

**GREECE - 2013**

**Exploration and Production of Hydrocarbons  
From the Planning (2012)  
to Implementation (2013)**

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**Ex. Technical Advisor ENERGEAN OIL & GAS**

**Ex. Technical Director of HELLENIC PETROLEUM SA**

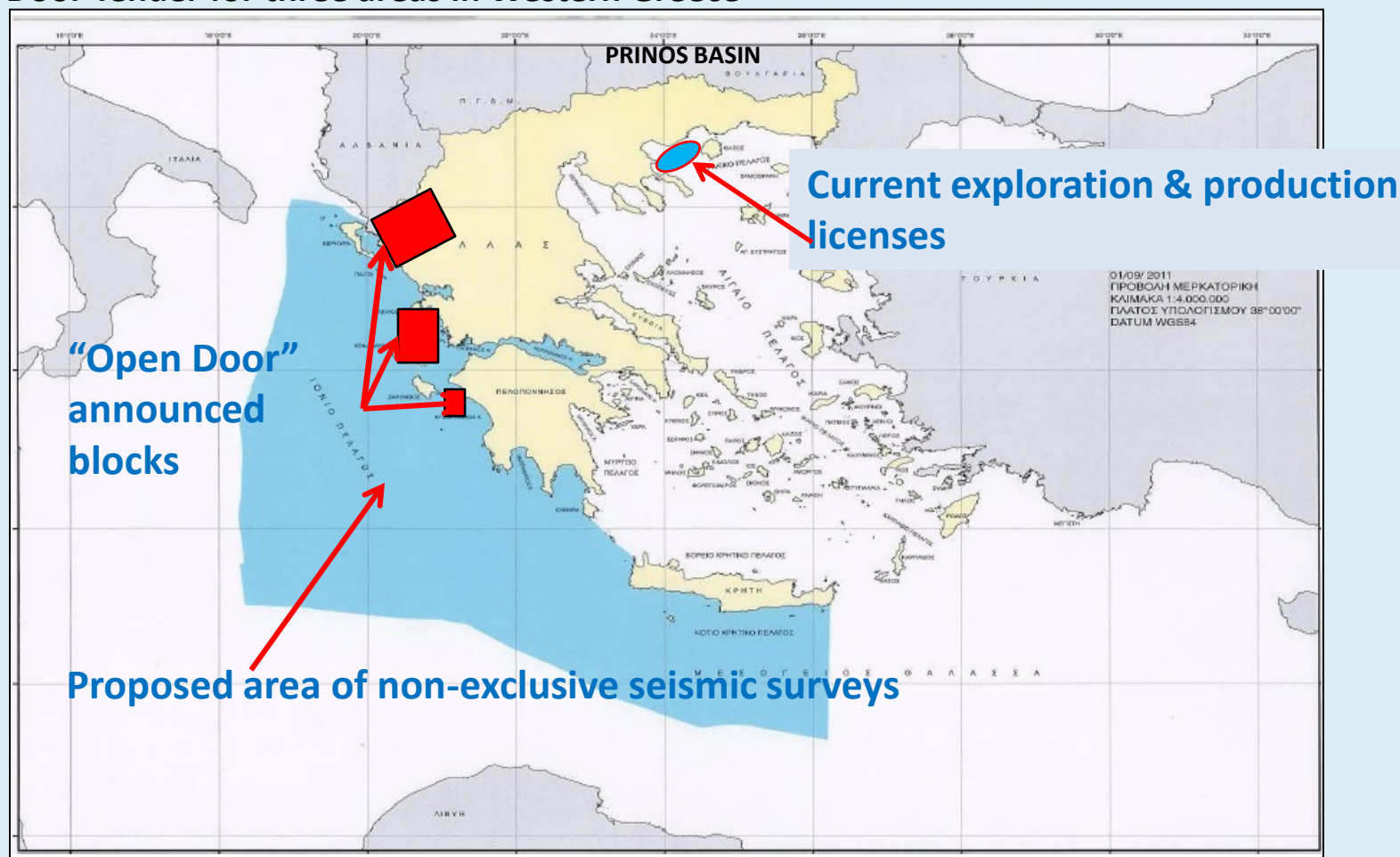
# **PLANNING FOR THE GREEK LICENSING ROUND**

**Dr KONSTANTINOS A. NIKOLAOU**  
**Petroleum Geologist – Energy Economist**  
**General Director KANERGY Ltd ([kanergy@otene.gr](mailto:kanergy@otene.gr))**  
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**Nicosia, Cyprus, January 26, 2012**

# Exploration Activity in Greece - Current Status

- After 12 years of inactivity, establishment of the Hellenic Hydrocarbons Management Company S.A, 2011 (organize, execute exploration and/or production tenders, evaluate offers, select winners, prepare contract agreements and constantly supervise appropriate execution)
- Non-exclusive seismic surveys
- Open Door Tender for three areas in Western Greece



# Greece: First “Open Door” Exploration Areas

Areas integrated in the process “open door”

- *Gulf of Patras*
- Epirus – Ioannina
- Western Katakolo

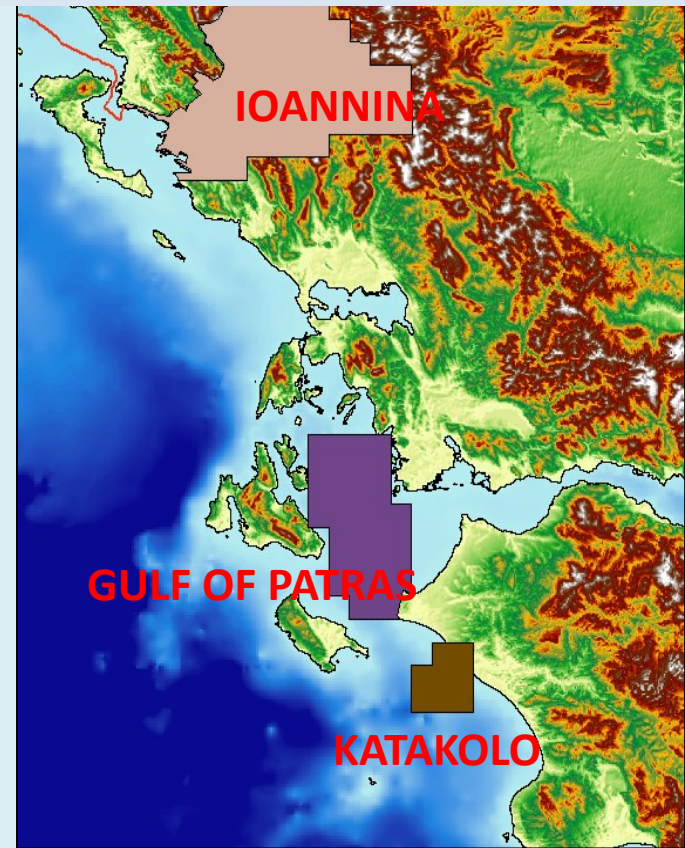
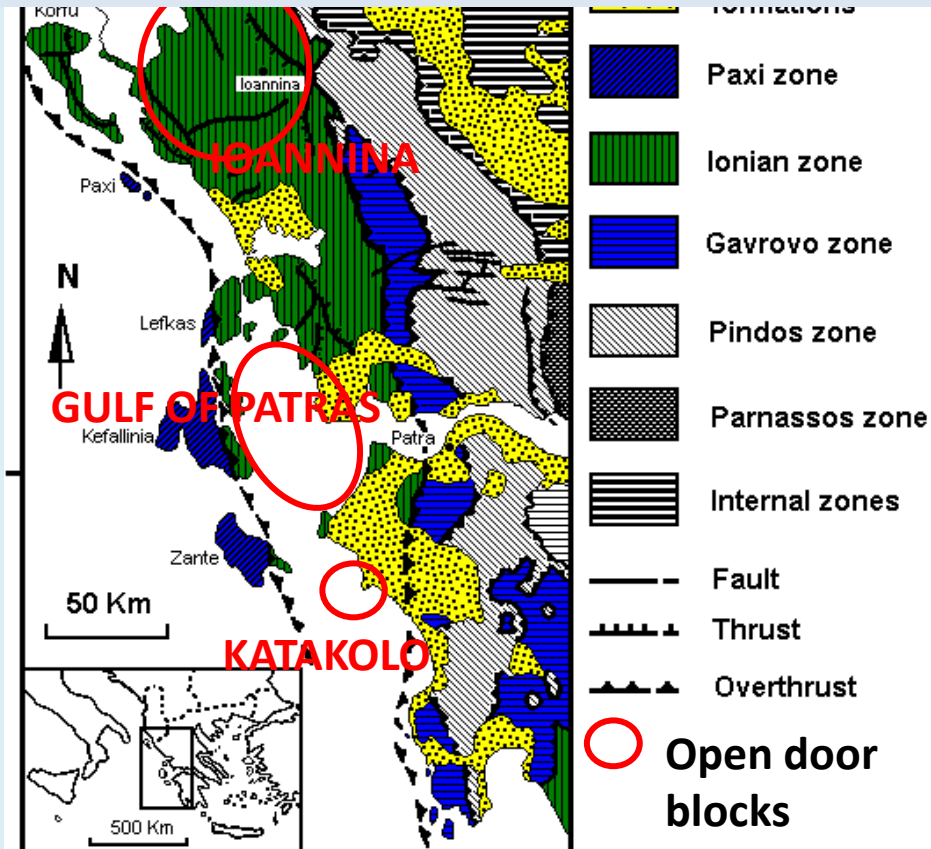


Tender: 1<sup>st</sup> of April 2012

Offers July 2. 2012

8 bids ..... still under evaluation !!!

