

# **Recent Developments in Exploration and Production of Hydrocarbons in Greece and Cyprus**

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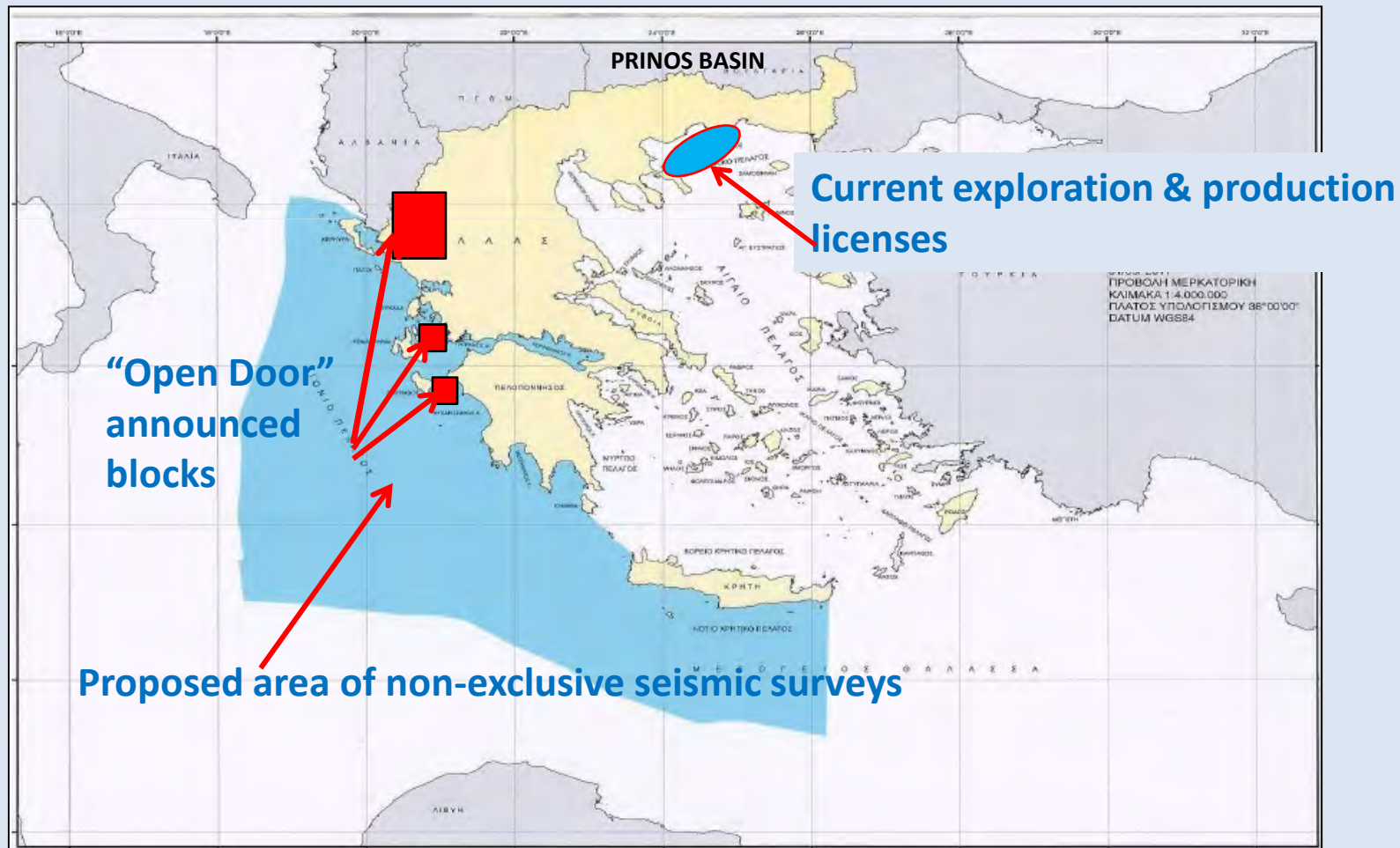
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# Exploration Activity in Greece - Current Status

- After 15 years of inactivity, re-establishment of the Hellenic Hydrocarbons Management Company S.A, 2011
- Tender for non-exclusive seismic surveys. Eight proposals have been submitted. Decision is expected within the 2-ond Quarter of 2012
- Tender for 3 areas using open door procedures



# **MAIN ISSUES NEED ANSWERS for Greece**

- **Are there proven or possible petroleum systems?**
- **Are there any credible analogues?**
- **Are fiscal terms and conditions attractive for Oil companies?**
- **Is the time enough to promote the "open door" tender?**
- **Is the business environment the proper ?**

