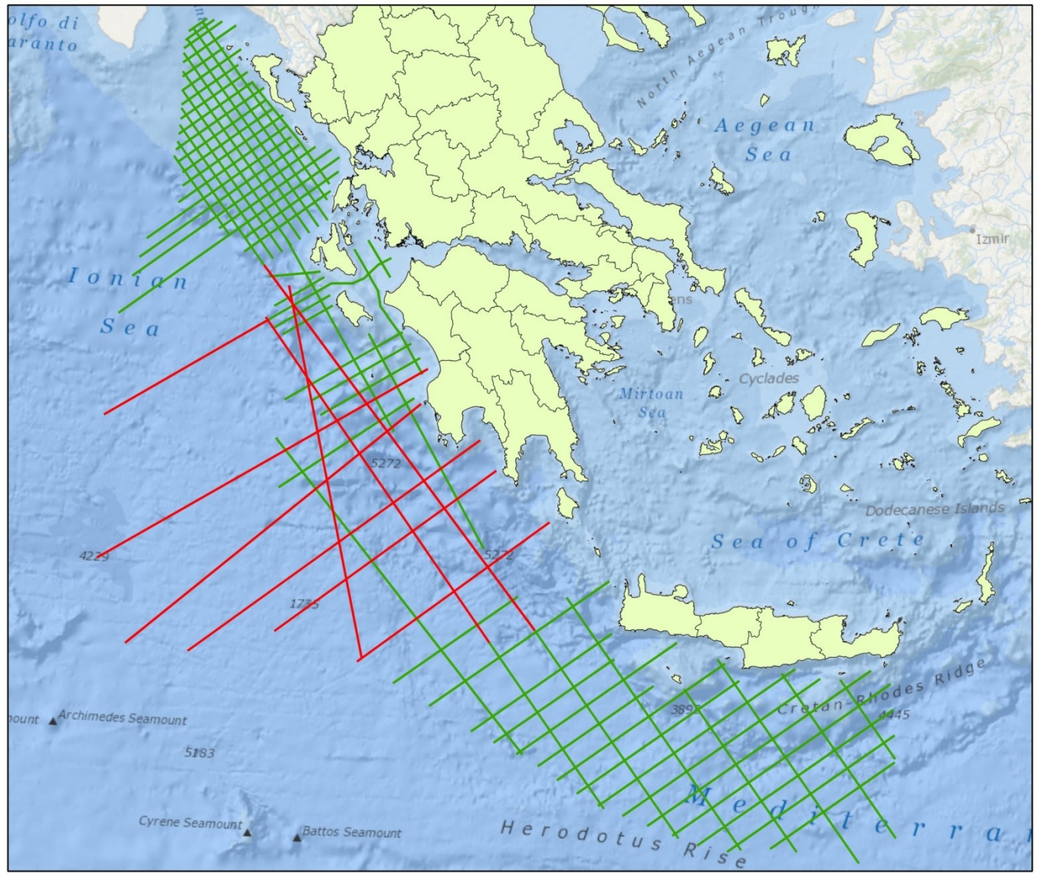


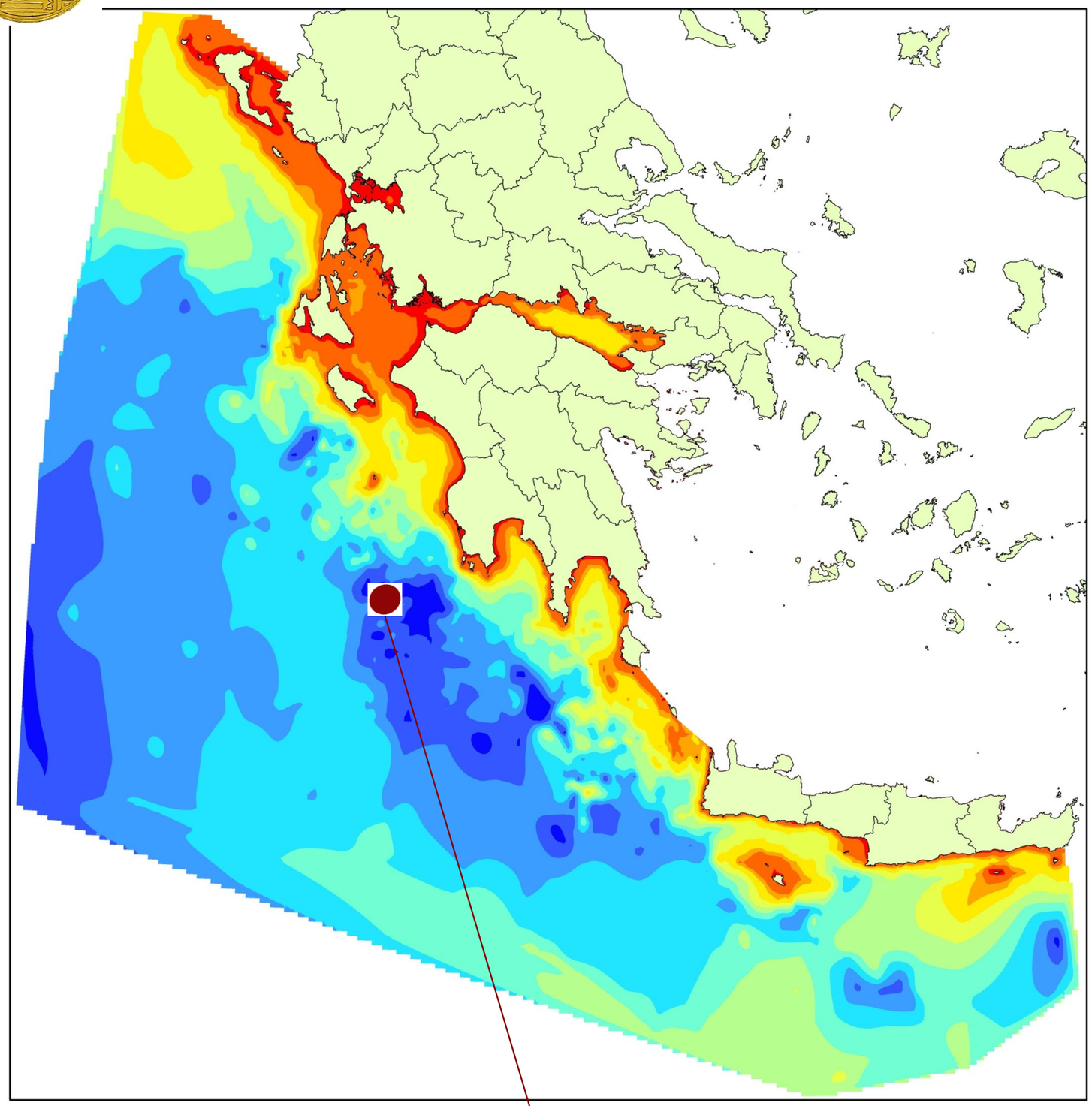
Consistent and Compatible Data System

It's amazing what we can see from 30,000 ft when the clouds completely clear and we take the time to focus our vision

