

# E&P Offshore Acreage in Greece: 2019 Roadmap

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Vice President HHRM SA

## Hellenic Hydrocarbon Resources Management SA

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### Establishment of HHRM by Law 4001/2011

- The law introduced HHRM as :

**“A Competent Independent Authority, exercising exclusively the Hellenic Republic’s rights on Hydrocarbon resources (managing upstream activities and licensing)”**

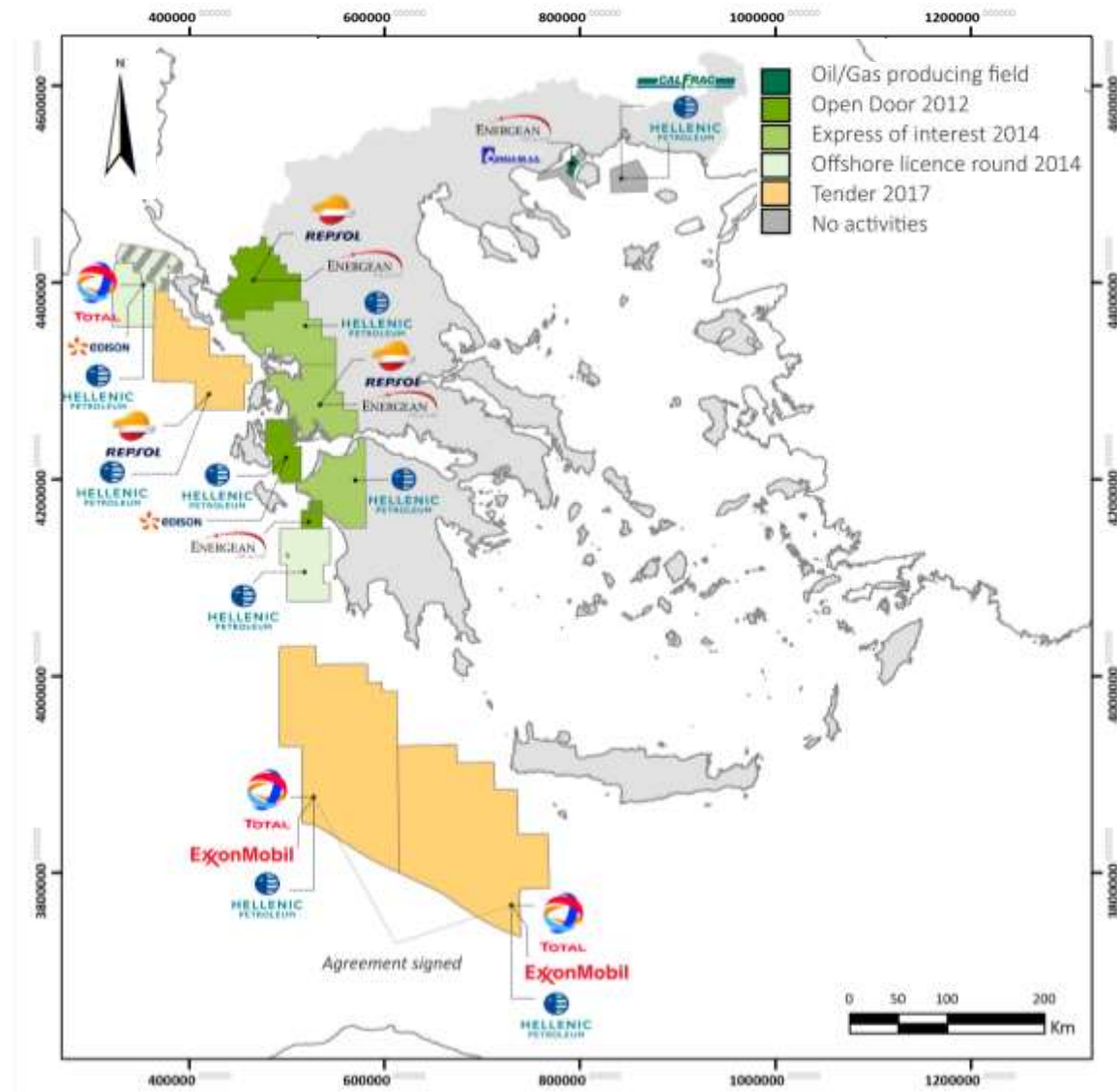
- **HHRM is a 100% State owned Company but not a NOC !**