**If the answers are positive then Greece has a chance to discover additional oil and gas.**

# SEDIMENTARY BASINS of GREECE,

Hydrocarbon  
Occurrences  
and  
infrastructures

Western  
Greece  
basins

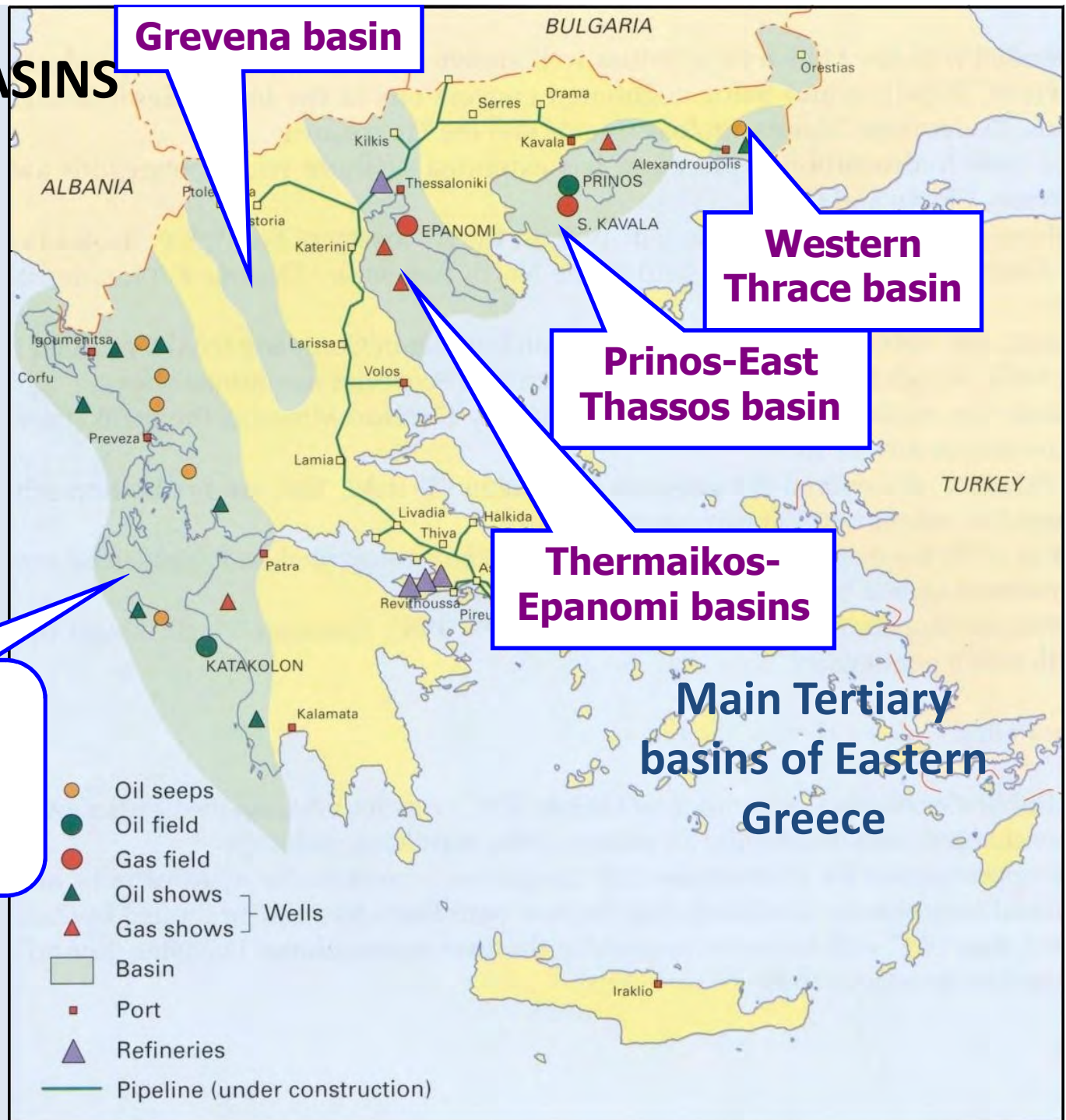
Grevena basin

Western  
Thrace basin

Prinos-East  
Thassos basin

Thermaikos-  
Epanomi basins

Main Tertiary  
basins of Eastern  
Greece



## H/C DISCOVERIES and HYDROCARBON SYSTEMS

The **answer** to the question whether or not Greece has any exploration and production potential for H/C, is definitely **positive**. This because there are proven and active petroleum systems in the alpine and Post-alpine basins of Western Greece, as well as, in the molassic and post-alpine tertiary basins of Eastern Greece, where source rocks, reservoirs, cap rocks, traps and proper geological and migration time **co exist**. The **active hydrocarbon seeps and shows** and hydrocarbon discoveries, found in both Western and Eastern Greece, attest to the existence of active hydrocarbon systems. Commercial exploitation of hydrocarbon accumulations in the Thracian Sea and in **analogues systems** to the ones of Greece, such as in Italy, Albania, Croatia, as well as discoveries in East Thrace in Turkey, all advocate to high hydrocarbon potential of the similar sedimentary basins of Greece.

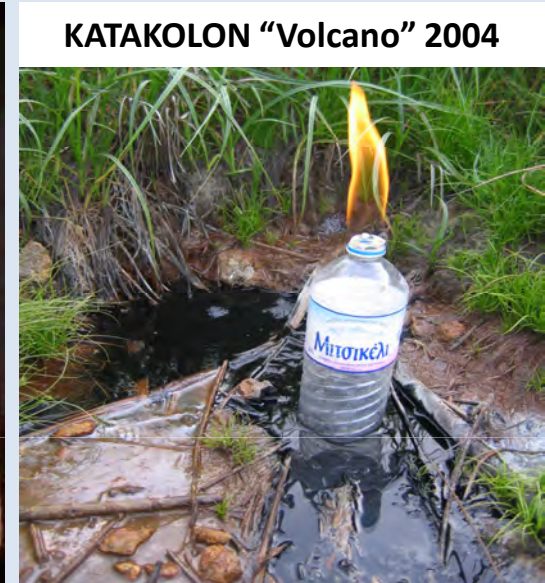
# Oil Shows and seeps in Greece



**ZAKYNTHOS**  
**HERODOTUS, 480 bc**



**KATAKOLON "Volcano" 1976**



**KATAKOLON "Volcano" 2004**

**DRAGOPSA -EPIRUS**



**SMOLITSAS - EPIRUS**



**Bouie- Epirus**



**LOUTRA KYLLINIS**

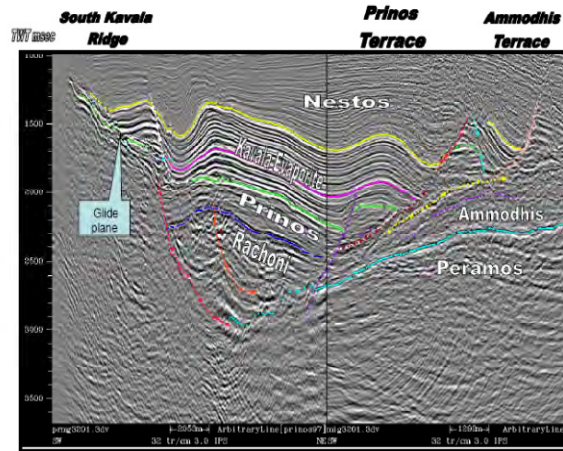


# **GR: HYDROCARBON FIELDS & DISCOVERIES**

- **PRINOS (oil field) Thracian Sea**
- **SOUTH KAVALA (gas field) - Thracian Sea**
- **NORTH PRINOS (oil field)-Thracian Sea**
- **EPSILON (oil field)- Thracian Sea**
- **EPANOMI (gas field)- Chalkidiki**
- **WEST KATAKOLON (oil field)- Ionian Sea**
  