StatoilHydro

Specific regional conditions

Bathymetric map



“Calypso Deep”, 5267 m

Characteristics

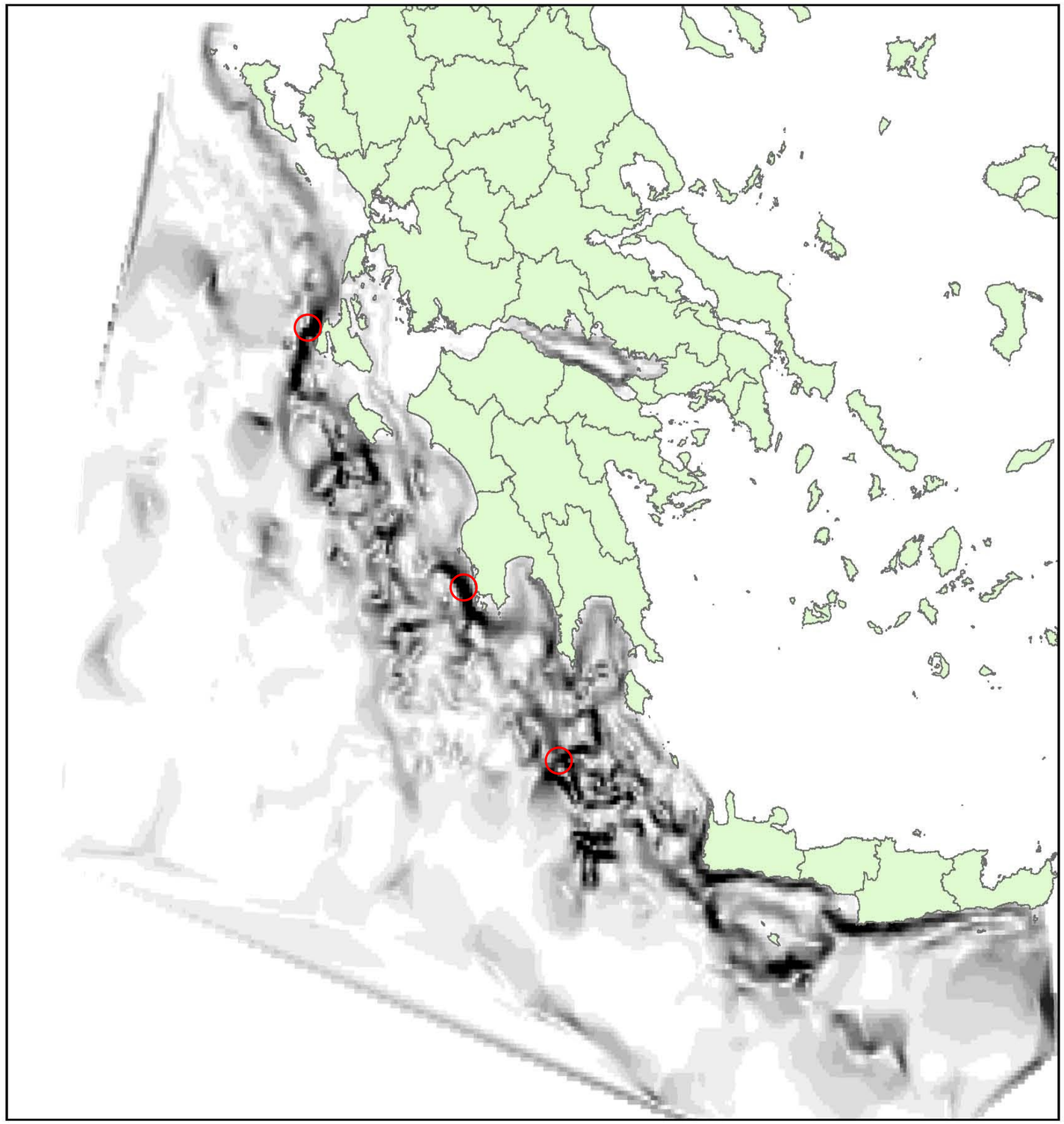
Water depth

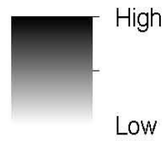
- ***From 50-100 m very nearshore to 5.000 m***

No smooth transition of water depth

- ***High upstands***
- ***Very intense sinkings***

Bathymetric map





1 cm = 35 km

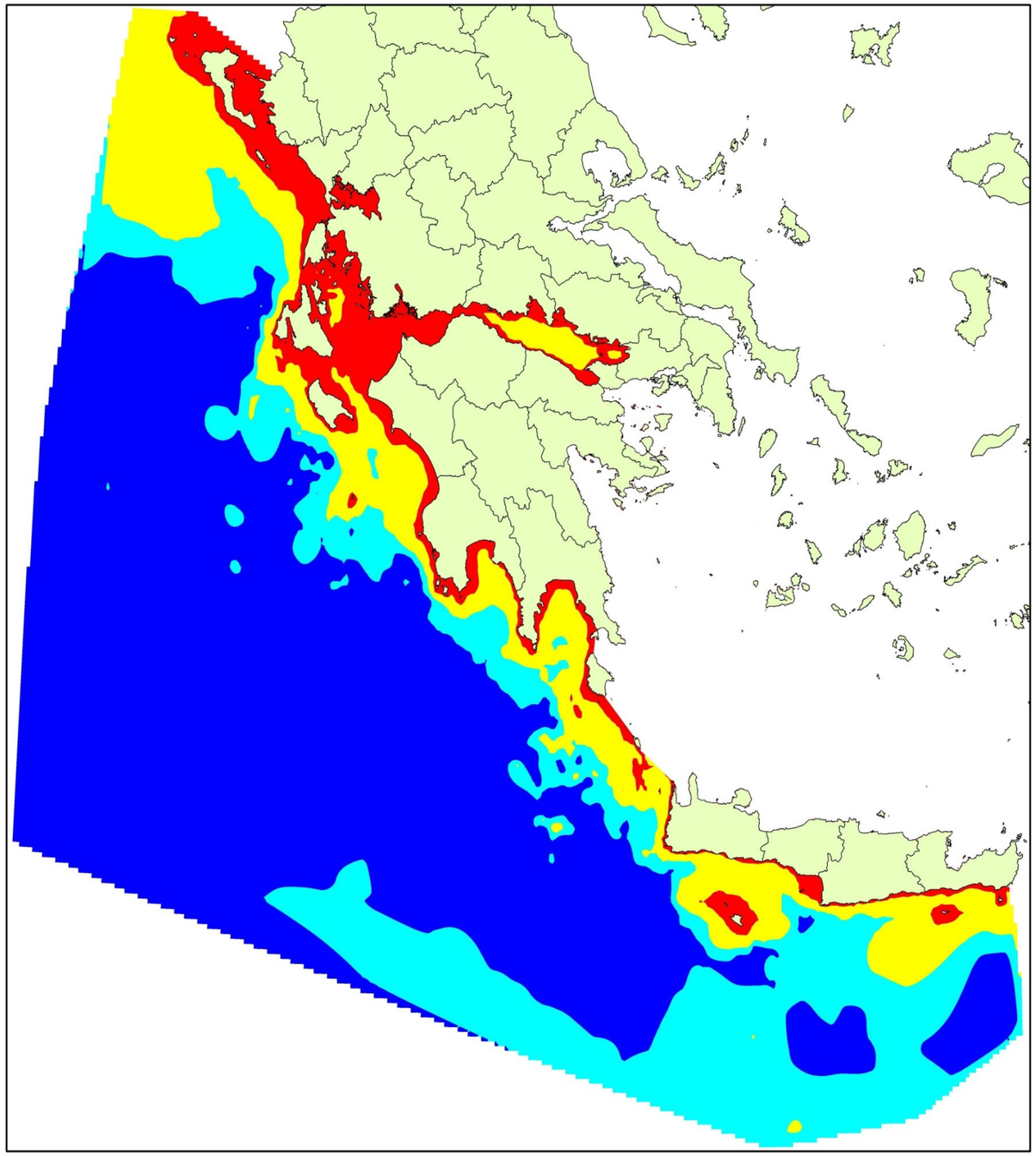
Percent slope
The darker the color, more steeper the slope
(A flat surface is 0 percent, a 45 degree surface is 100 percent, and as the surface becomes more vertical, the percent rise becomes increasingly larger.)