External Hellenides geotectonic zones





# Non Exclusive Seismic Surveys (PGS)

**Contract Signed: October 2013**

**Execution: November 2012- February 2013:**

**Initial programming : 8.500 Km**

**Executed : 12.500 Km**

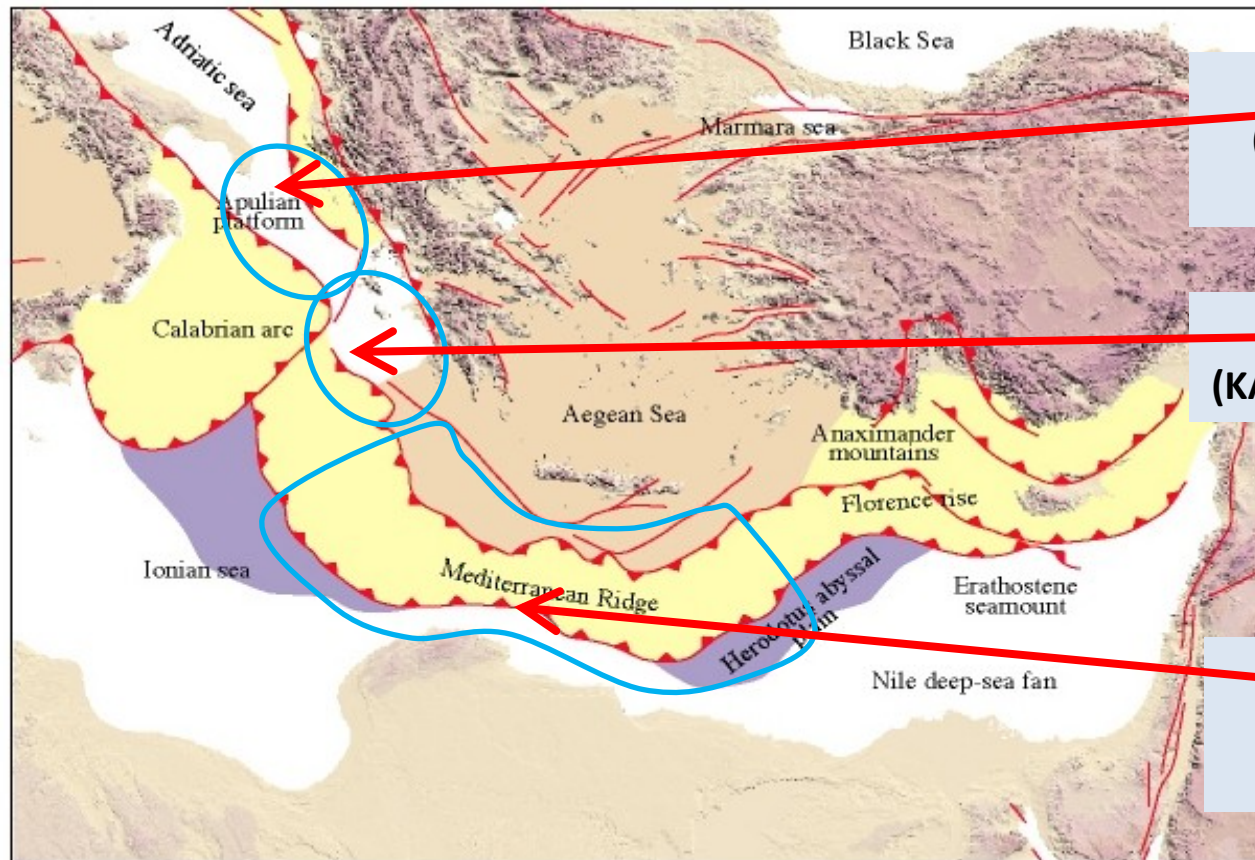
**Processing & Interpretation : 4<sup>th</sup> Q of 2013**

**Exploration Round: 3<sup>rd</sup> or 4<sup>th</sup> Q 2014 → (???)**



# **Hydrocarbon Potential ?**

# TECTONIC SKETCH OF EASTERN MEDITERRANEAN



**NORTH IONIAN SEA  
(SOUTH ADRIATIC/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)

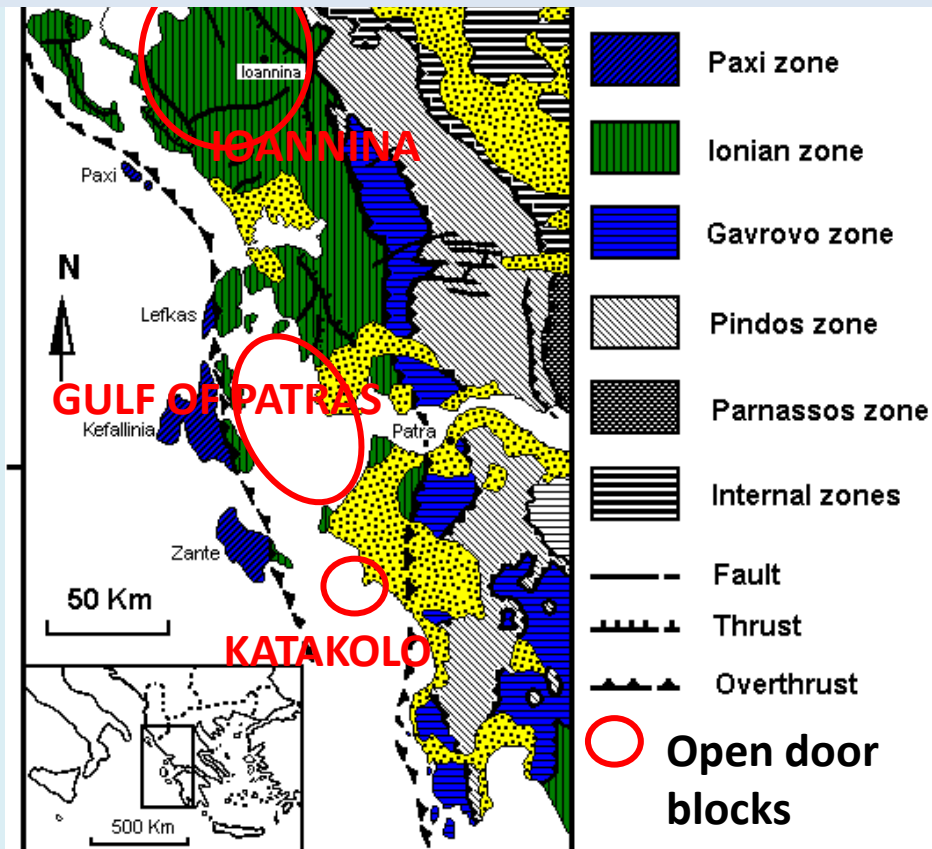


# Greece: First “Open Door” Exploration Areas

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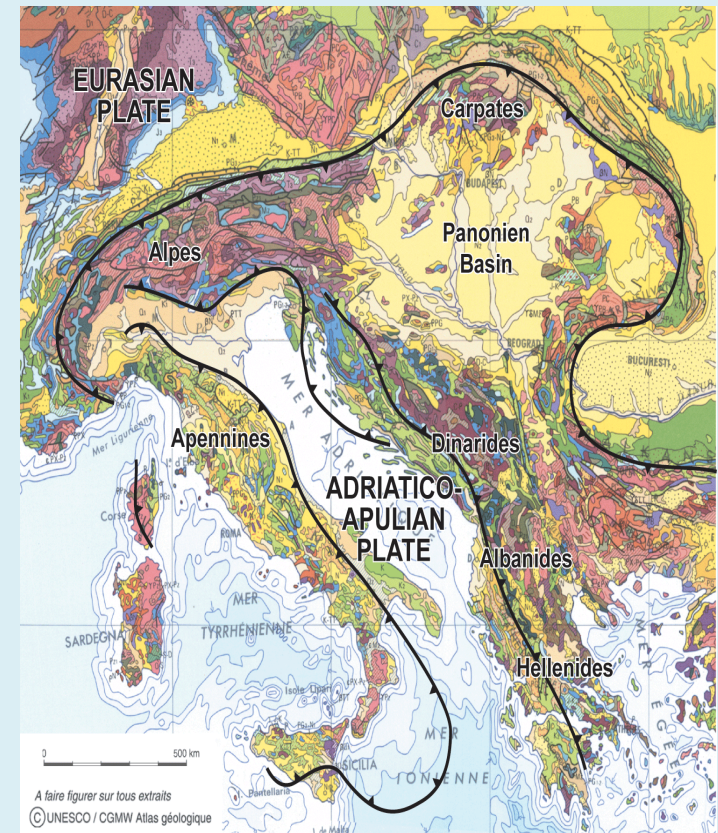
- *Gulf of Patras*
- Epirus – Ioannina
- Western Katakolo

External Hellenides geotectonic zones



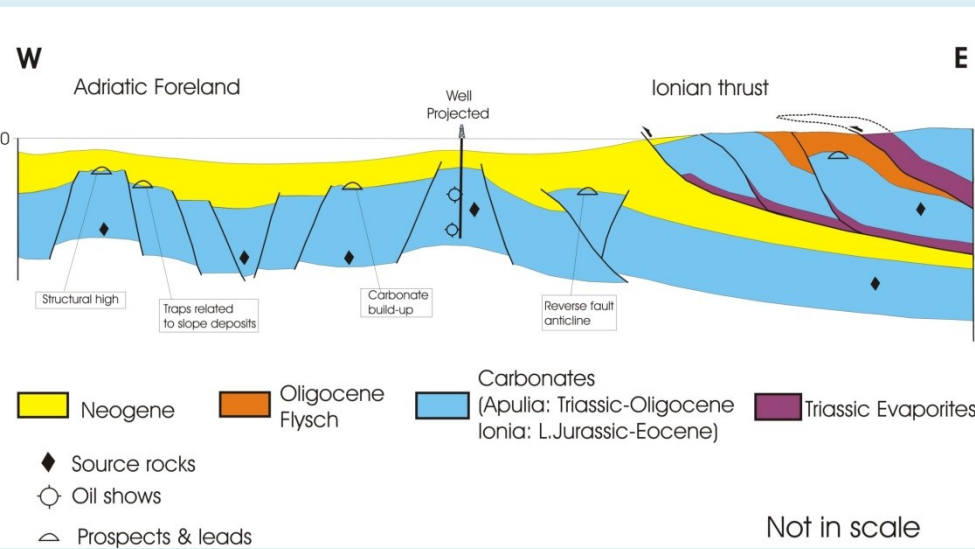
- **WESTERN GREECE IS A PART OF THE ALPINE MEDITERRANEAN OROGENIC BELT AND IS LOCATED SOUTH OF THE DINARIDES AND ALBANIDES BELTS.**