## Hellenic Hydrocarbon Resources Management SA

### HHRM SA

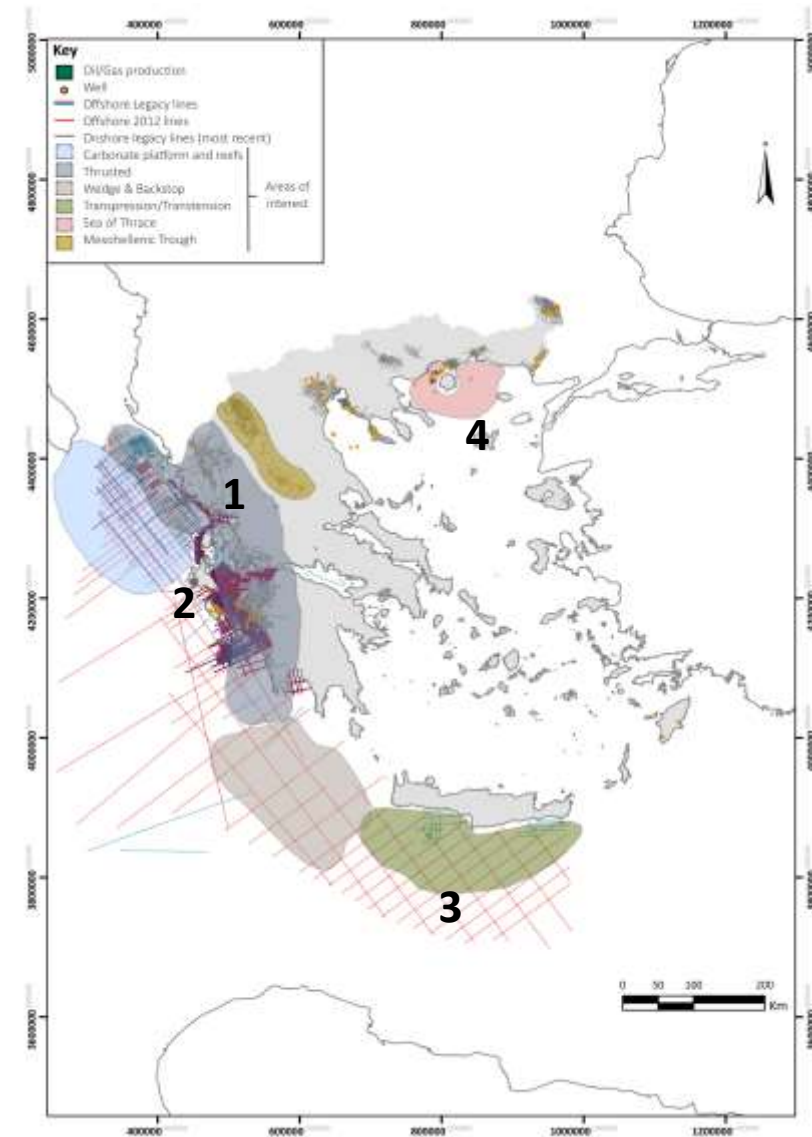
1. exercises the management for State account of Hydrocarbon rights (including prospecting, exploration & exploitation ) for the public benefit.
  - The HHRM, as lessor, proceeds to tenders, receives bids, evaluates, negotiates and concludes Lease Agreements with third parties.
  - The Agreements are signed by HHRM SA and the Contractor and are submitted to the Minister of Environment and Energy for approval.
  - The right of hydrocarbon prospection is granted by decision of HHRM SA.
2. HHRM has been also appointed as the Competent Authority for Offshore Safety in Oil and Gas Operations in Greece since July, 2016, through Law 4409/2016 (transposition of Directive 2013/30/EU ).