Characteristics

Steep Slopes

- ***From 50 to 2000 m in less than 7km in several places***
- ***From 2000 m to 3000 m in less than 1 km***

Potential Drilling Depth



“Deepwater” Definitions:

Pre Macondo:

Water Depth (m)	Designation
0-300	Shallow
300-1500	Deepwatter
1500 -	Ultradeep

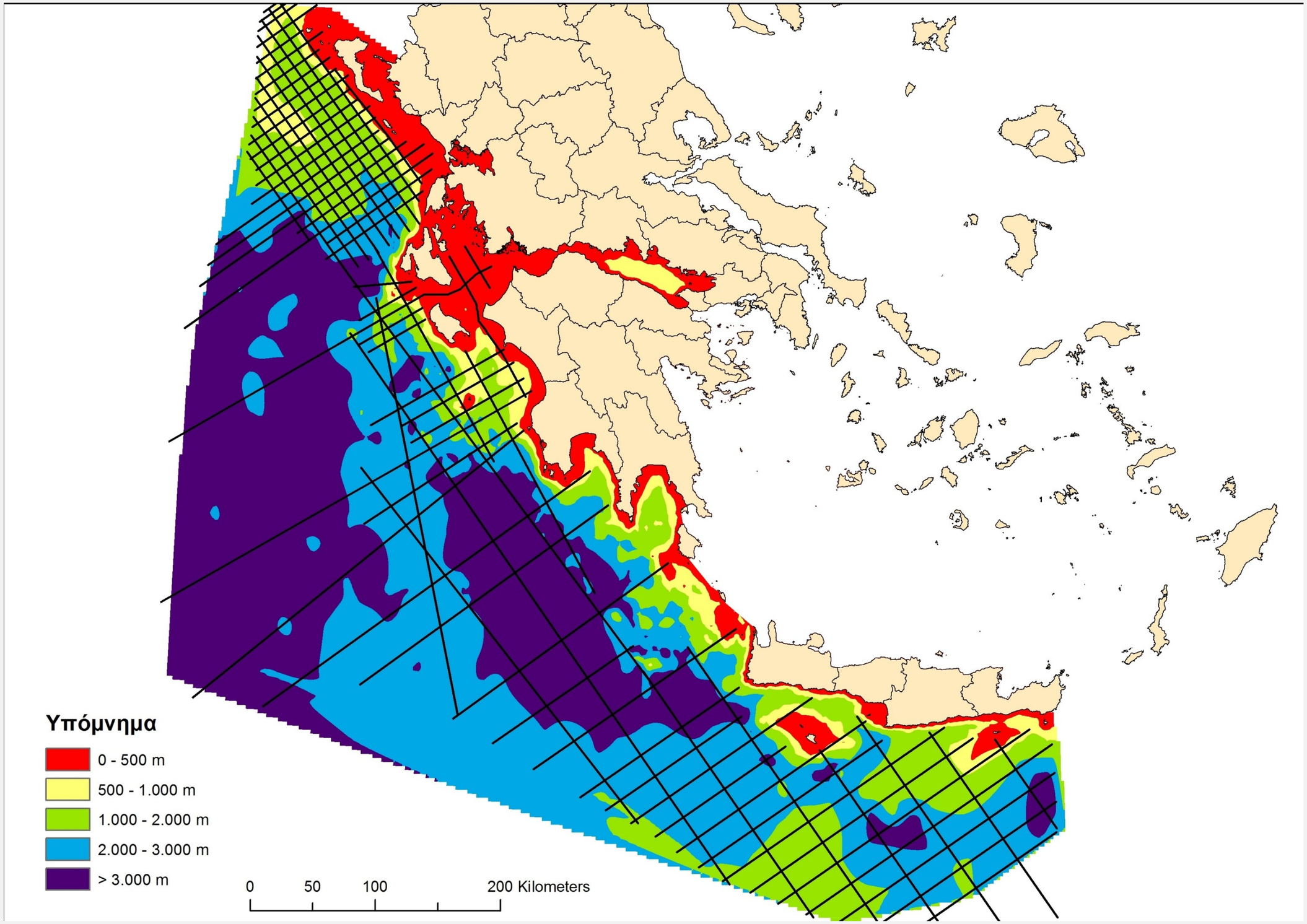
EIA, BSEE (Bureau of Safety and Environmental Enforcement), Bureau of Ocean Energy Management (BOEM) cite ***1000 ft*** *as a cut-off*

Post Macondo:

BSEE’s Gulf Of Mexico (GOM) well permit, U.S Department of Interior cite ***500 ft*** *as the cut-off*

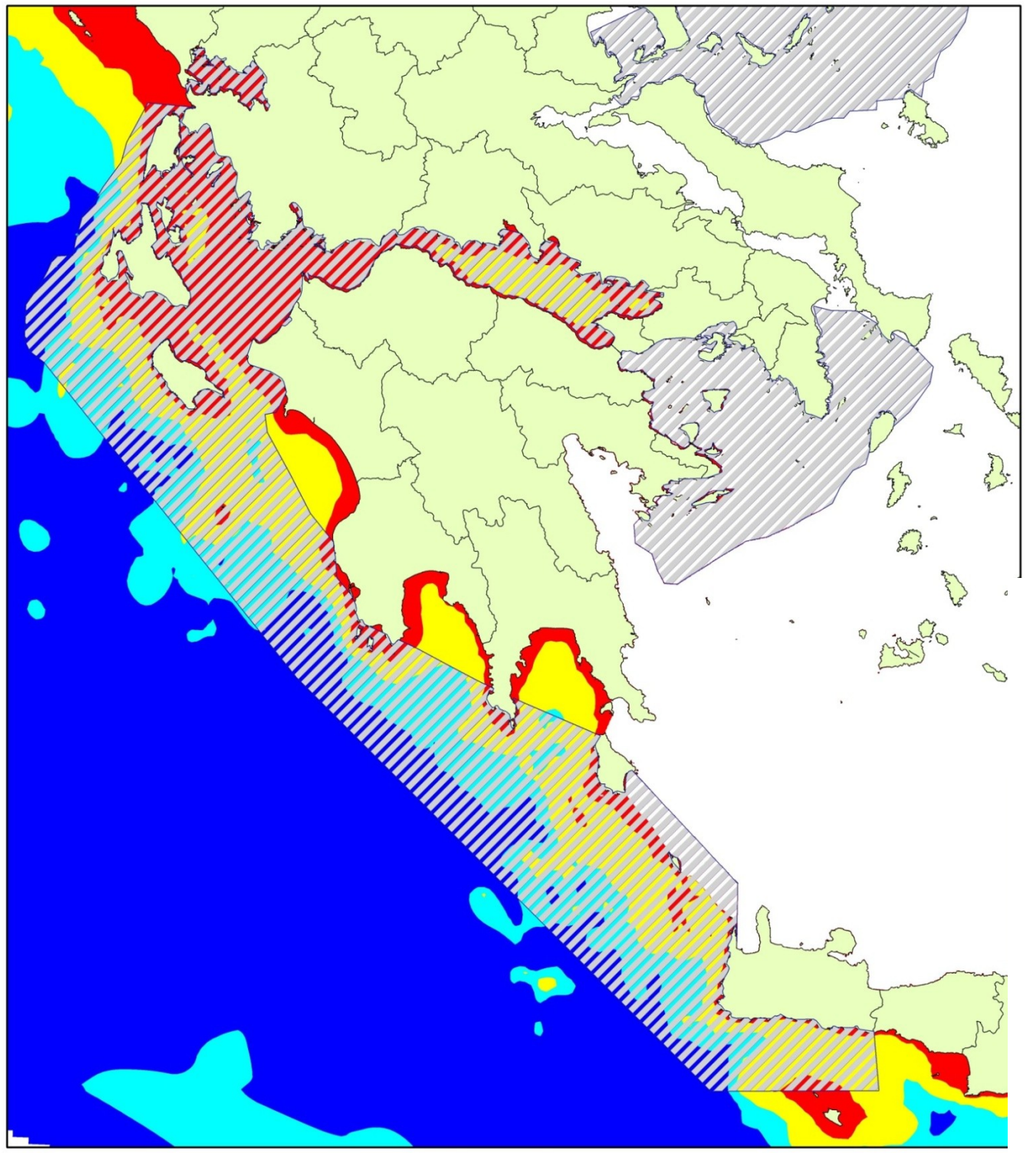
Most acreage in deep & ultra deep water depth