- **ALYKES(Asphalt discovery) – Zakynthos**
- **Athos (oil discovery)- Thracian Sea**
- **AMMODIS (Heavy Oil Discovery)- Thracian Sea**
- **EAST THASSOS (Heavy Oil Discovery )-Thracian Sea**
  
- **Interesting biogenic gas accumulations were discovered while drilling Neogene layers.**
  
- **More than 200 oil /gas shows on the surface or in wells**

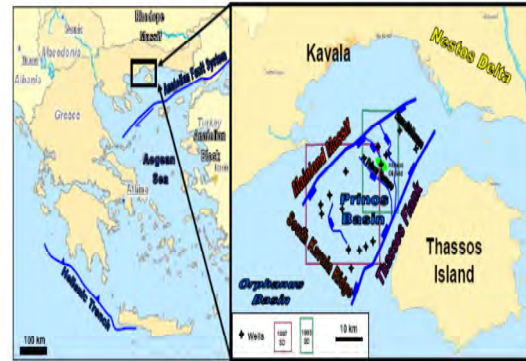
# HYDROCARBON DISCOVERIES IN GREECE

## Prinos arbitrary seismic line



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

## Prinos Location Map



1. Prinos Basin Location Map, Tectonic Elements, Wells and 3D Seismic Coverage

## Prinos Platforms



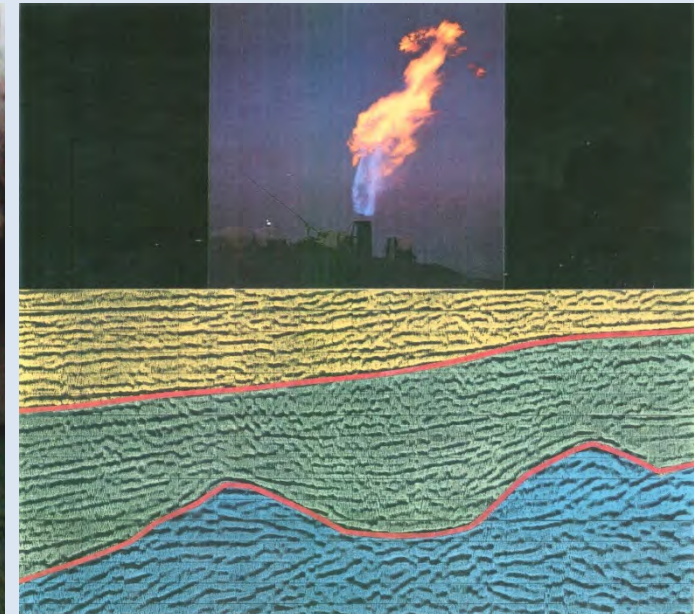
## D.S.T. W.KATAKOLO – 1A



## D.S.T. W.KATAKOLO – 2

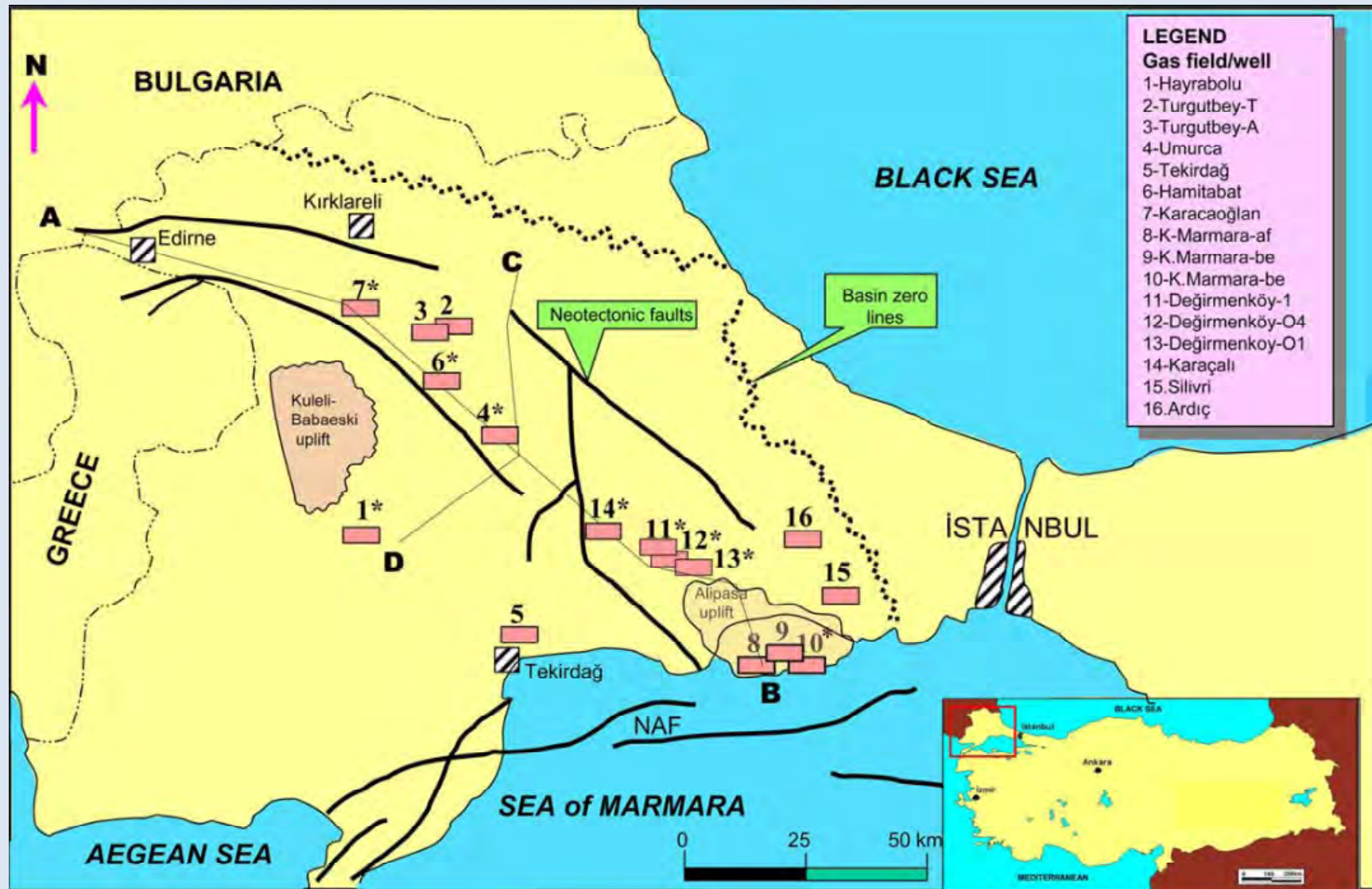


## DST EPANOMI - 1

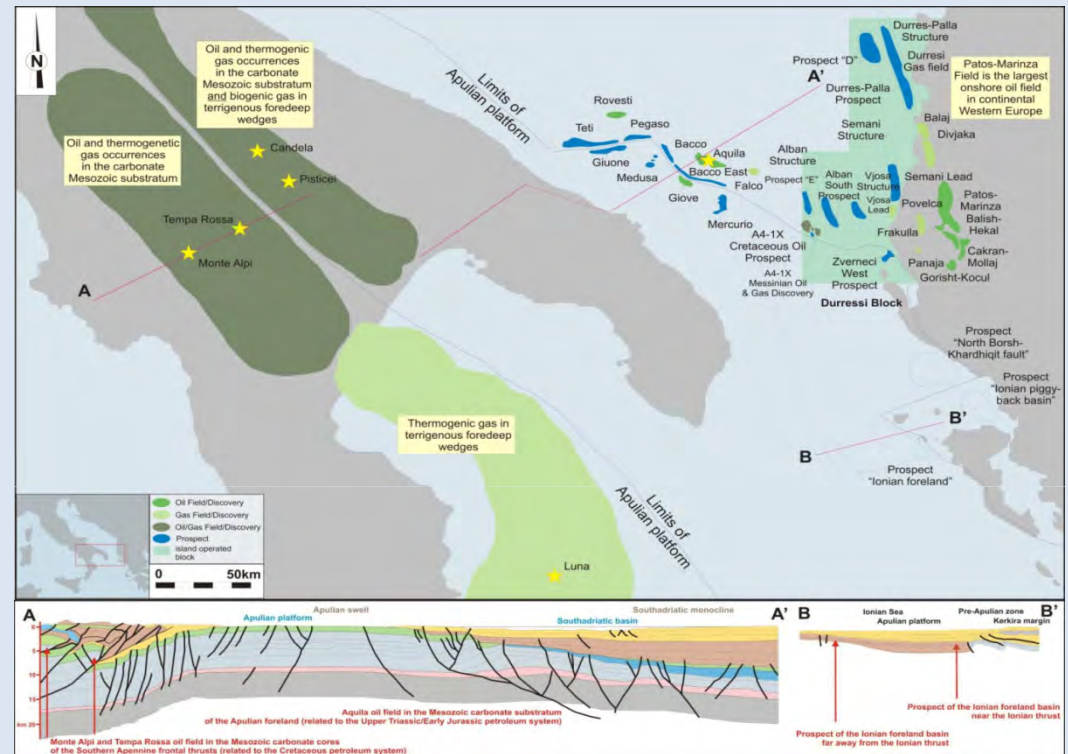


# **Analogues**

# H-C Discoveries in East Thrace Basin in Turkey



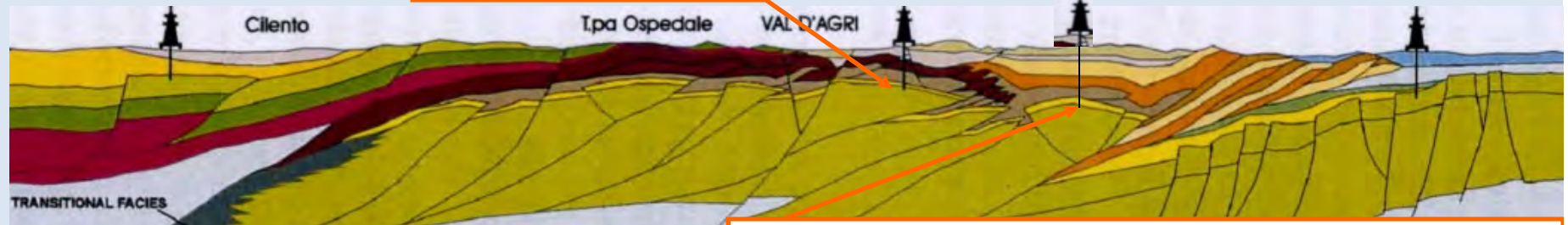
# H-C fields in Italy and Albania



A