## Awarded areas in focus: Current blocks situation in Greece



## Greece and hydrocarbons: Principle Tectonic settings

1. The active Fold & Thrust Belt (Hellenides)
2. Kefalonia Fault (KFT)
3. Africa slab subduction (Aegean Island Arc)
4. NAF



## Future E&P Opportunities

### 1. Offshore (Western Greece)

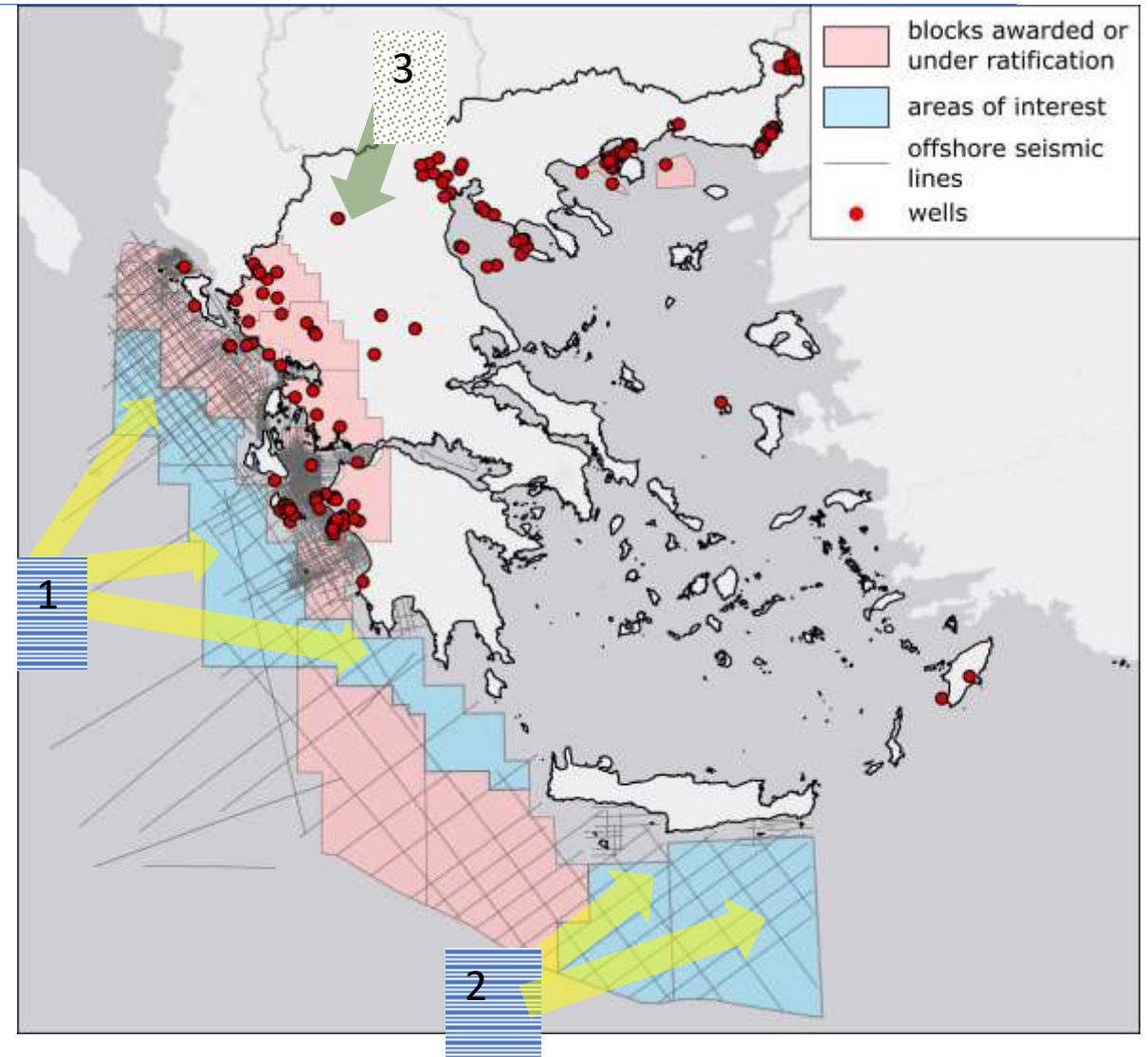
- Central Ionian Sea (N & S part)
- South of Peloponnesus

### 2. Offshore

- South of Crete (central & eastern part)