- **MESOZOIC AND TERTIARY EVOLUTION WAS CONTROLLED BY RELATIVE MOVEMENTS BETWEEN AFRICA (ADRIA) AND EURASIA PLATES**

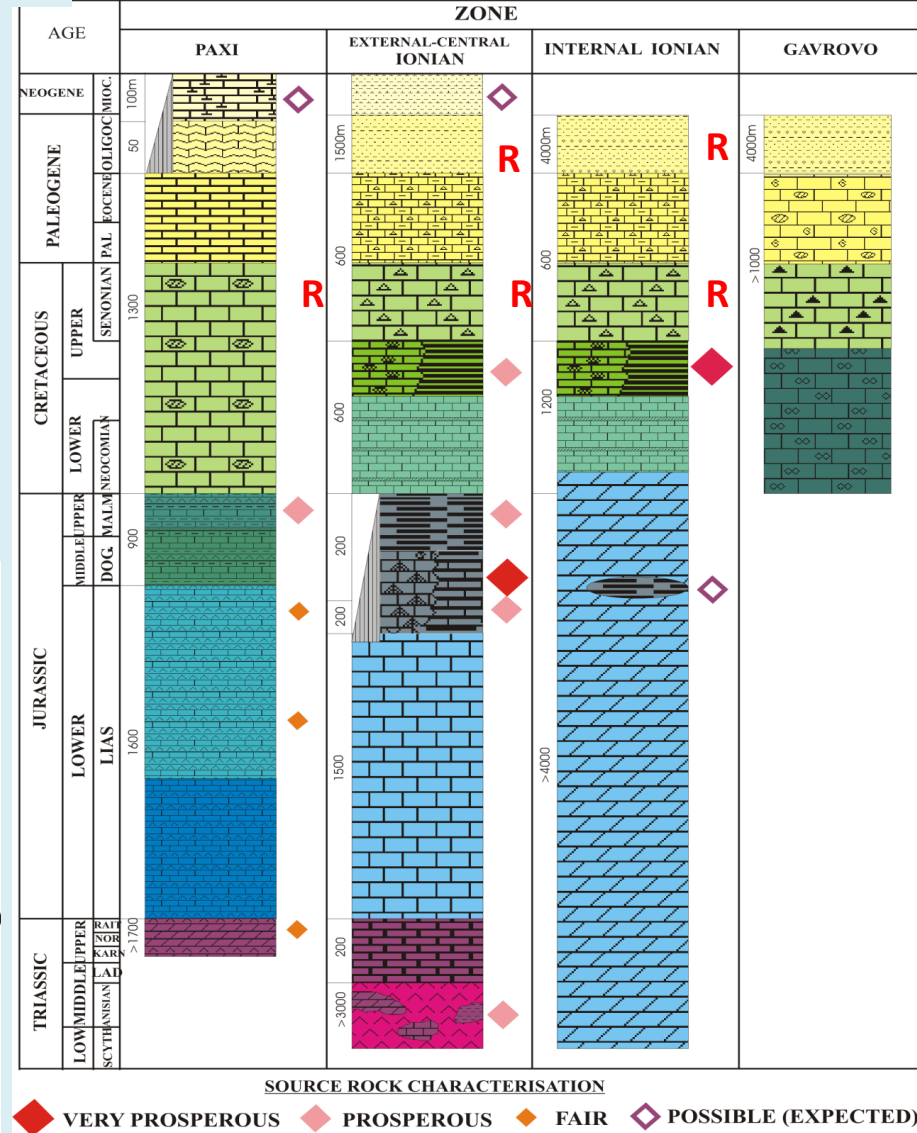
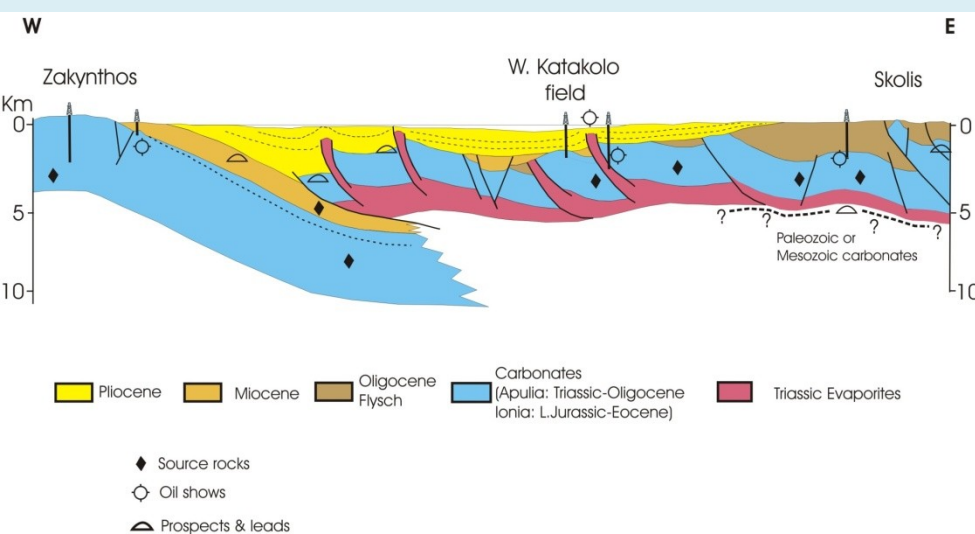


# Greece: Geological Summary of the External Geotectonic Zones of W. Greece

## Northern Ionian cross section and potential plays      Simplified lithostratigraphic column with main reservoir & source rocks



## Central Ionian cross section and potential plays





# Oil Groups of Western Greece

GROUP	GEOTECTONIC ZONE	AREA	SOURCE ROCK	AGE	OILWINDOW
<b>A (A1-A2)</b>	CENTRAL IONIAN	EPIRUS (BOTSARA)	POSIDONIA BEDS	MIDDLE JURASSIC	3750-5800 m
<b>B</b>	CENTRAL IONIAN	TRIFOS KYLLINI W. KATAKOLO	VIGLA SHALES	LOWER CRETACEOUS	3450-5600 m (Internal Ionian)
<b>C</b>	CENTRAL IONIAN	DELVINAKI S. KATAKOLO ETOLIKO-1	TRIASSIC BRECCIAS	TRIASSIC	1000-3600 m
<b>D1</b>	PAXI	ZANTE	CLASTIC SEDIMENTS	MIOCENE	5800-7850 m
<b>D2</b>	GAVROVO	FILIATRA	EVAPORITES		
<b>E</b>	PAXI	PAXI ISLAND	APTICI SHALES	M-U JURASSIC	5600-7250 m

## Source Rocks and oil seeps in Western Greece

**Lower Posidonia beds**



**Lower Posidonia beds**



**Loutra Kyllinis oil seep**



**Zakynthos: Miocene source rocks**



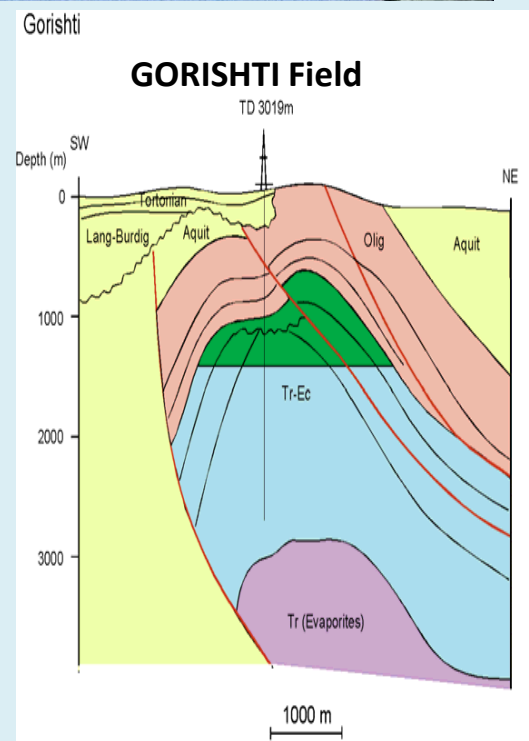
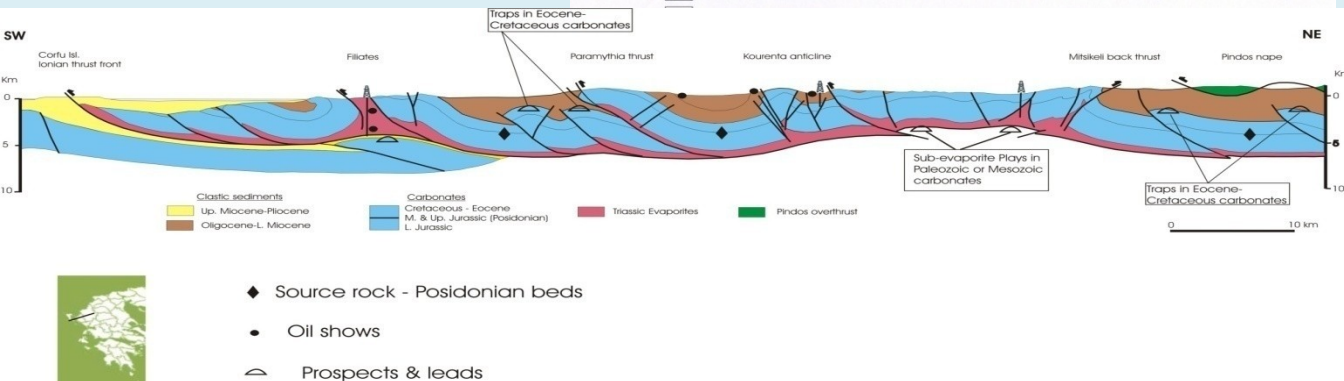
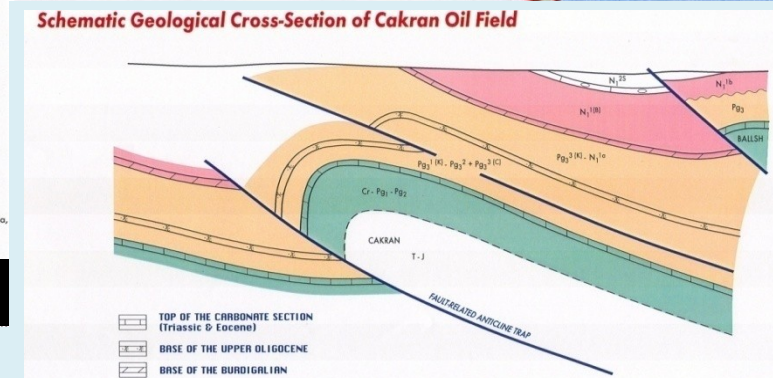
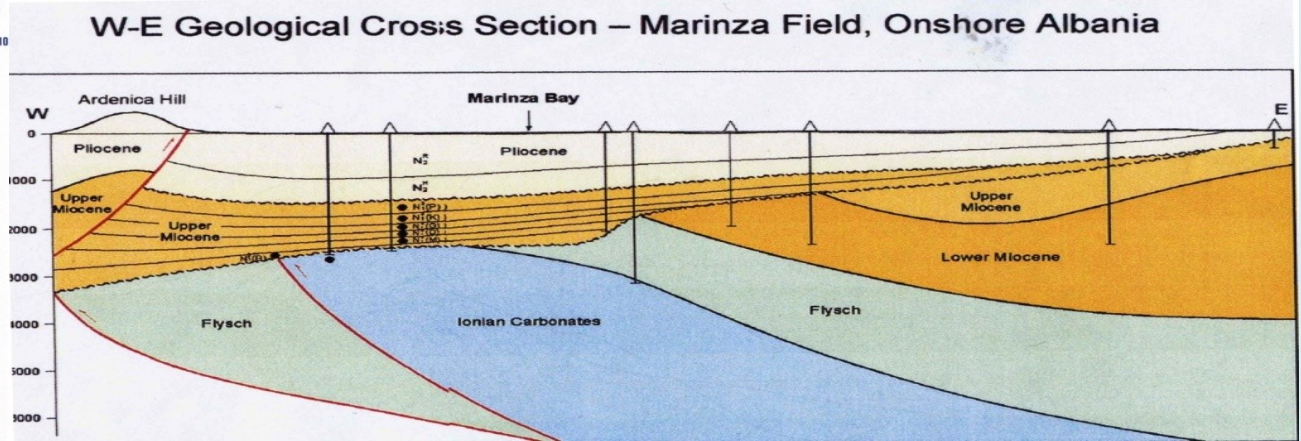
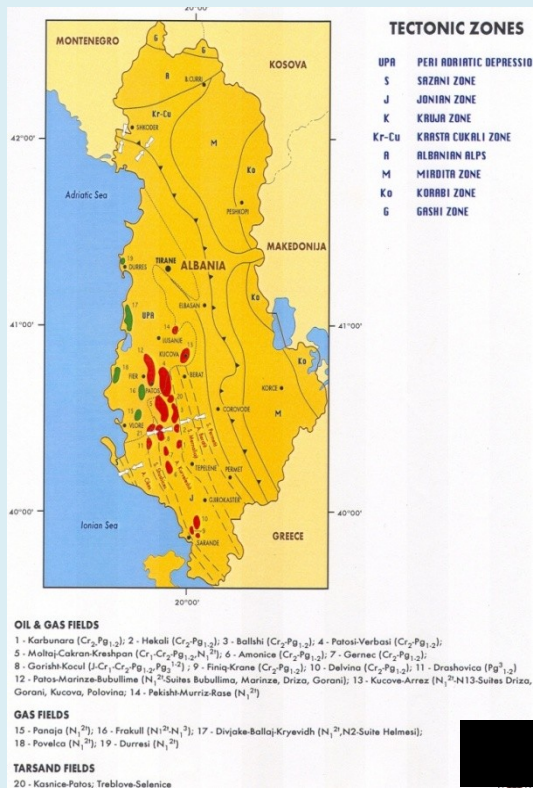
**HERODOTUS OIL SEEP**