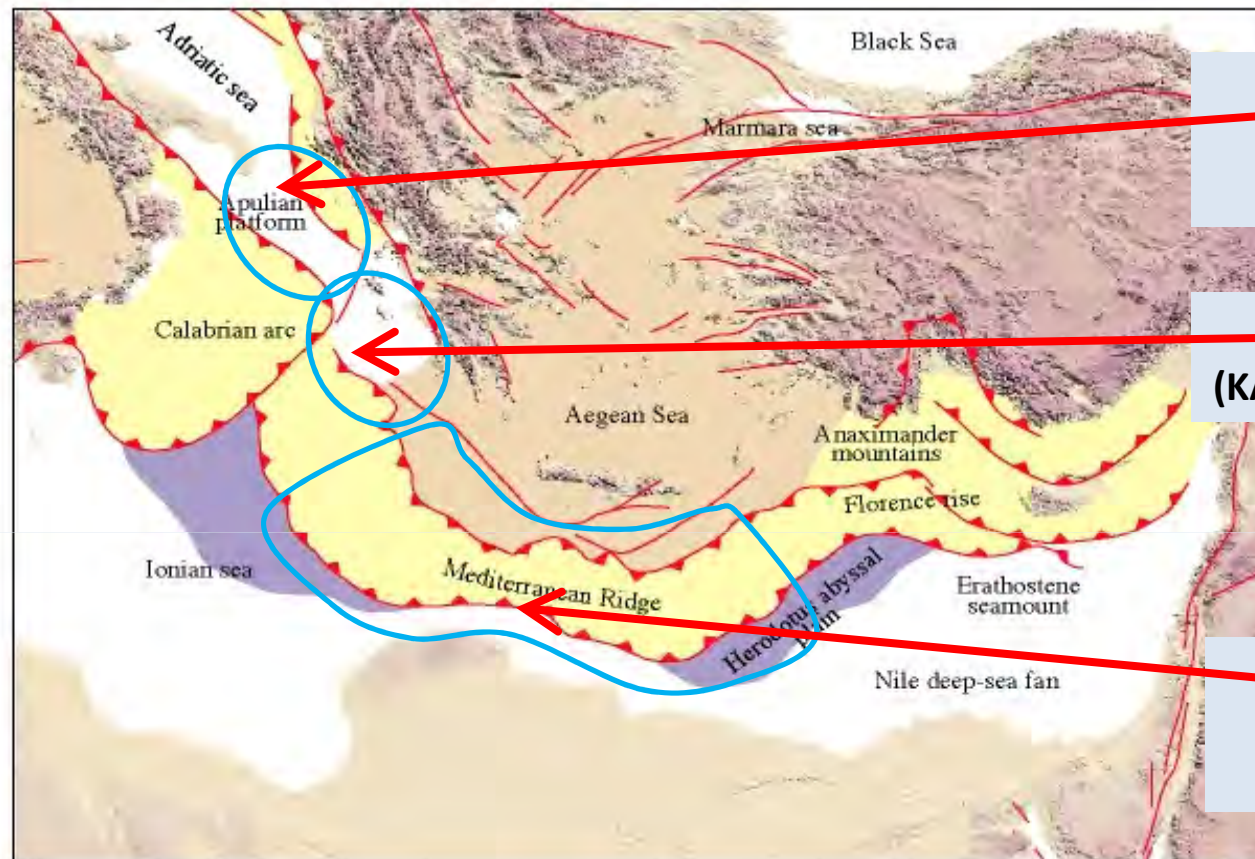
M.Alpi trend

B



Tempa Rossa (Monte Grosso) trend

# TECTONIC SKETCH OF EASTERN MEDITERRANEAN



**NORTH IONIAN SEA  
(SOUTH ADRIATIC/APULIAN  
PLATFORM)**

**CENTRAL IONIAN SEA  
(KATAKOLON - PATRAIKOS GULF)**

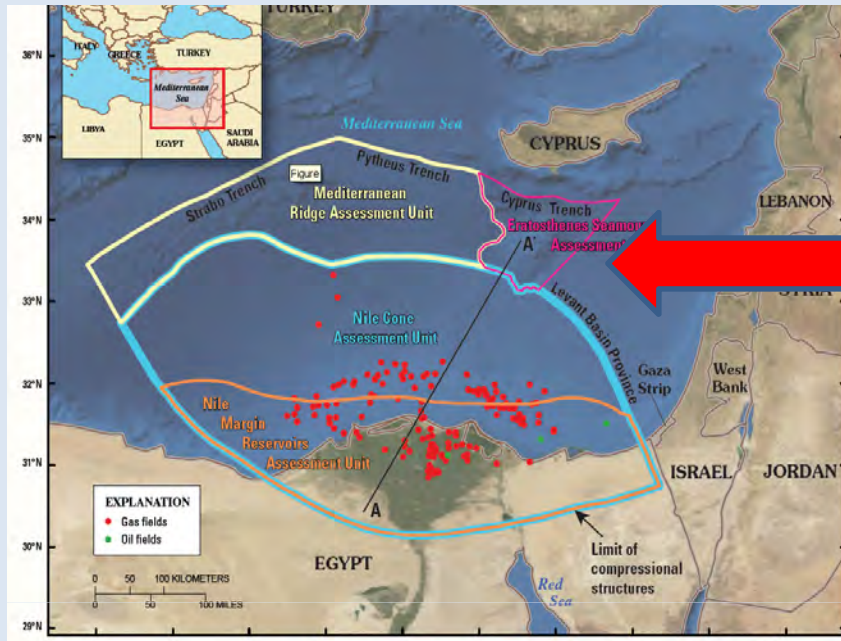
**SOUTH IONIAN and  
SOUTH CRETE AREA  
???**

*Tectonic sketch of the Eastern Mediterranean*

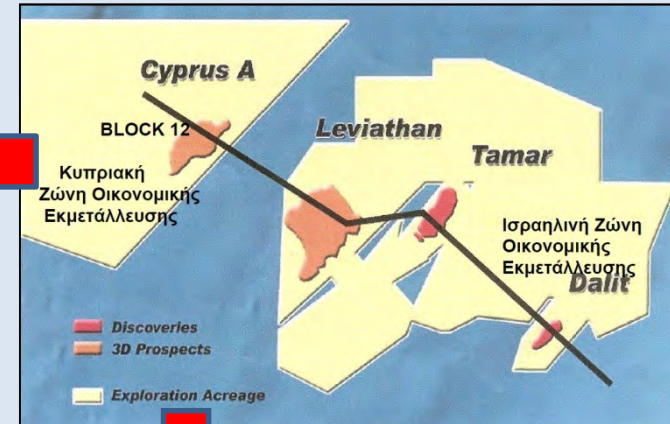
*(adapted from Barrier, E., Chamot-Rooke, N. and Giordano, G., 2004,*