Bathymetric map and Seismic Survey



Seismic Survey covers all water depth variation

Geographical-Social-Environmental Issues



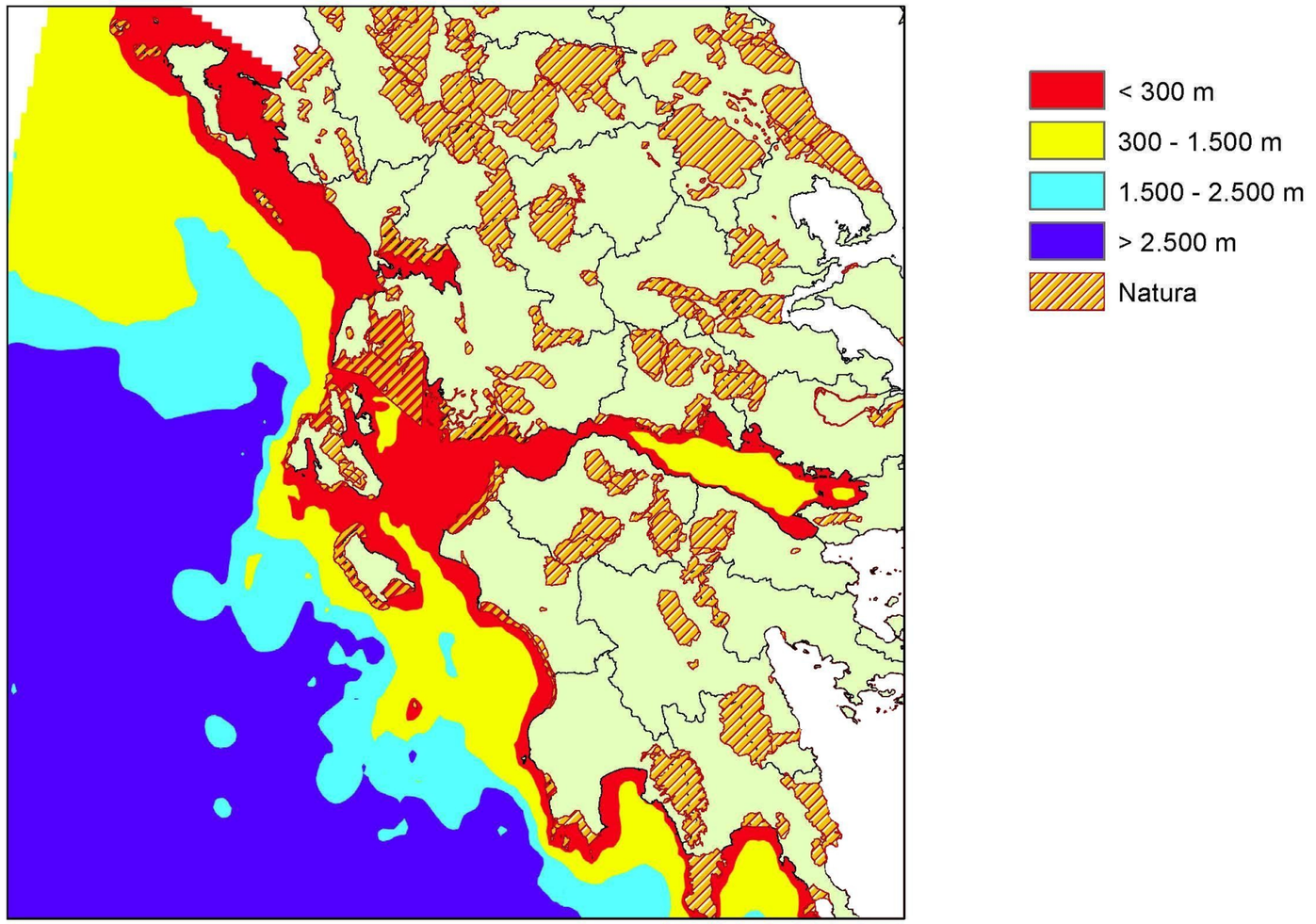
Complex cluster of islands

Tourism: principal economic activity

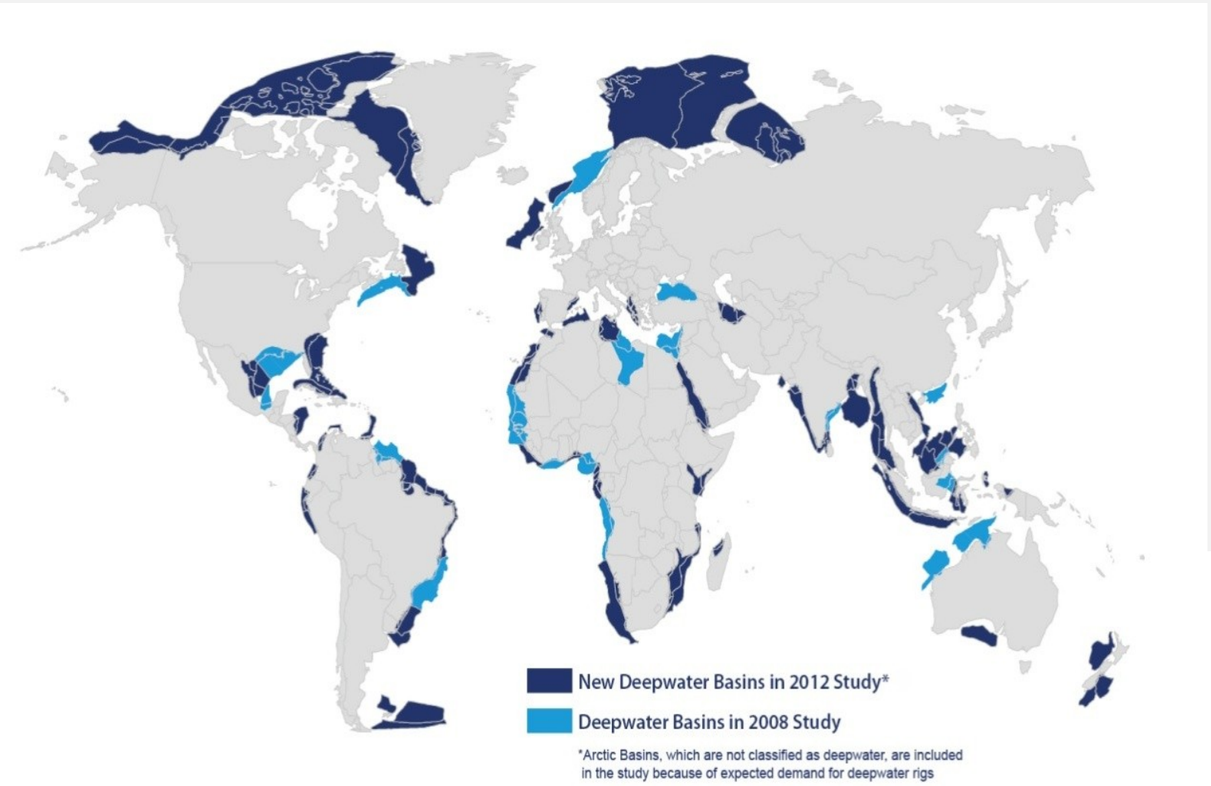
Heavy traffic of ships and yachts

Areas of high natural beauty

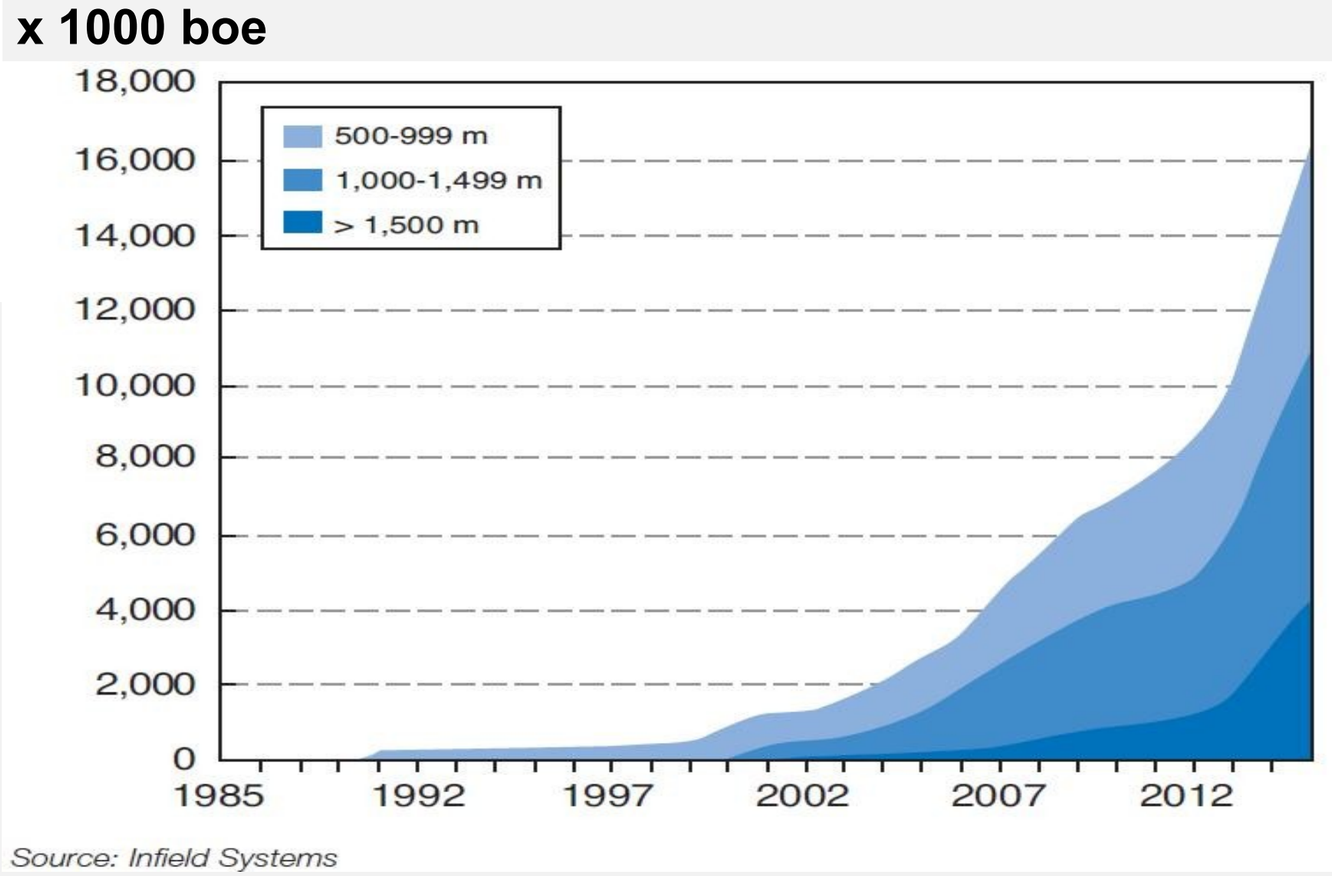
Protected areas (Accobams, natura, national parks)