**Dragopsa Oil Seep**



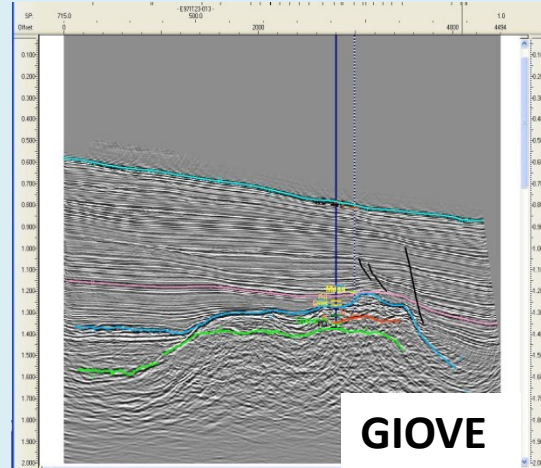


# ANALOGUES and HYDROCARBON OCCURRENCES IN ALBANIA (OIL & GAS FIELDS )

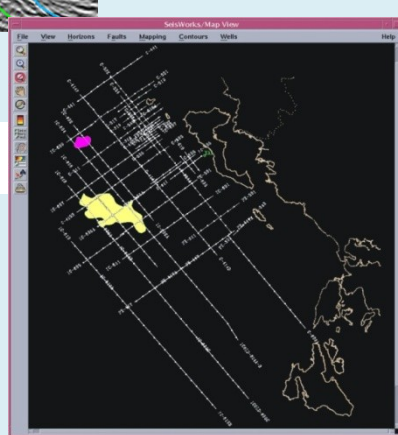


Structural section across NW. Greece

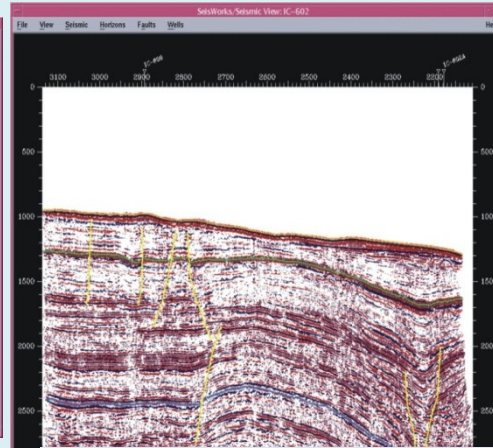


[illegible]

# GIOVE



**West CORFU:**  
0 sq. Km structure



### West CORFU: Faulted Block

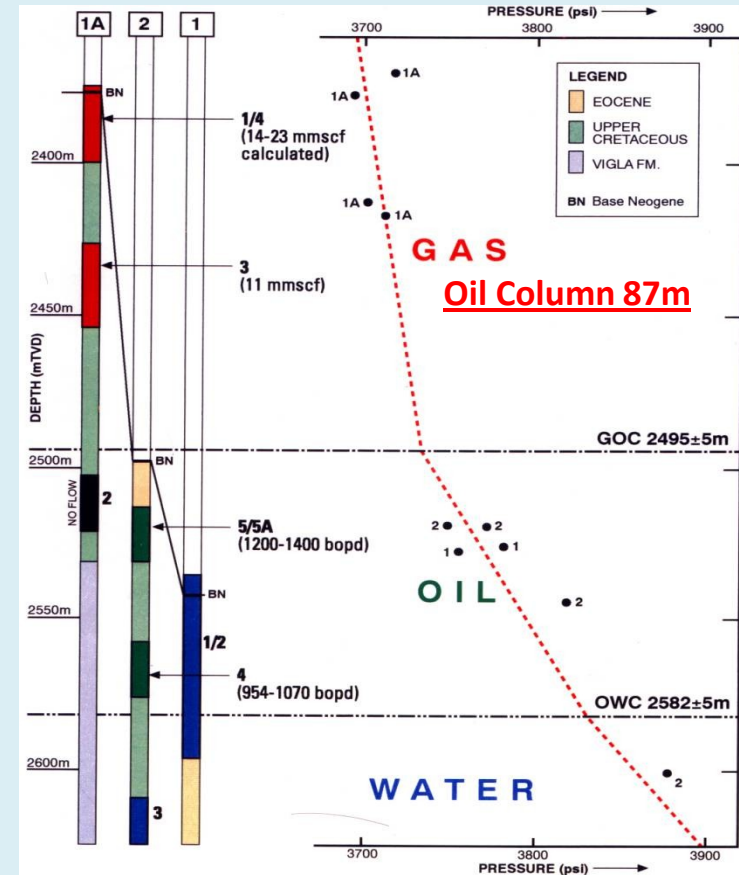
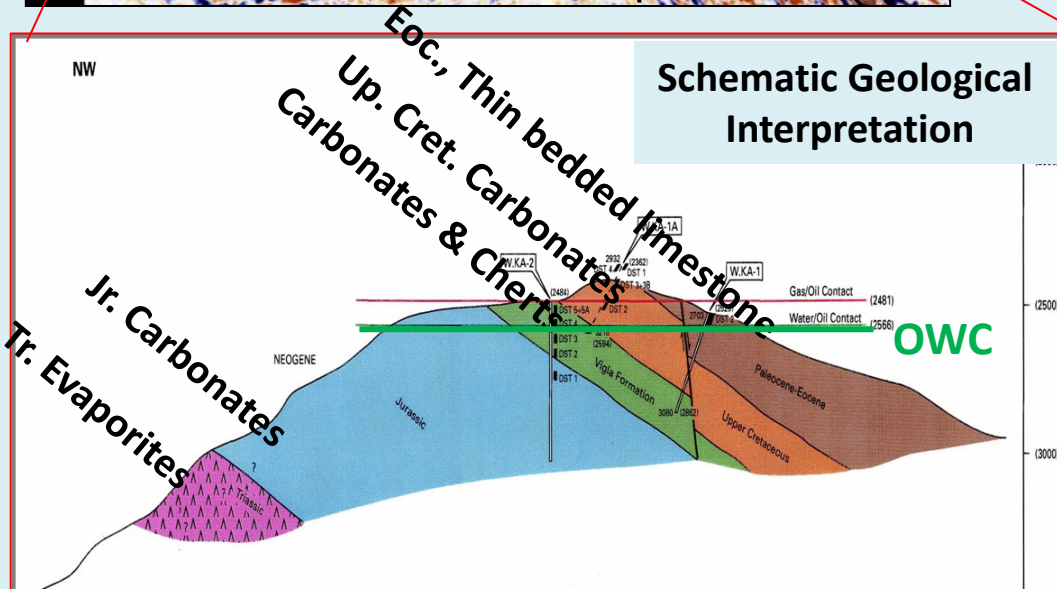
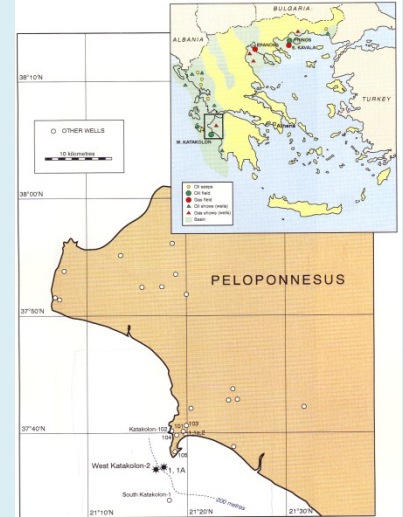
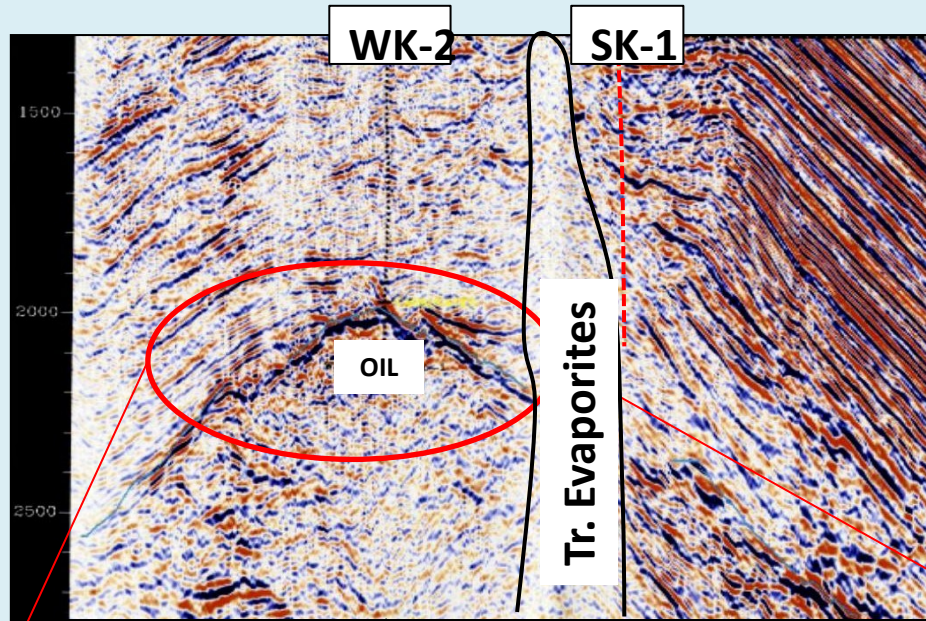
#### N-S directed seismic line

1. Platform margin build-ups (Giove, Medusa discoveries)
2. Pelagic Carbonates - Paleo-structures (Rovesti discovery / Aquila field)
3. Proximal Talus Slope Play
4. Platform Rotated Fault Blocks (Cretaceous/Jurassic)
5. Distal Calcareenite Turbidites (re-sedimented platform carbonates – Aquila field)