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

## Egypt: Offshore discoveries in Eastern Mediterranean



## ISRAEL: Offshore Discoveries in Levantine Basin

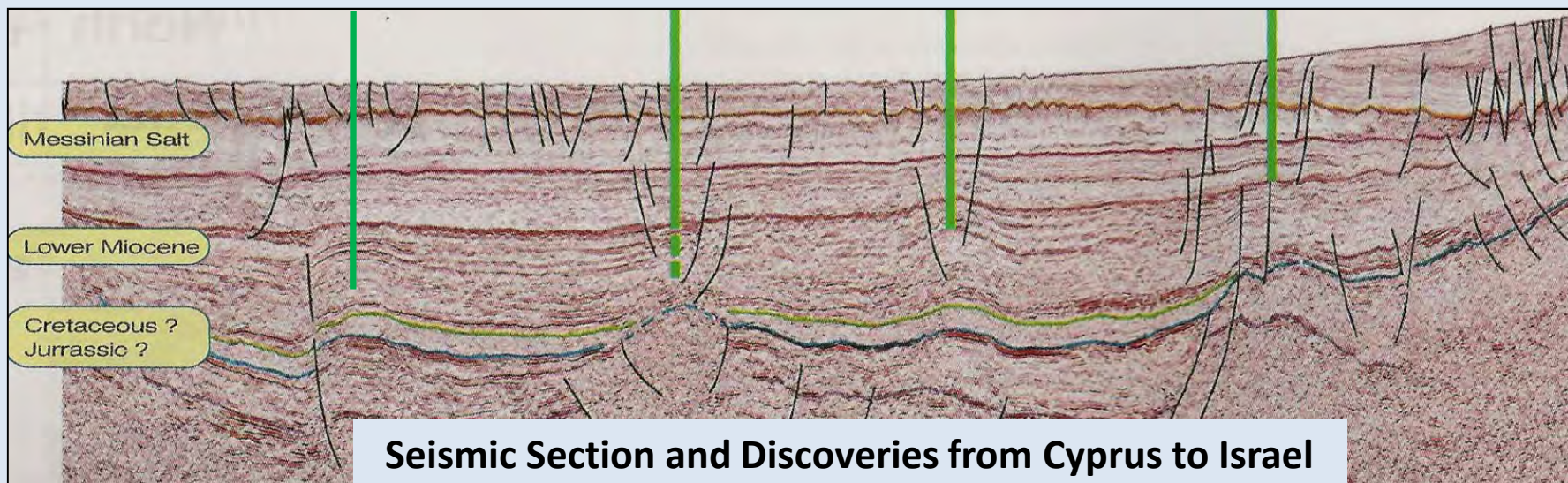


**Cyprus A**  
7 + Tcf

**Leviathan**  
≈ 16 + Tcf

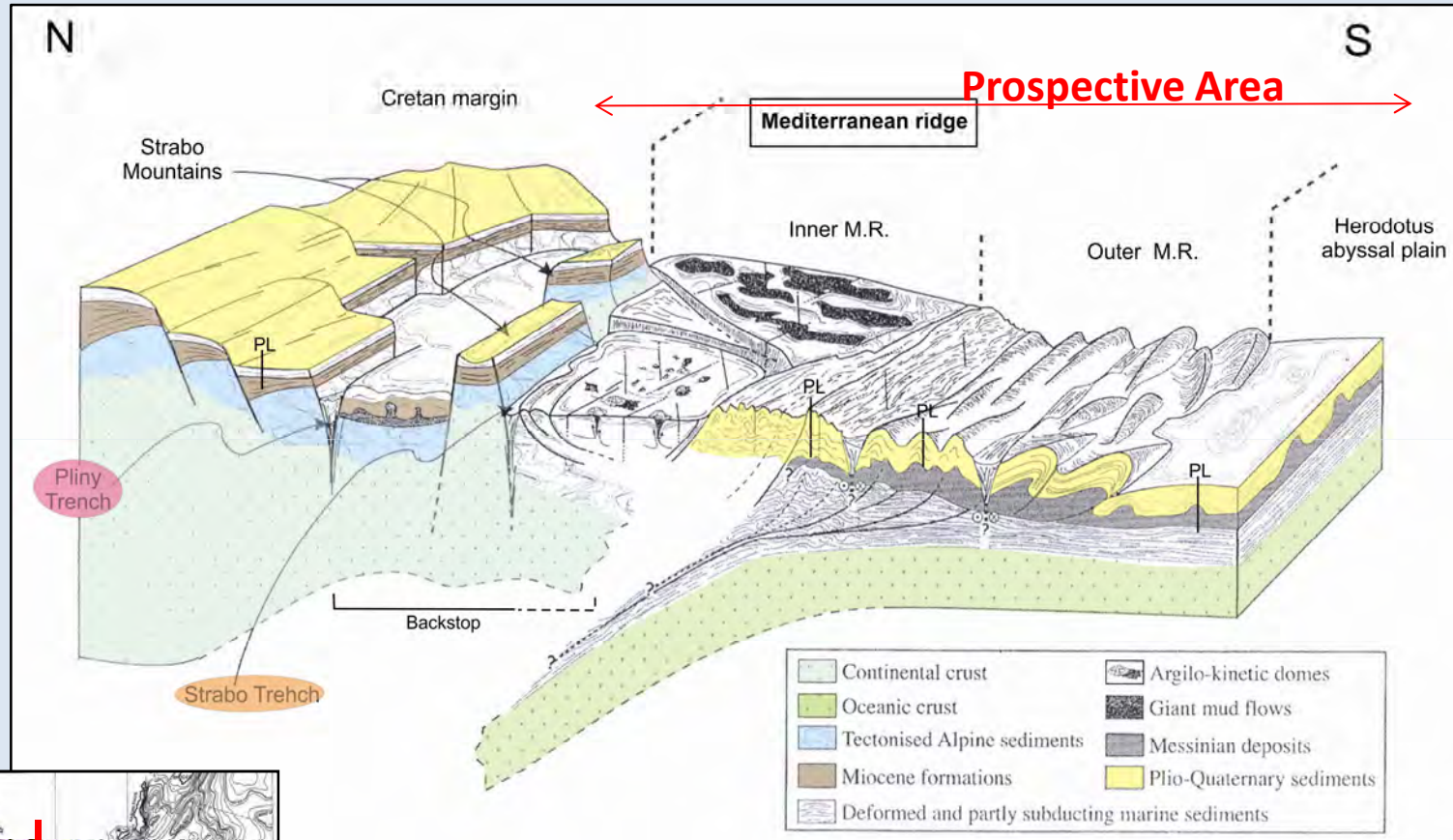
**Tamar**  
≈ 8+ Tcf

**Dalit**  
≈ 0.5 Tcf



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

## General Geological Model



***Huguen et al (2001)***

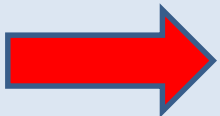
# Exploration & Production -Business Environment

## 1. On institutional and legislative level

- Absence of stable, enduring and credible interlocutor of the State
- *Deficit* at the level of mechanism, mentality and of course human resources
- Lack of experience, knowledge and significant "gaps" in the flow of administrative practices. institutional bodies hardly work in a modern and fast pace producing outcome.
- Rigid labor laws
- Endless bureaucracy
- Lack of understanding o business time and risk
- Widespread corruption
- Lack of a clear environmental policy.