Deep Water Exploration & Production

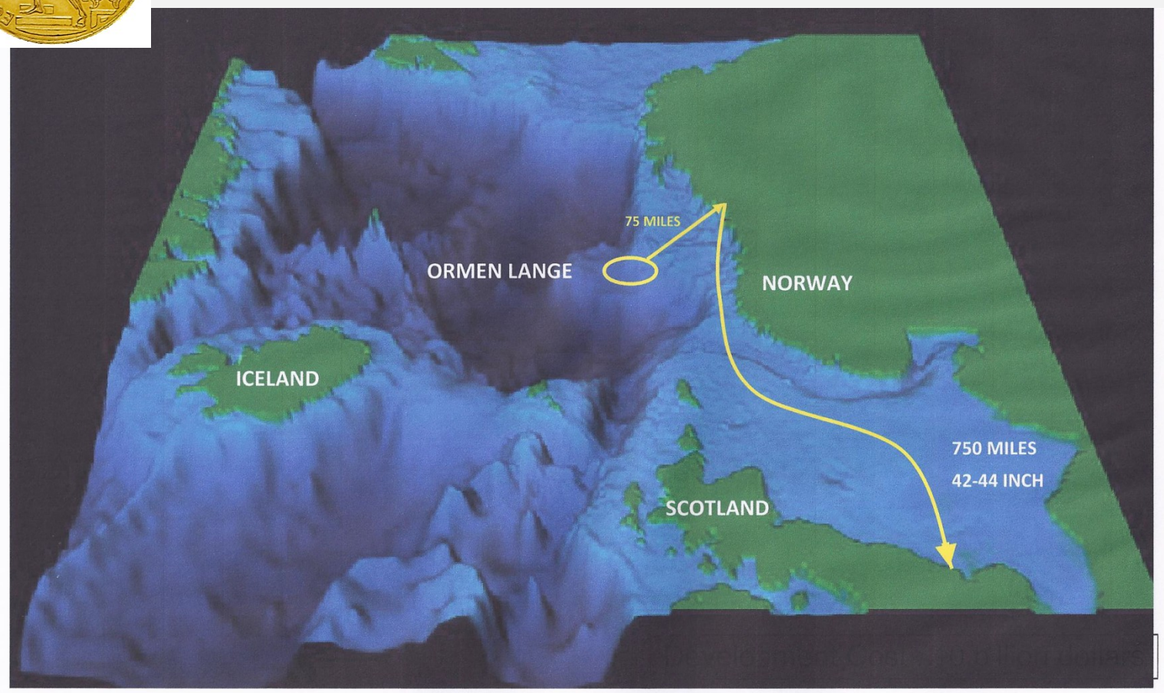


New exploration areas



Deep and Ultra Deep water Hydrocarbon production

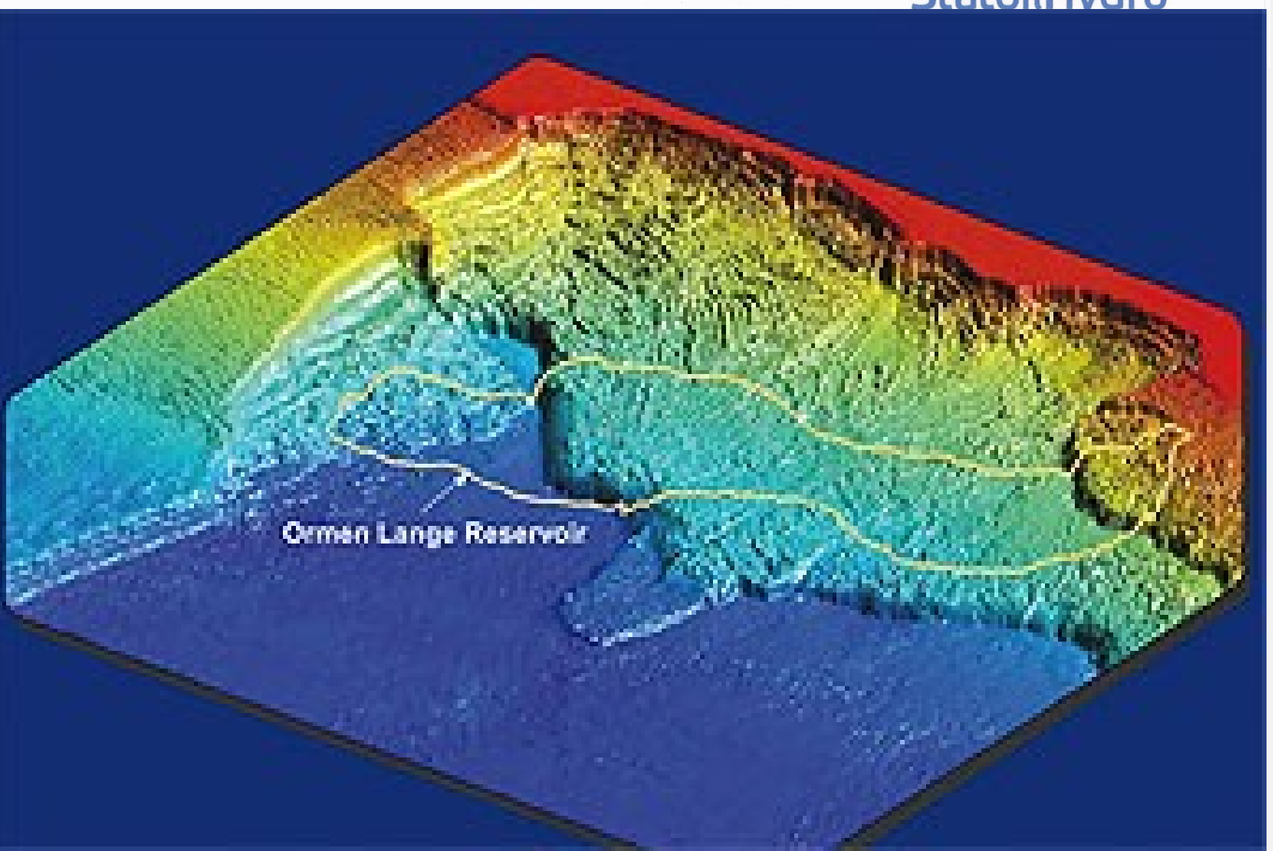
“Ormen Lange” Field

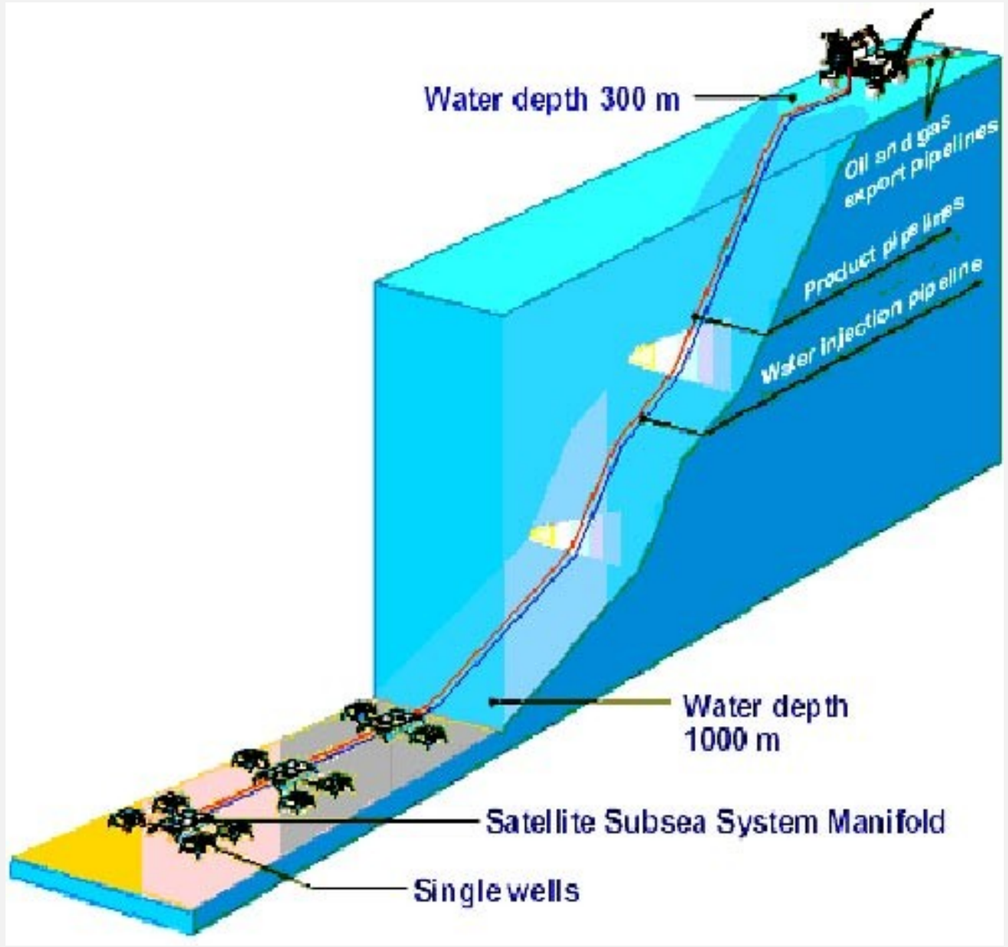


THE ORMEN LANGE PROJECT

STATOILHYDRO FIELD DEVELOPMENT OPERATOR & SHELL PRODUCTION/OPERATIONS OPERATOR