## West Lefkas - Reefal build-ups

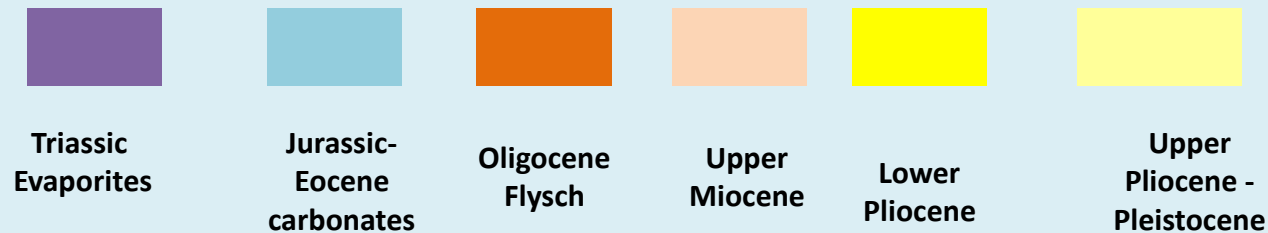
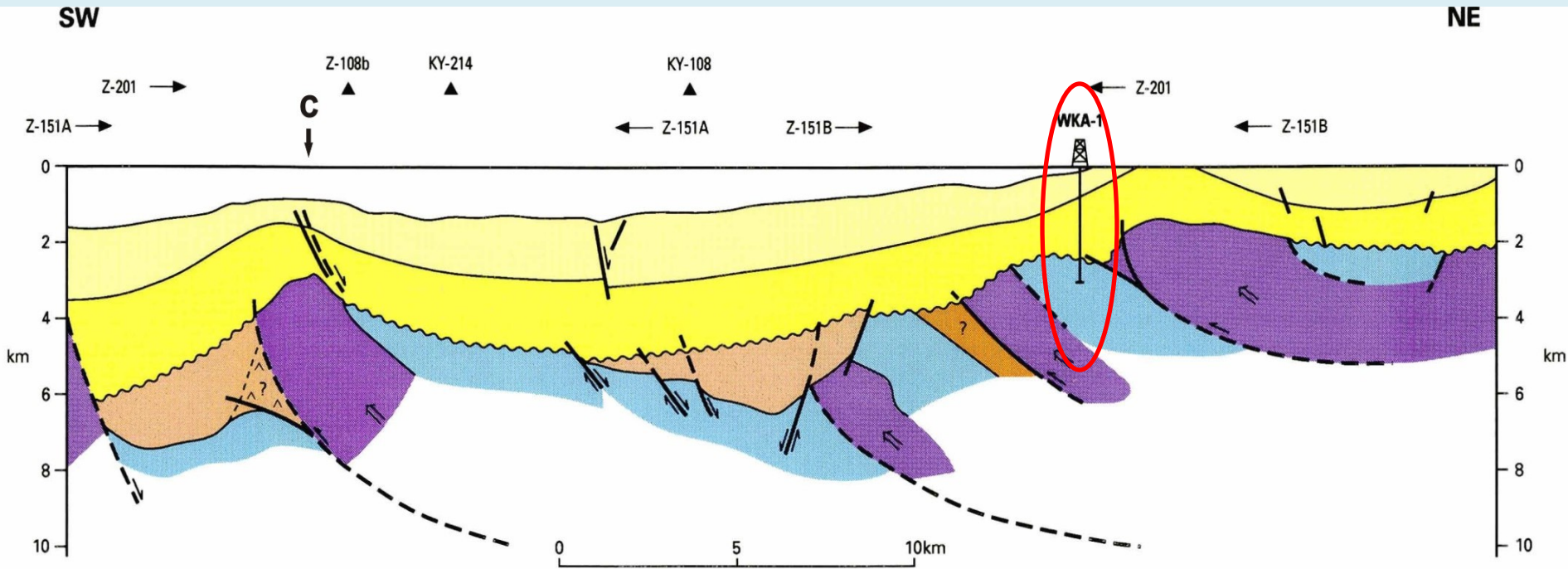


# Greece : Katakolo Oil Field



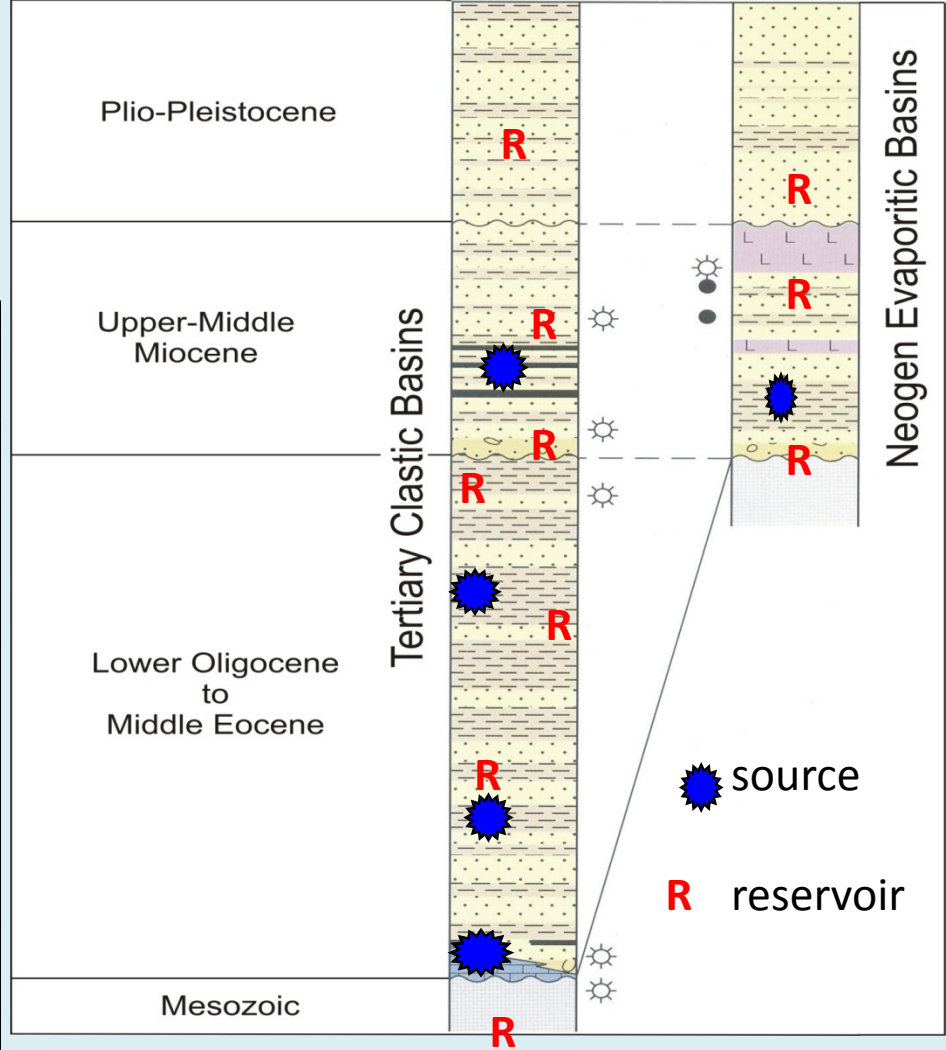
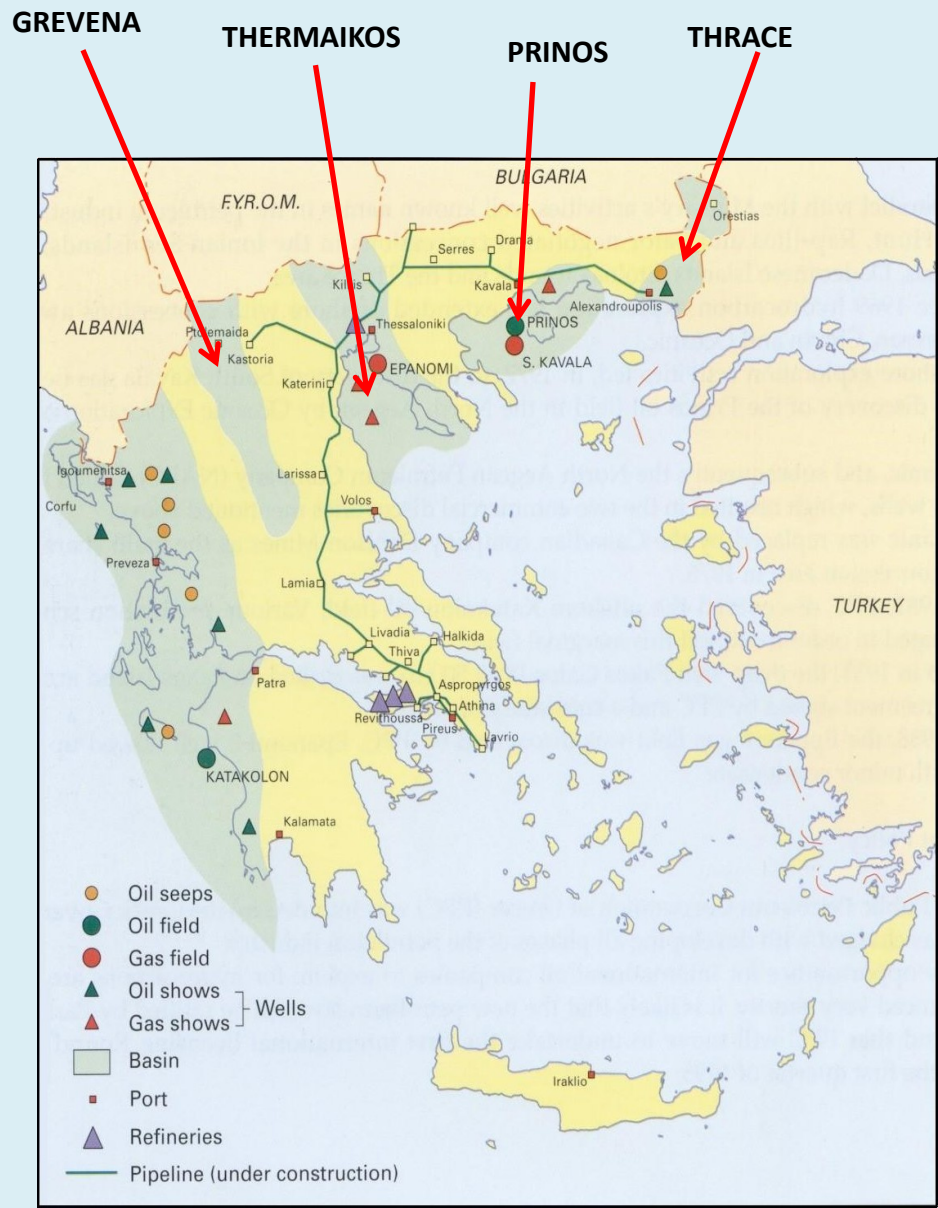
# W. Katakolo As a key case

## [field geoseismic section (based on 2D profiles)]





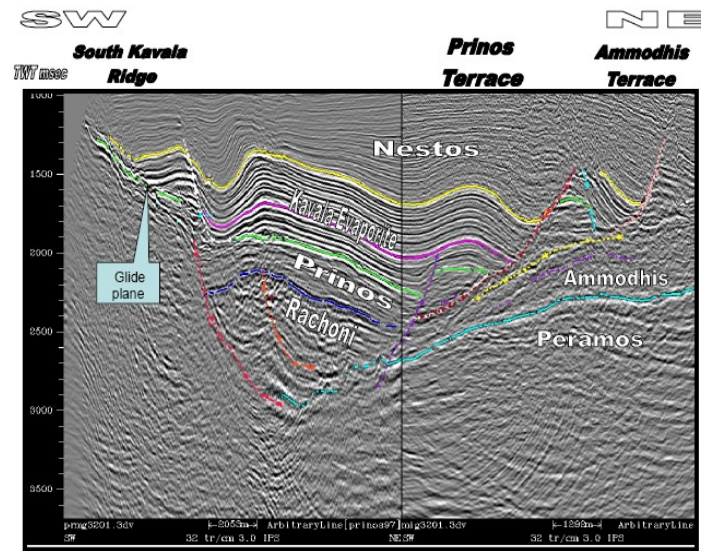
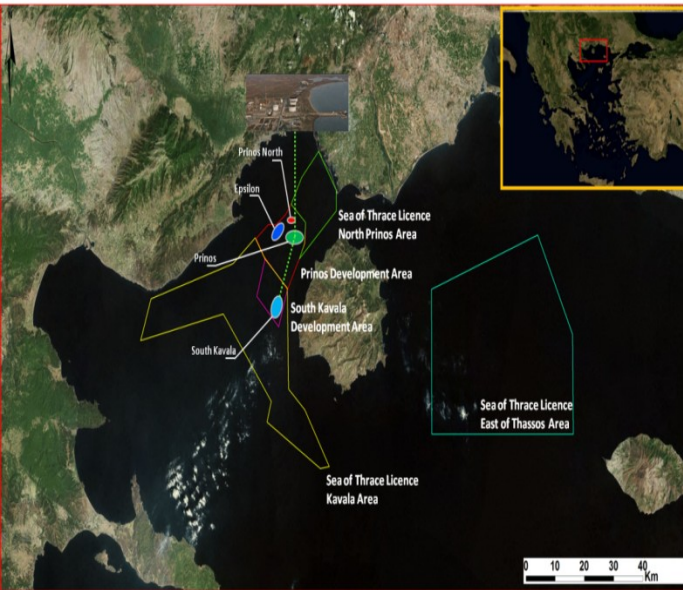
# Eastern Greece Tertiary Basins