## 2. On the political level

- Absence of delimitation of exclusive economic zones
- High political uncertainty
- Governmental instability
- Great economical crisis, tremendous public dept and high deficit,



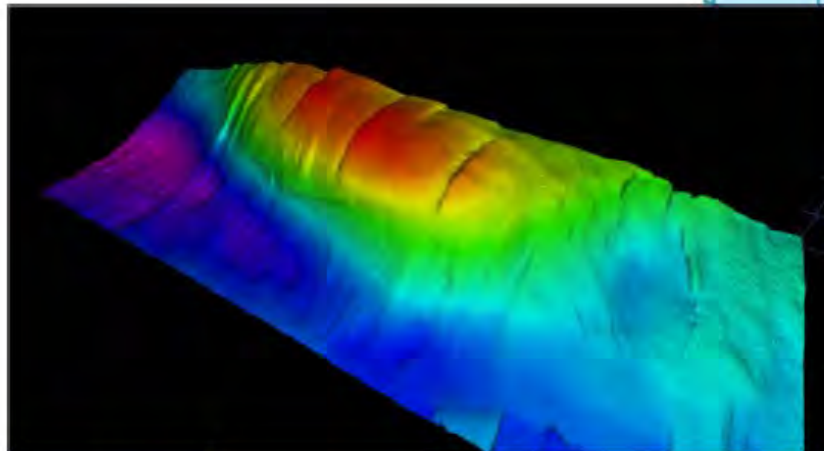
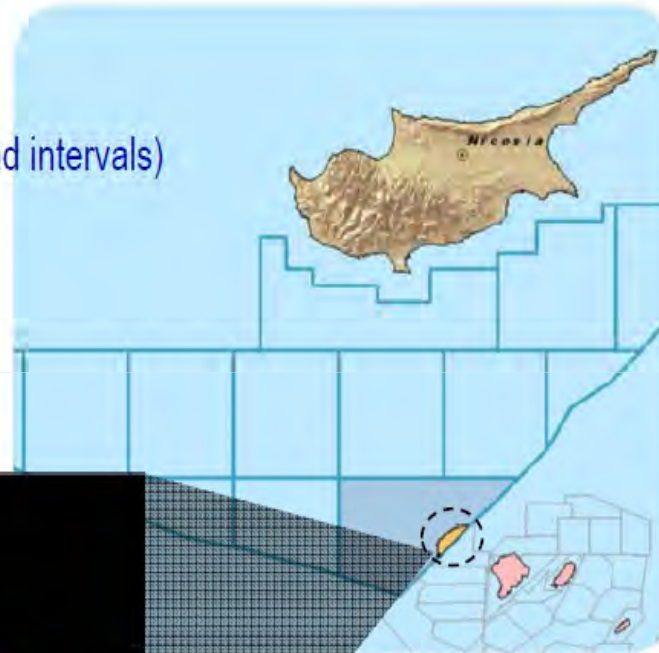
**Uncertain political and business environment !!!**

# CYPRUS: Afrodite Discovery

## Exploratory Well in Block 12

Natural Gas Discovery 28 Dec. 2011

- ▶ 7tcf gross mean estimated resources
- ▶ 310 feet net natural gas pay (Miocene sand intervals)
- ▶ 5,860m total depth
- ▶ 1,688m water depth



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## Delimitation of the EEZ

### Arab Republic of Egypt

- Delimitation of the EEZ (2003)
- Framework Agreement concerning the development of cross-median line hydrocarbon resources (2006)
- Confidentiality Agreement (2006)

### Lebanon

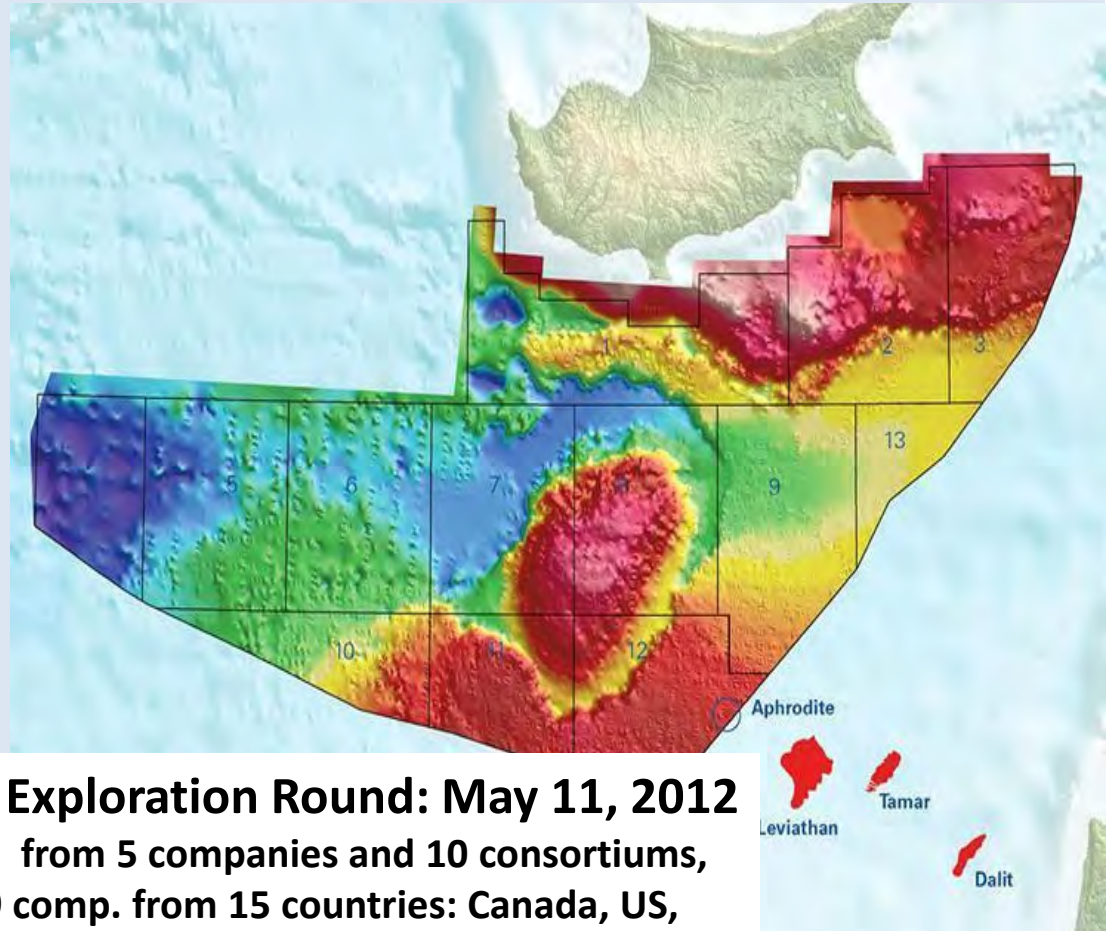
Delimitation of the EEZ (2007)