StatoilHydro





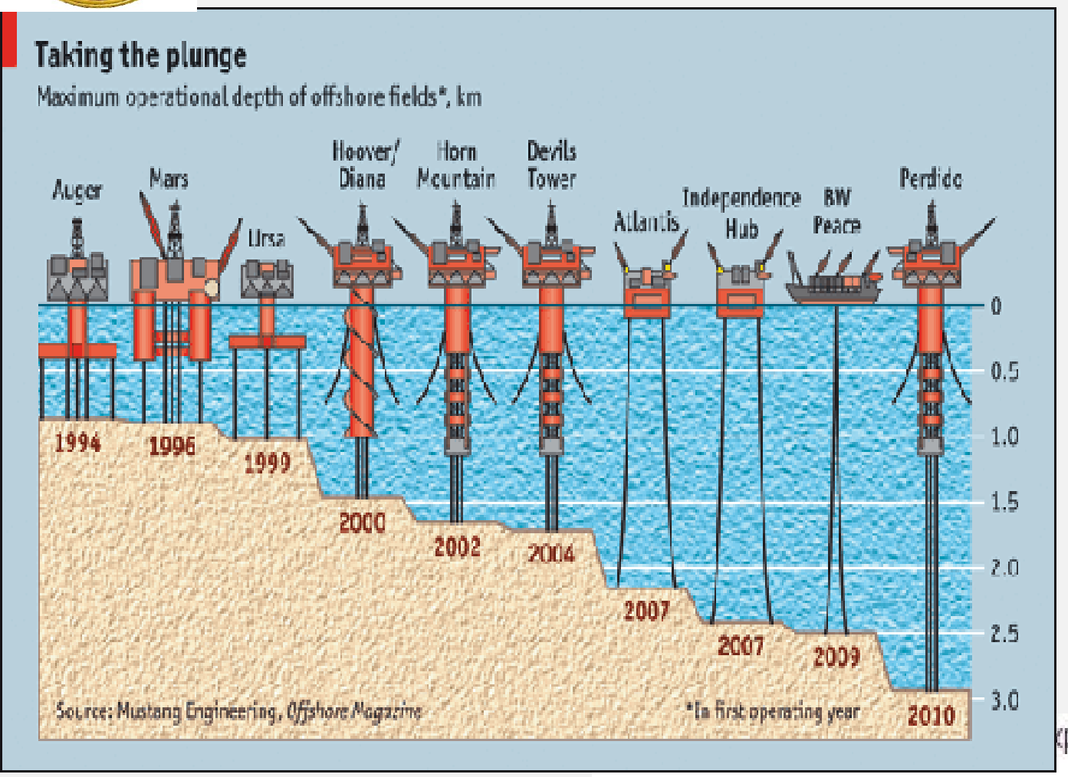
The field lies in a depth of 800-1,200m, close to the steep back wall left by the Storegga submarine slide.

Estimated reserves: 315 billion m3 of gas.- Third largest gas discovery on the Norwegian shelf

In production since 2007