**Stratigraphy , source and reservoir Rocks Intervals of Eastern Greece Tertiary Basins**



# Analogue For Eastern Greece



3. Arbitrary 3D Seismic Line Along Axis of Prinos Basin (Strike)

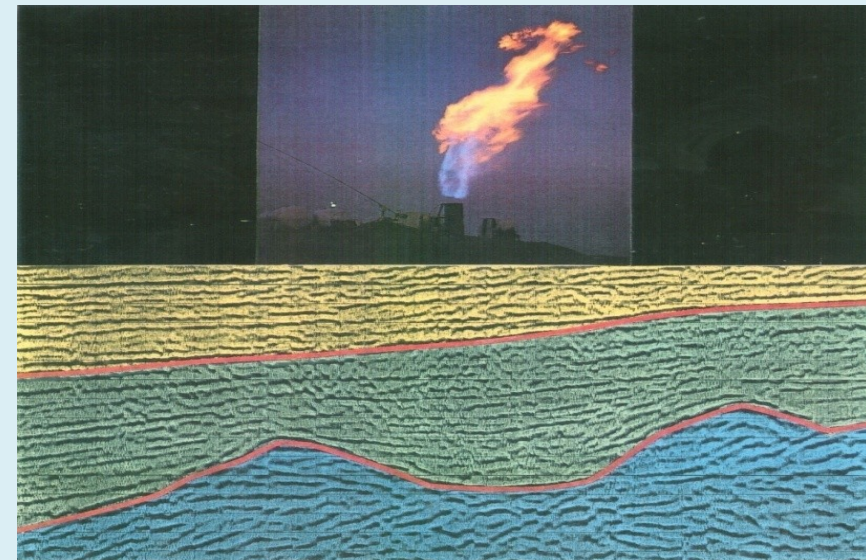


**PRINOS SOUTH KAVALA FIELDS**

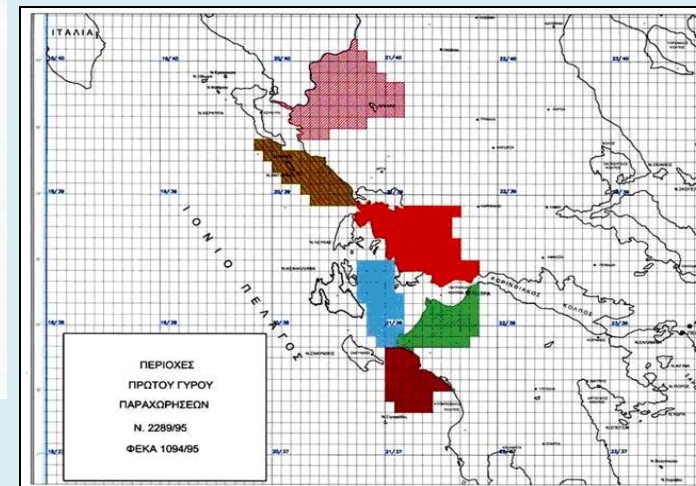
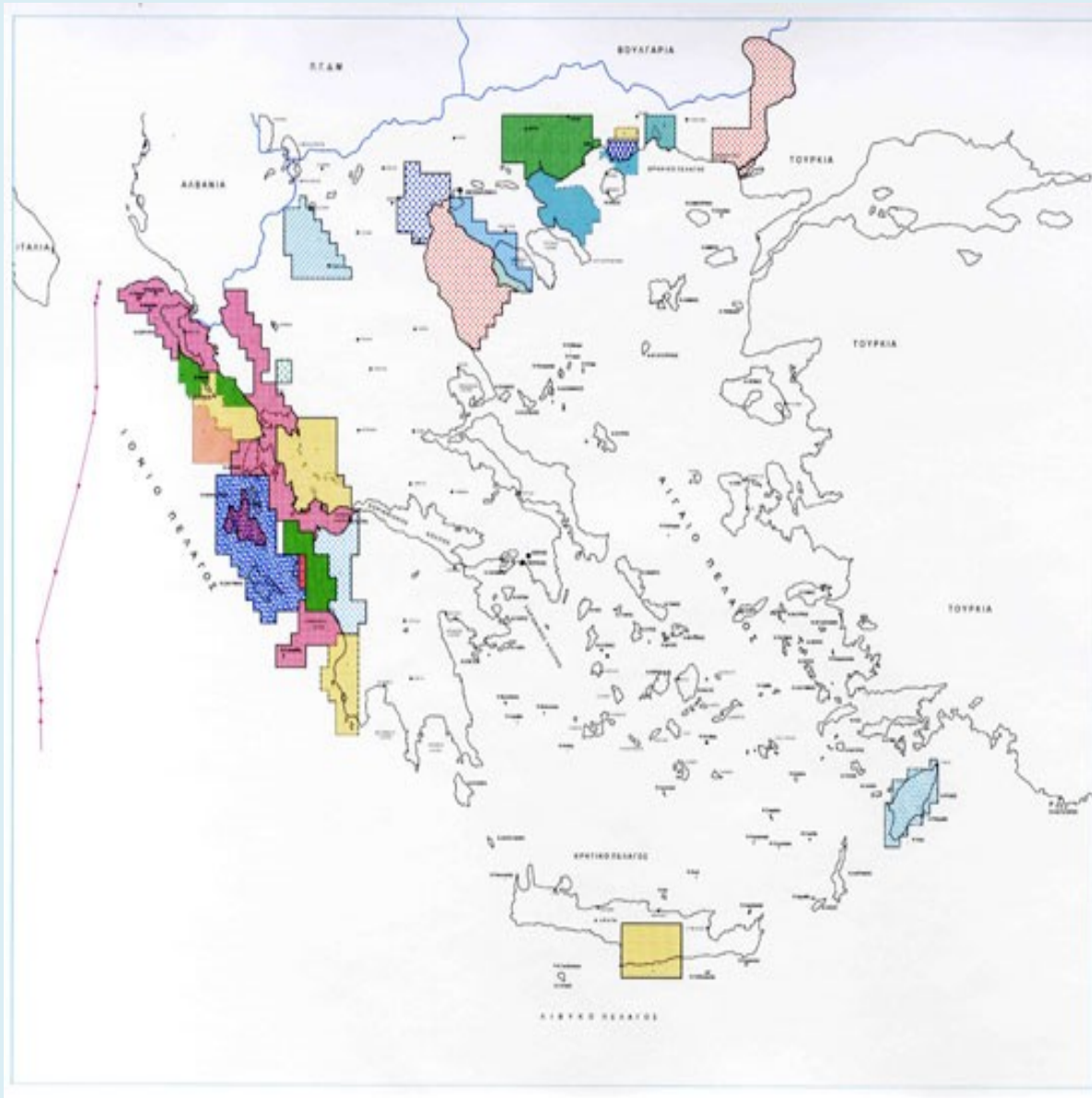
## H-C Discoveries in East Thrace Basin in Turkey