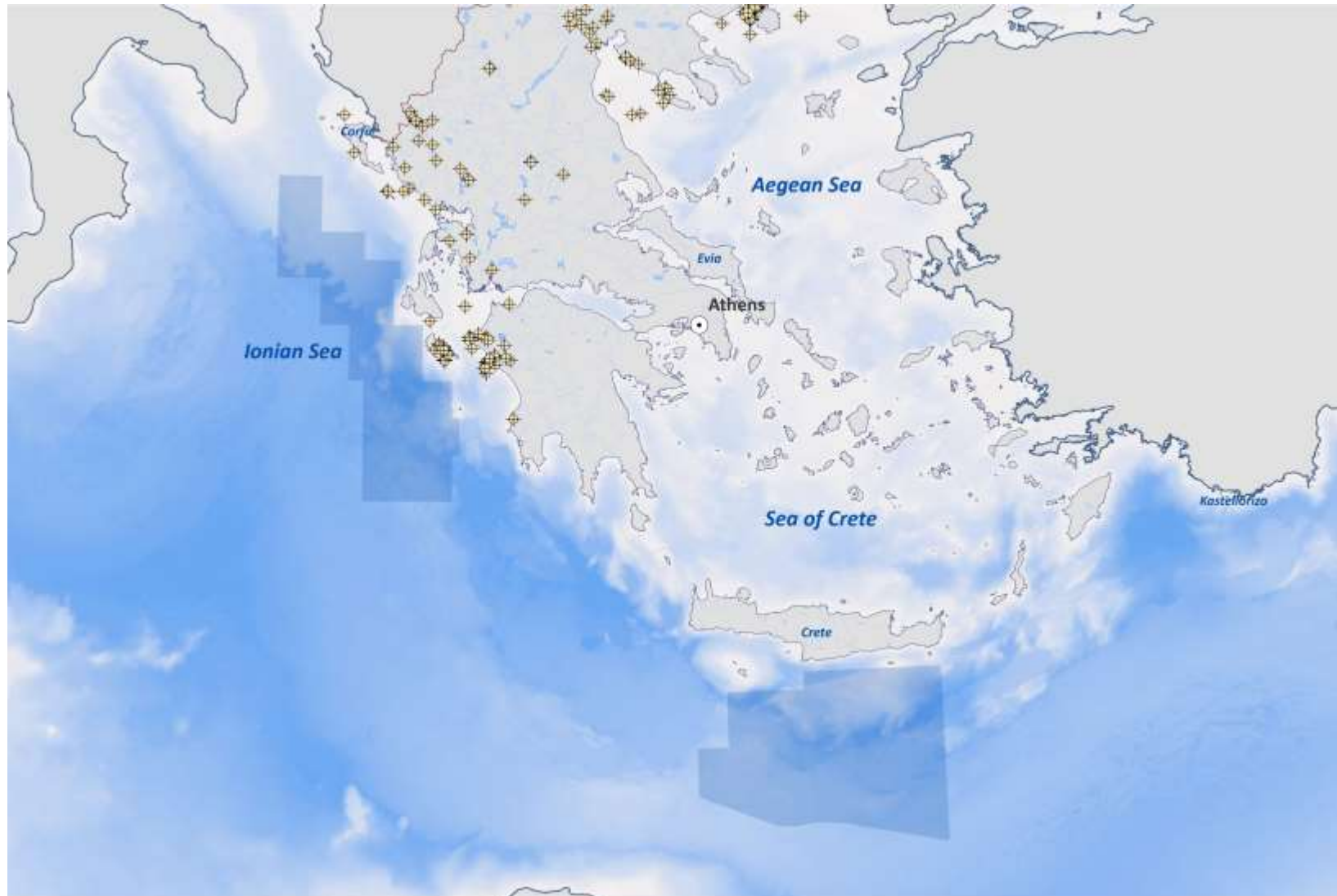
### 3. Onshore (Central Greece)

- Mesohellenic Basin
- Under technical evaluation





## Offshore Acreage



## Main Challenges vs Advantages (Offshore)

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### Main challenges

- Frontier areas (sparse seismic 2D grid, to the south)
- Sea-water depths
- Structural elements such as the Kefalonia transform fault and its consequences, South of Crete complexity
- Source Rocks
- Environmentally protected sectors & tourism