“The project meets 15% of the UK's gas requirements."

Deep Water Exploration

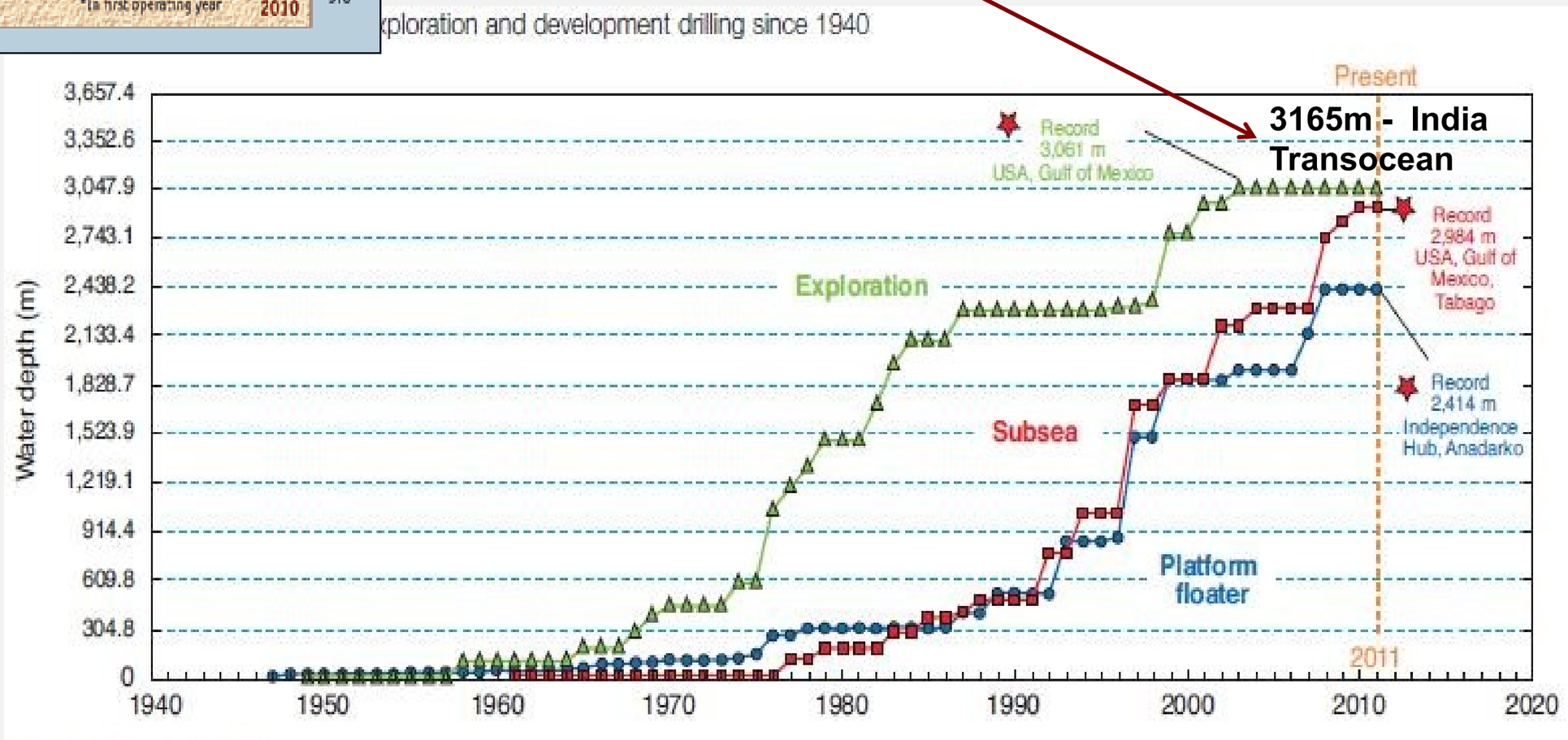


The days of cheap and easy-to-drill oil are over. Now comes the hard work of finding and producing oil from more challenging environments.

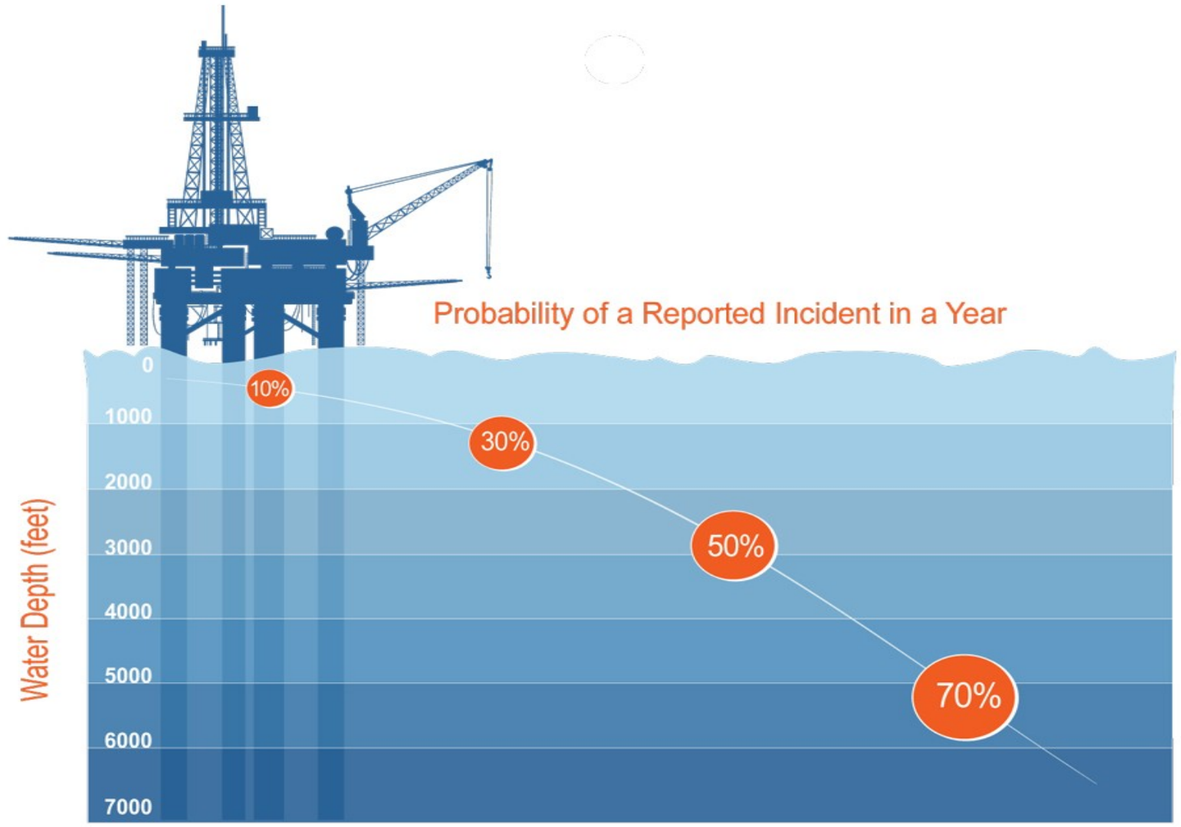
Technology has proved its ability to go deeper