## Thermaikos: Epanomi Discovery

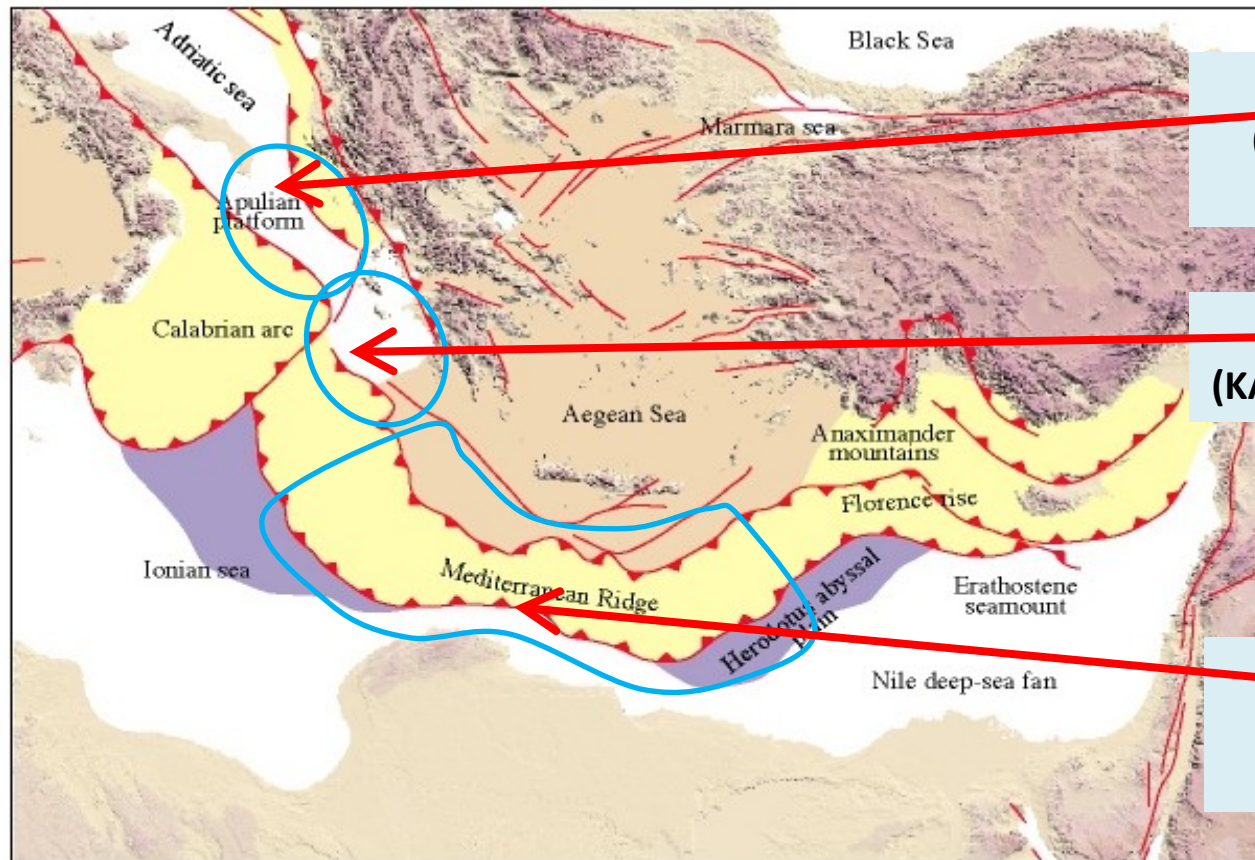


# GREECE: Areas Potential For Future Open Door Tender





# TECTONIC SKETCH OF EASTERN MEDITERRANEAN



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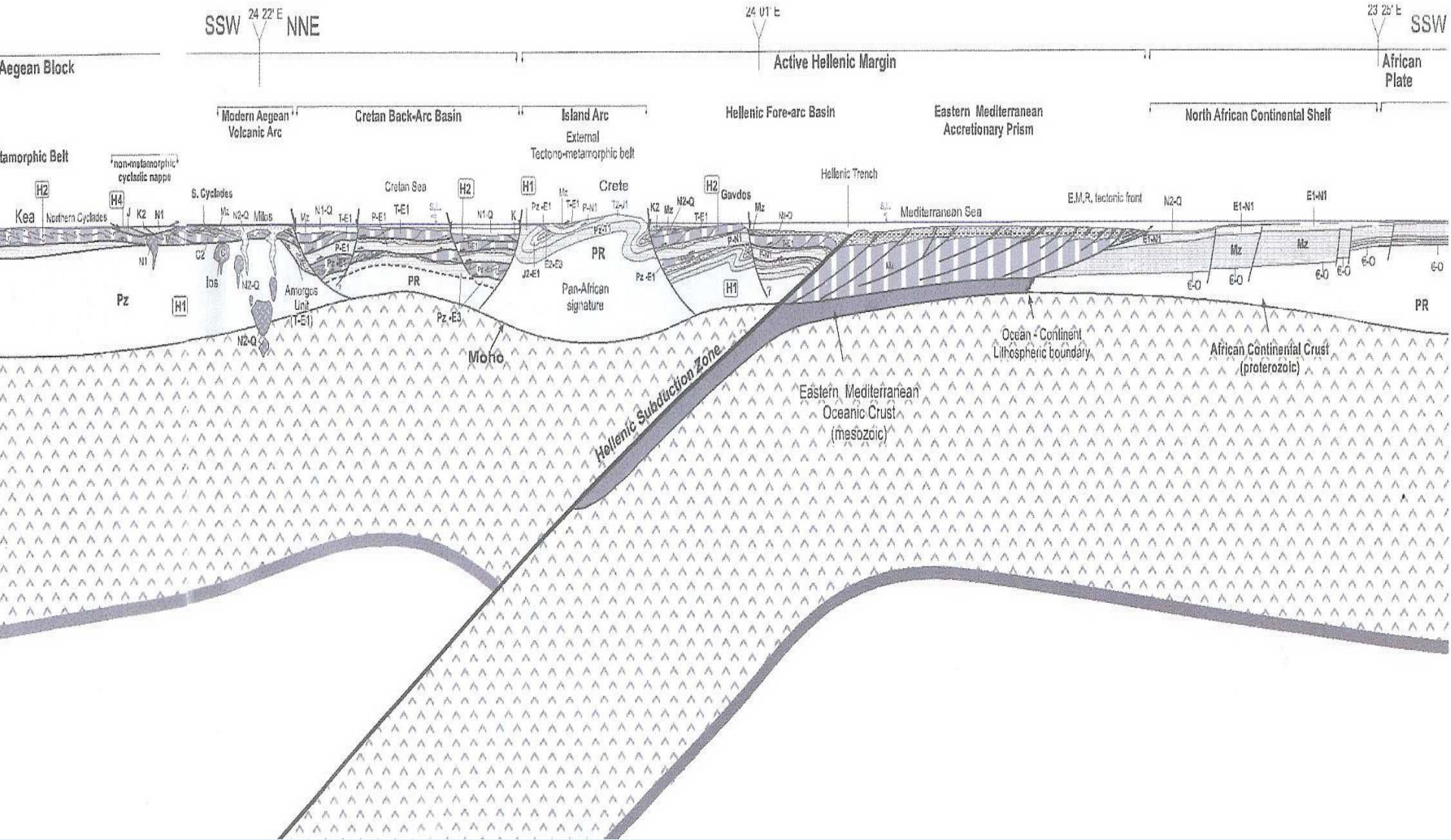
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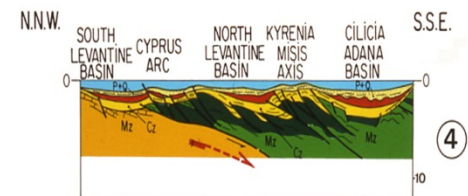
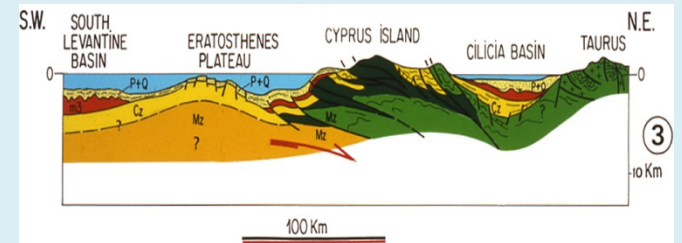
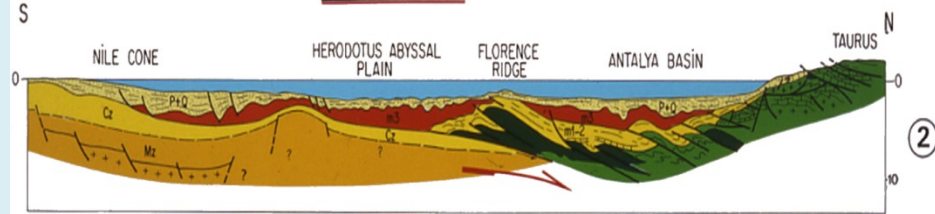
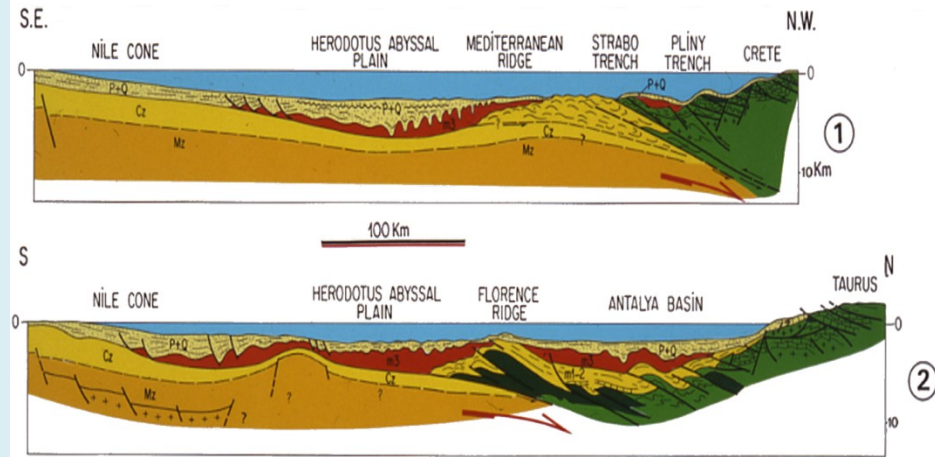
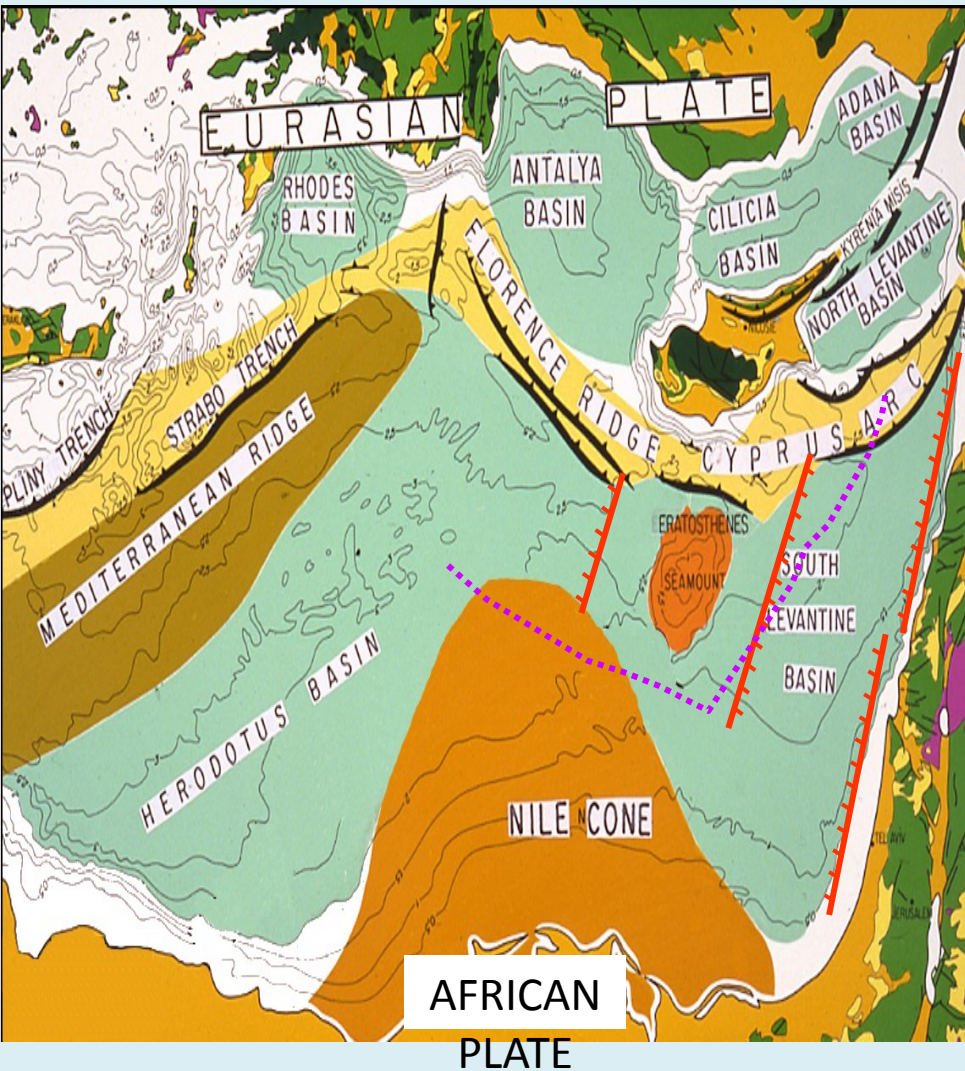
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 Geodynamic Map of the Mediterranean, Commission for The Geological Map of the World, CCGM)