### Main advantages

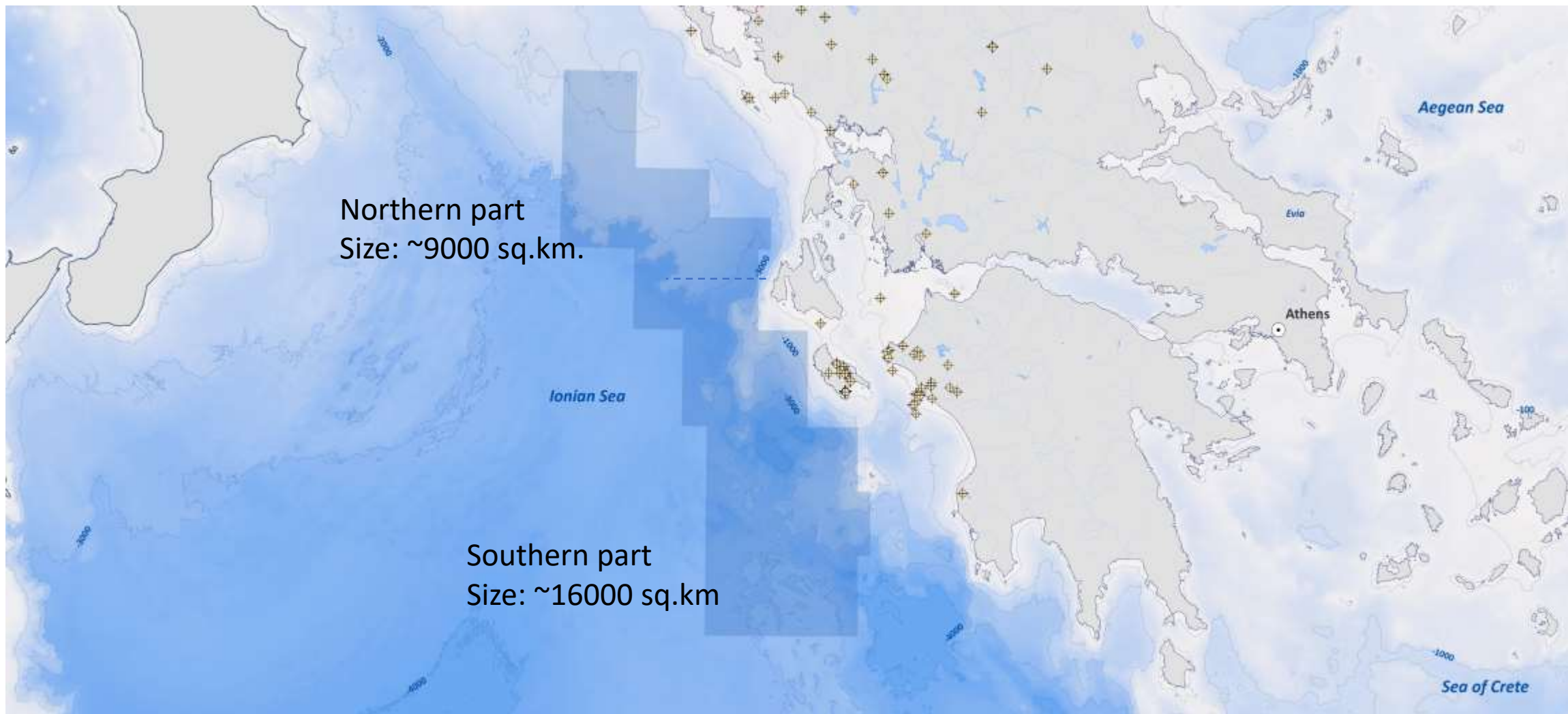
- Discoveries in W Greece, Oil & gas shows and seeps, Albanian [basin] and Italian analogues [platform]
- Wells to correlate (Ionian Sea, absent in Crete)
- Large acreage-potential blocks to explore
- EastMed Pipeline Project in progress (S. of Crete), TAP underwater (N Ionian)
- Fiscal regime