Innovation & technology maturity

Highly educated and trained personnel



Associated risk & cost



The annual probability of a company-reported incident increases with water depth, even after controlling for the levels of production, facility complexity, company in charge, and distance to shore.

Year	High Deepwater Rig Dayrate
2002	$222,750
2003	$225,000
2004	$230,000
2005	$318,500
2006	$475,000
2007	$528,000
2008	$629,000
2009	$629,000
2010	$650,000
2011	$703,000
2012	$703,000

Day rates for semisubmersibles and drillships in the Gulf generally range from the high $300,000s to the low- to mid-$500,000s, but there are indications that drilling contractors could see significantly increased day rates when these contracts expire and new agreements are put into place.

Creating Blocks of comparable attractiveness

REPUBLIC OF LEBANON Ministry of Energy and Water(2013)

Main Parameters to be considered

- Number of blocks to be licensed in the upcoming round
- Block size (*no binding provision in the Petroleum Act, Law 2289/95 as in force*)
- Location of Blocks *(shallow/deep, deep/ultradeep, bathymetric constraints ?)*
- Expected depth of potential structures

Proven and well tested technology to be applied

Subject to

- ✓ **Potential Prospectively of the region (based on all available information/data)**
- ✓ **Strategy for the promotion of high interest areas along with those where more information is required aimed to maximizing the value of the total region in both near and long term**

Main Parameters to be considered

Fiscal regime

(royalties, rate of return, cost recovery ceilings, depreciation, etc)

- **Specifically tailored system to stimulate the exploration and development of deepwater acreages ?**

❖ **To provide motivations for increasing E&P investment and compensate exploration and production cost and risk**

❖ **To balance regional asymmetries**

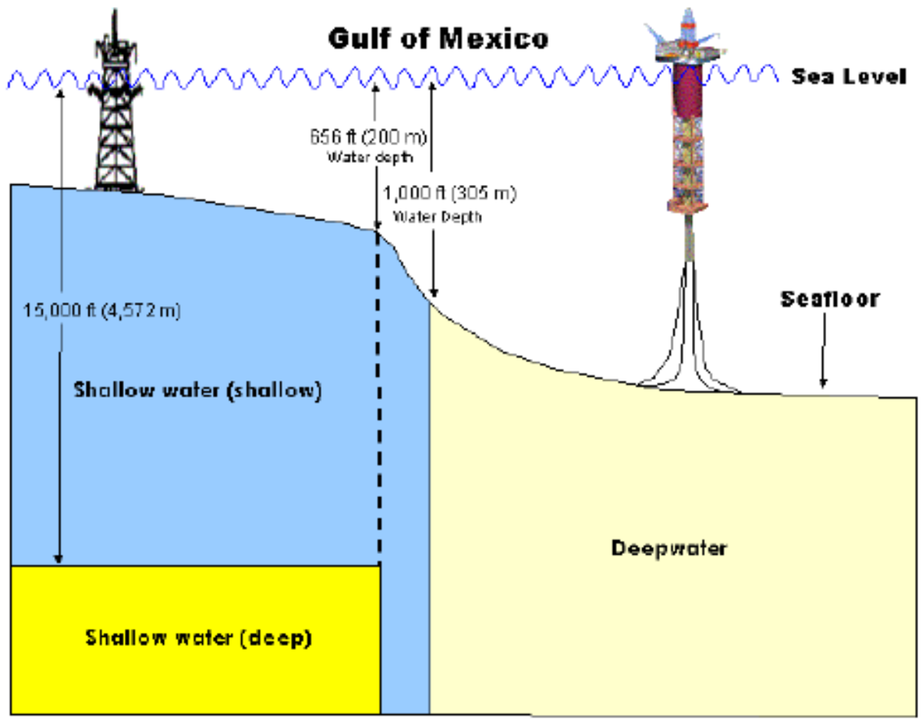
Fiscal regime

1. **Profit oil & gas share for wells in shallow grid area of less than 200m water depth and depth to reservoir shallower than 4,000m**

Cumulative Available Oil/ Available Gas from Contract Area	Government Holdings Share of Profit Oil/Profit Gas in Contract Area		Contractor Share of Profit Oil/Profit Gas in Contract Area	
MMBOE	*Crude Oil/LPG/ Condensate*	*Natural Gas*	*Crude Oil/LPG/ Condensate*	*Natural Gas*
0 – 100	20%	10%	80%	90%
> 100 – 200	25%	15%	75%	85%
> 200 – 400	40%	35%	60%	65%
> 400 – 800	60%	50%	40%	50%
> 800 – 1200	70%	70%	30%	30%
> 1200	80%	80%	20%	20%

2. **Profit oil & gas share for wells in deep grid area of more than or equal to 200m and less than 1,000m water depth or deeper than 4,000m to reservoir in shallow grid area**

Cumulative Available Oil/ Available Gas from Contract Area	Government Holdings Share of Profit Oil/Profit Gas in Contract Area		Contractor Share of Profit Oil/Profit Gas in Contract Area	
MMBOE	*Crude Oil/LPG/ Condensate*	*Natural Gas*	*Crude Oil/LPG/ Condensate*	*Natural Gas*
0 – 200	5%	5%	95%	95%
> 200 – 400	10%	10%	90%	90%
> 400 – 800	25%	25%	75%	75%
> 800 – 1200	35%	35%	65%	65%
> 1200 – 2400	50%	50%	50%	50%
> 2400	70%	70%	30%	30%



Concluding Remarks

Data availability

- Data of high quality
- Integrated, consistent, compatible digital information (Legacy + New data)
  Ionian Mega Project
- Interpretation report – Definition of potential targets
- Hydrocarbon assessment report based on all available information
- SEA including the identification of the most vulnerable areas.

Comprehensive assessment of regional characteristics and definition of the measures needed to be taken to

- Maximize the value of the entire area
- Motivate deep water exploration
- Create blocks (shape, size, location) of comparative attractiveness
- Manage the complexities and balance regional asymmetries

To undertake exploitation of oil and gas resources in a social, economical and environmentally sustainable and technically responsible manner

Thank you