# East Mediterranean and Plate Tectonics



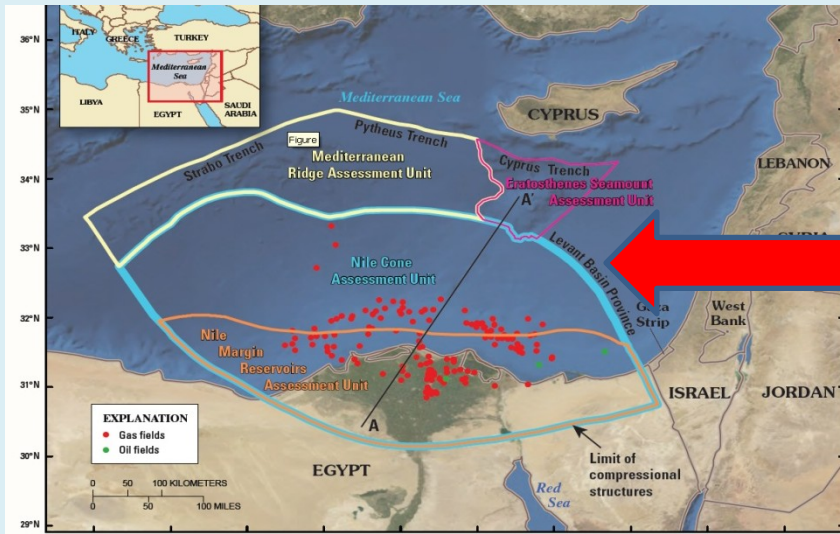


# East Mediterranean Geological Sections

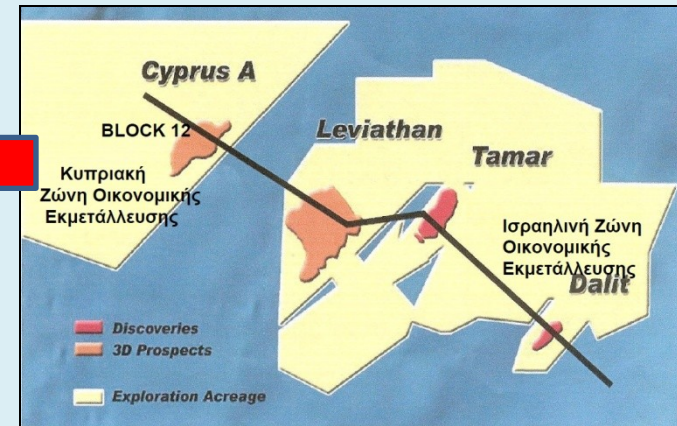




## Egypt: Offshore discoveries in Eastern Mediterranean



## ISRAEL: Offshore Discoveries in Levantine Basin

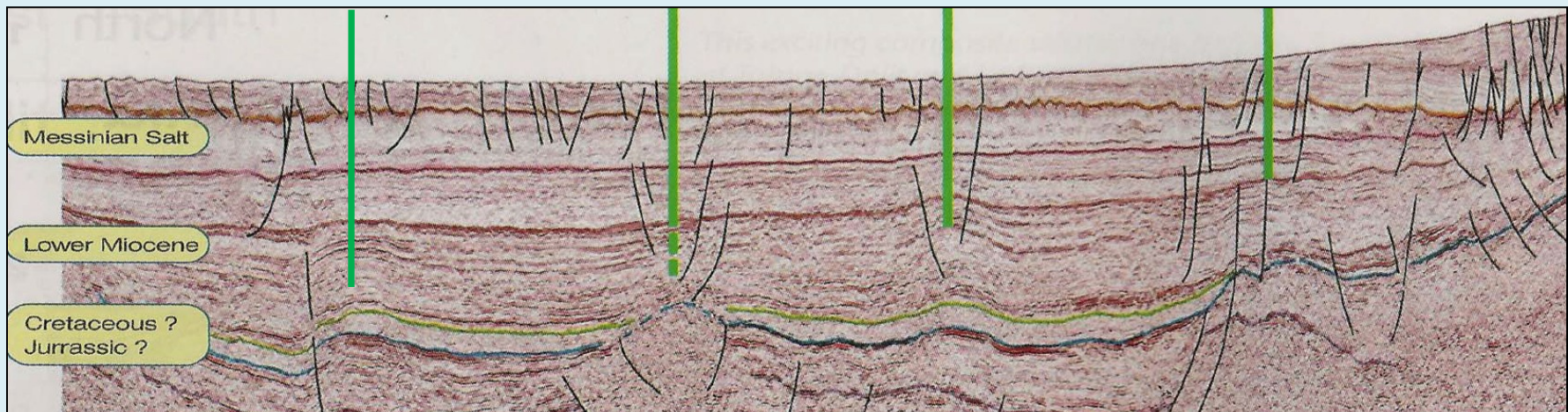


**Cyprus A**  
7 + Tcf

**Leviathan**  
≈ 16 + Tcf

**Tamar**  
≈ 8+ Tcf

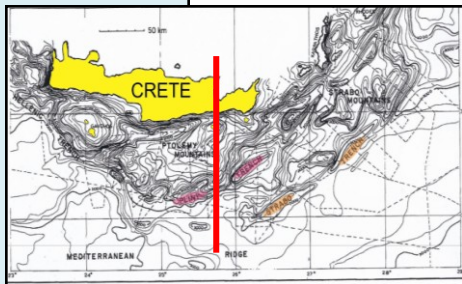
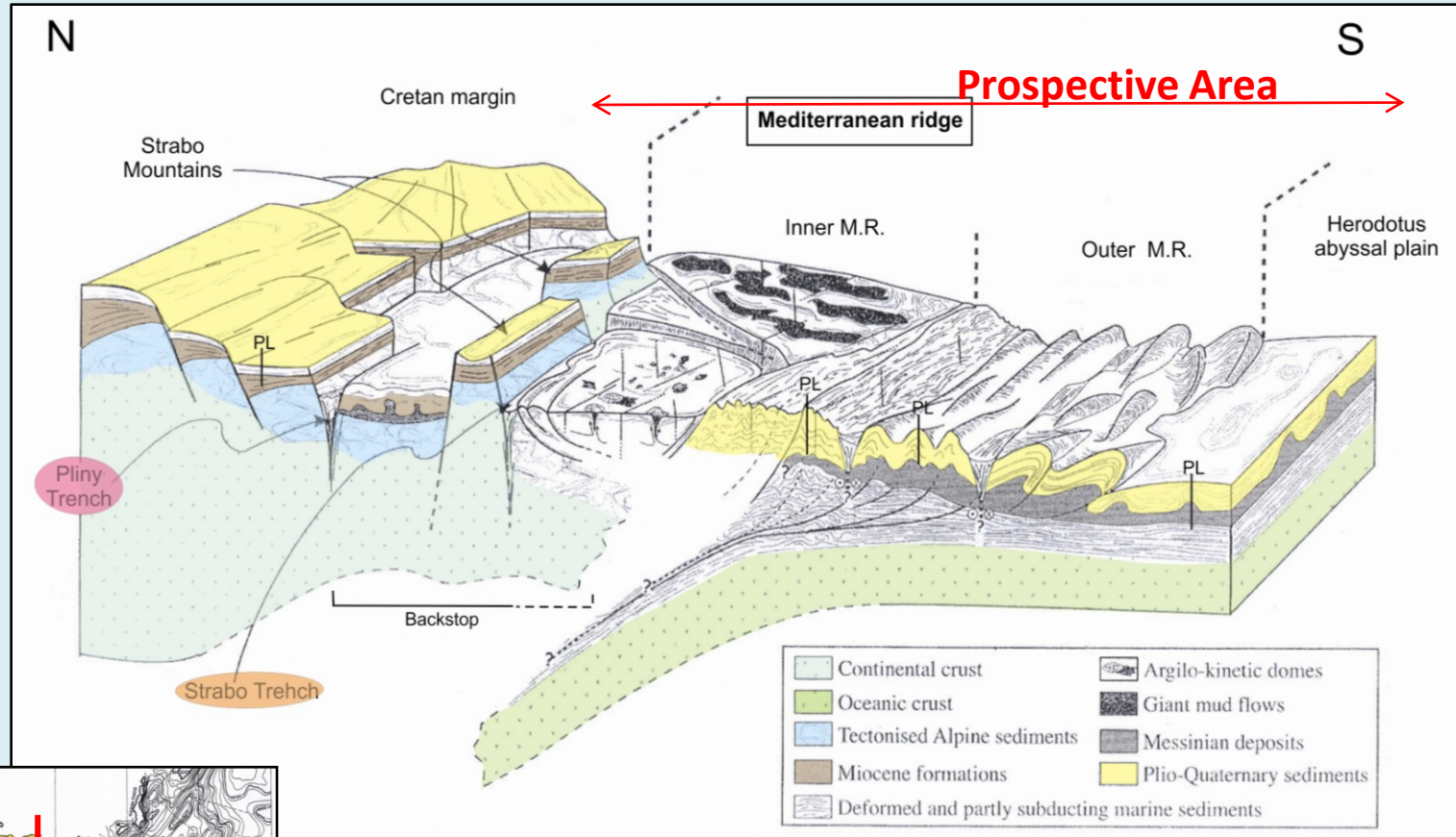
**Dalit**  
≈ 0.5 Tcf



**Seismic Section and Discoveries from Cyprus to Israel**

# Greece : Areas South Of Crete

## General Geological Model





# GREECE: LEGAL FRAMEWORK

- Law 2289/1995 (“Prospecting, Exploration and Exploitation of Hydrocarbons and other provisions”), as amended by section 156, §10 of Law 4001/2011.
- In the Law 2289/1995, the Public body for the management of the Greek State’s rights was the Public Petroleum Corporation-Exploration and Exploitation of Hydrocarbons S.A. (DEP-EKY).
- The new Law 4001/2011 establishes a new **Regulatory Authority, namely the Hellenic Hydrocarbons Resources Management S.A (H.H.R.M. S.A)**. According to this Law, up to the operation of H.H.R.M. S.A, all necessary actions concerning the Exploration & Exploitation of hydrocarbons are made by the Directorate of Petroleum Policy of the Ministry of Environment, Energy and Climate Change.

**Rights for exploration and exploitation of hydrocarbons are granted on behalf of the Greek State, according to the following procedures (Article 156, paragraph 17 L 4001/2011):**

- a) Either after **an invitation to tender**, published in the Government Gazette and sent for publication in the Official Journal of the European Union. The deadline for the submission of the offers is defined in the invitation and can not be less than ninety (90) days from the day of the last publication.
- b) Or after **submission of application by an interested party** for an area which is not included in the invitation to tender according to case a. The H.H.R.M. SA, if the application is accepted, issues invitation to tender, approved by the Minister of Environment, Energy and Climate Change, published in the Government Gazette and sent for publication in the Official Journal of the European Union. The deadline for the submission of offers by other interested parties is at least ninety (90) days from the day of the last publication.
- c) Or after an **open invitation (open door)** for expression of interest, when the area for which the concession is requested is available on a permanent basis or has been the subject of a previous procedure which has not resulted in the conclusion of a lease agreement or a production sharing agreement or has been abandoned by contractor, in the case that he has withdrawn from the agreement or has terminated it. The Minister of Environment, Energy and Climate Change, by notice, published in the Government Gazette and sent for publication in the Official Journal of the European Union shall notify the above areas with the minimum basic terms of the concessions as well as any other relevant information. Interested parties may tender for a concession in more than one area. The offers are submitted until the last day of the first and second semester of each calendar year.  
Within thirty (30) days from the end of the semester, the Minister of Environment, Energy and Climate Change announces that the area is excluded from the areas which are available as above, in case the area is on an ongoing process of concession. The offers are evaluated and among them is selected the one most advantageous to the State, following negotiations with the interested parties and based on the selection criteria of the open invitation.  
The deadline for submission of offers is specified in the call for tenders and cannot be less than ninety (90) days from the day of last publication.



## **EXPLORATION STAGE**

**Exploration Stage shall be divided into consecutive Exploration Phases as follows:**

**ONSHORE : 7 years. Three phases. 3 years; 2 years; 2 years**

**OFFSHORE : 8 years. Three phases 3 years; 2 years; 3 years**

**Exit possibility** at the end of each Phase

**2<sup>nd</sup> Exploration Phase must comprise at least one well**

## **EXPLOITATION STAGE**

**The exploitation period will be up to 25 years with possibility of extension**

## **FISCAL TERMS**

### **Type of Agreements : Royalty/Tax**

- **Royalty 2 – 20%**
- **Income tax 20% + 5% regional tax**
- **Depreciation: 40 – 70%**

## **BIDDABLE TECHNICAL AND FISCAL PARAMETERS**

- **Exploration Work Program for each phase**
- **Euro commitment for each phase**
- **Royalties linked to the ratio Revenue/Costs**
- **Capital depreciation**
- **Signature and Production bonus**
- **Training**
- **Relinquishments**