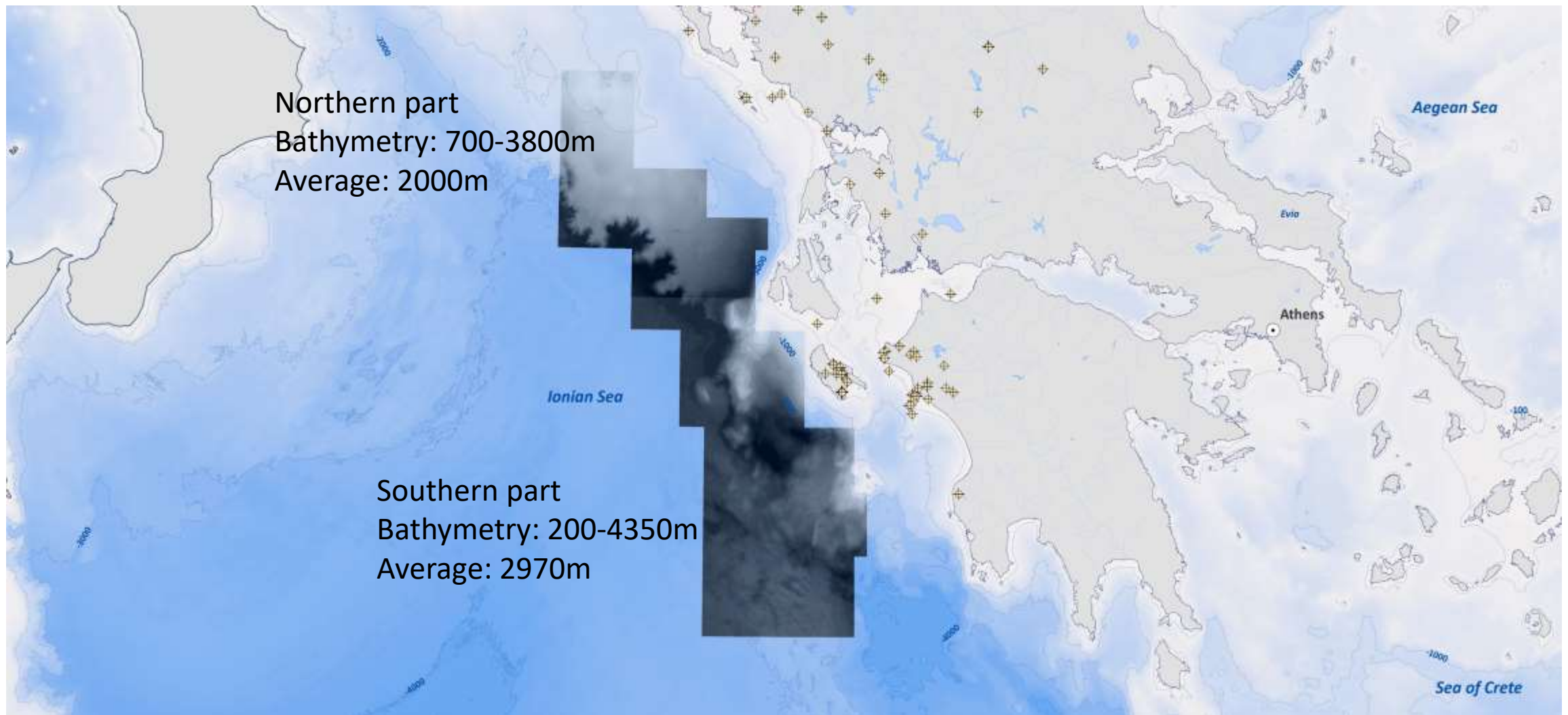
## Plays in the available Offshore Acreage