### Israel

Delimitation of the EEZ (2010)

- ▶ 13 Exploration Blocks
- ▶ Extensive 2D Seismic Grid
- ▶ 3D Seismic Surveys
- ▶ 1<sup>st</sup> Licensing Round: 2007
- ▶ One Exploration Licence (Block 12)

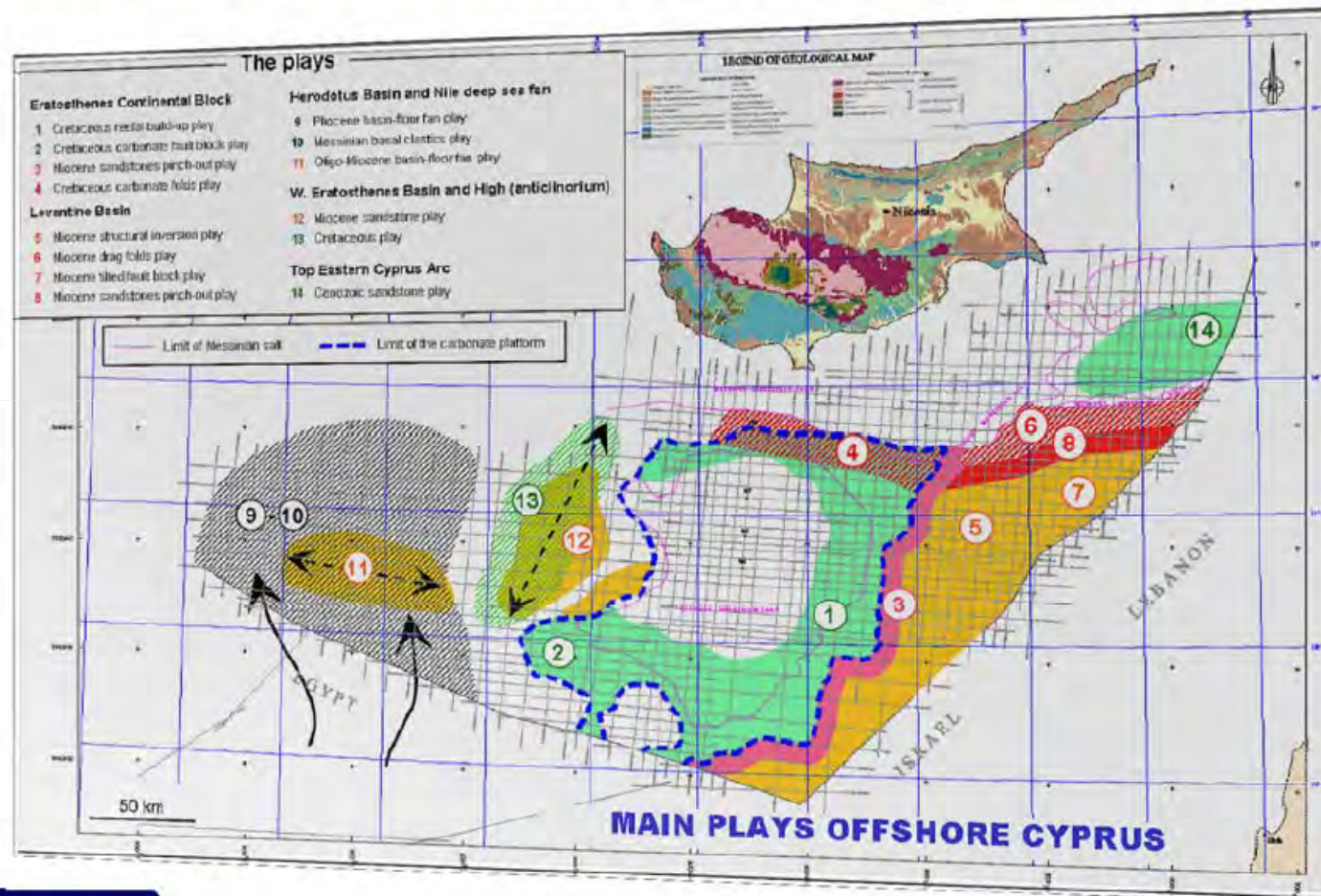
# CYPRUS E&P of H/C



## 2-nd Exploration Round: May 11, 2012

33 bids, from 5 companies and 10 consortiums,  
Total 29 comp. from 15 countries: Canada, US,  
Israel, France, Russia, UK, Malaysia, Italy,  
Australia, Korea, Norway, Netherlands, Lebanon,  
Cyprus and Indonesia,  
No bid for Blocks 1, 4, 13  
Most popular No 9 and 2

# Offshore Cyprus: 14 Recognized Hydrocarbon Plays



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