## Offshore Central Ionian Acreage

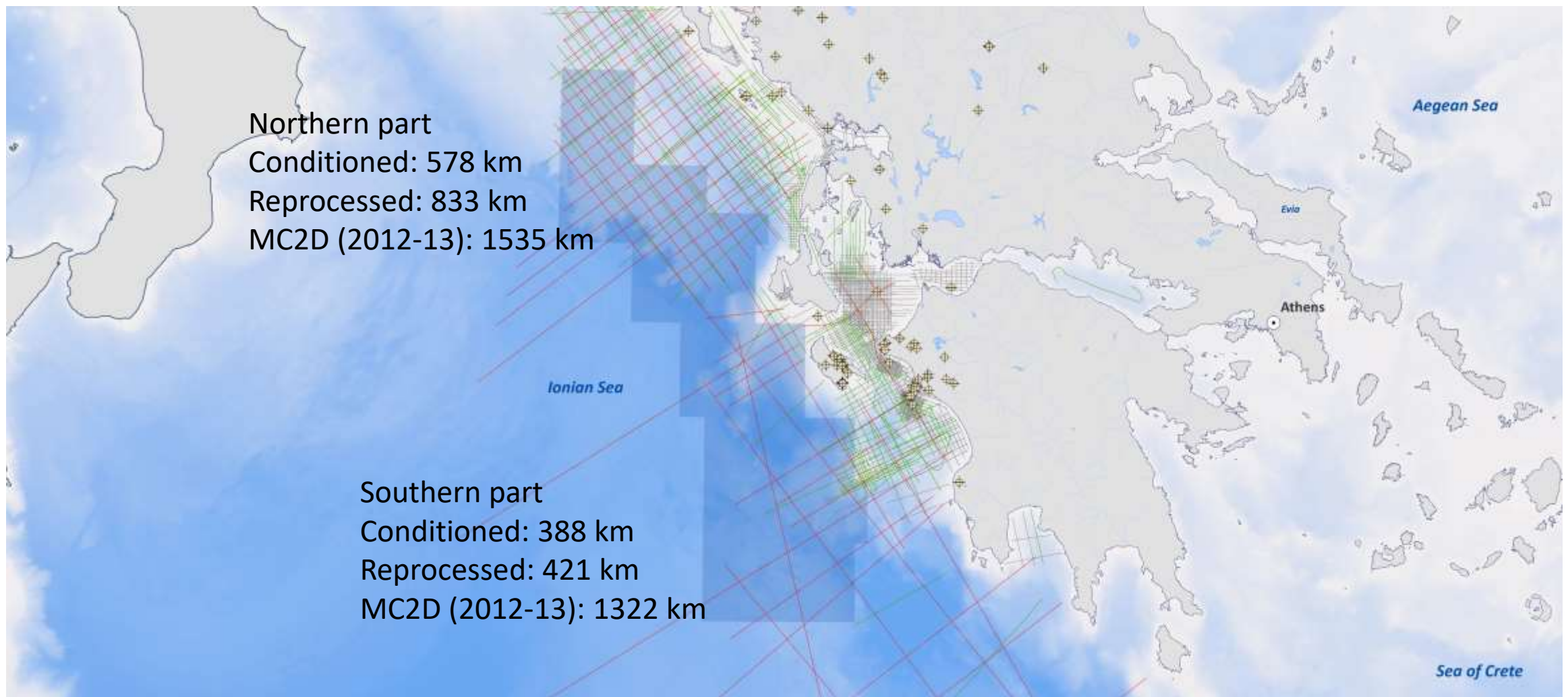


## Offshore Central Ionian Acreage: Bathymetry

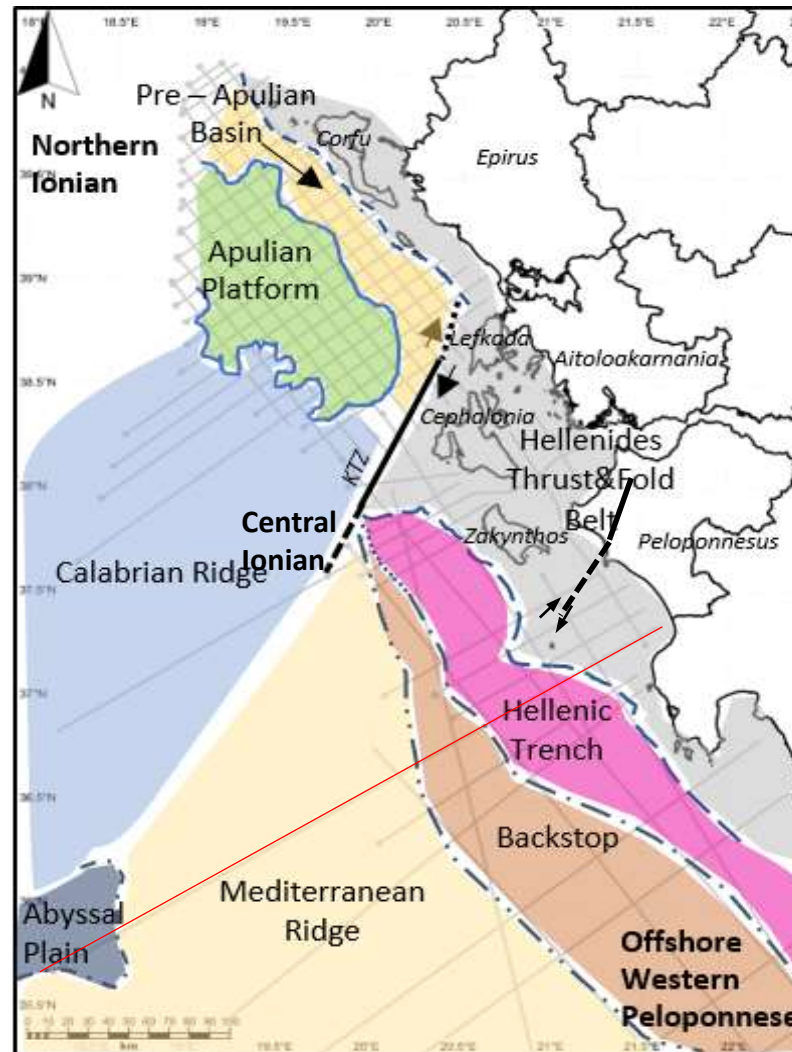




## Offshore Central Ionian Acreage: Seismic coverage

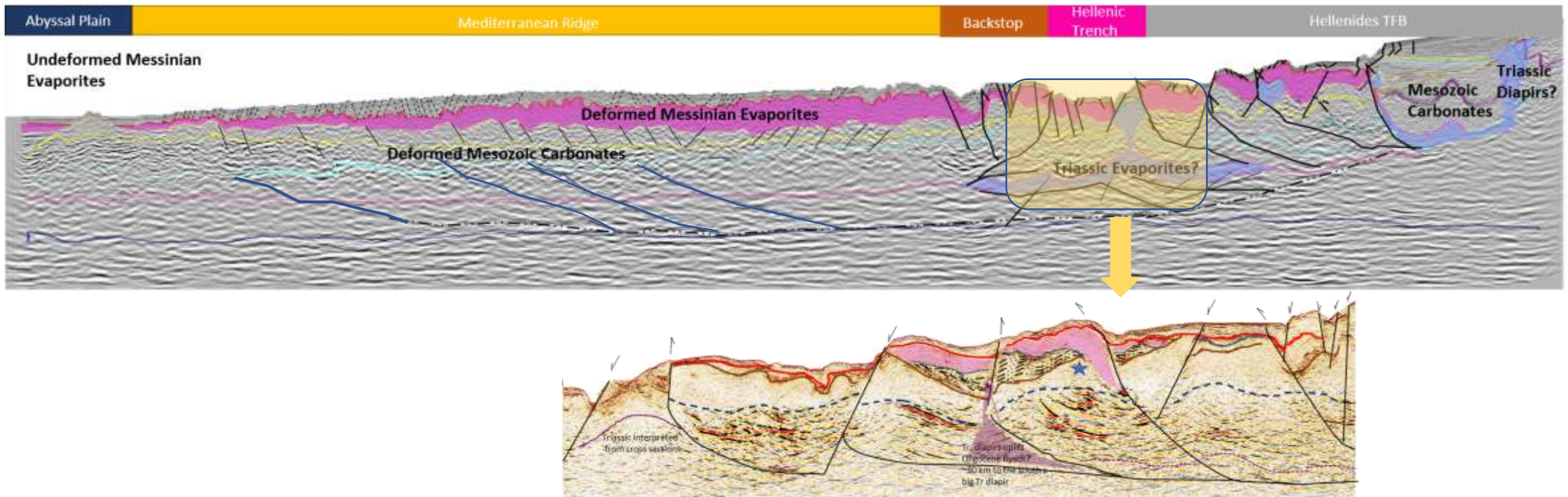
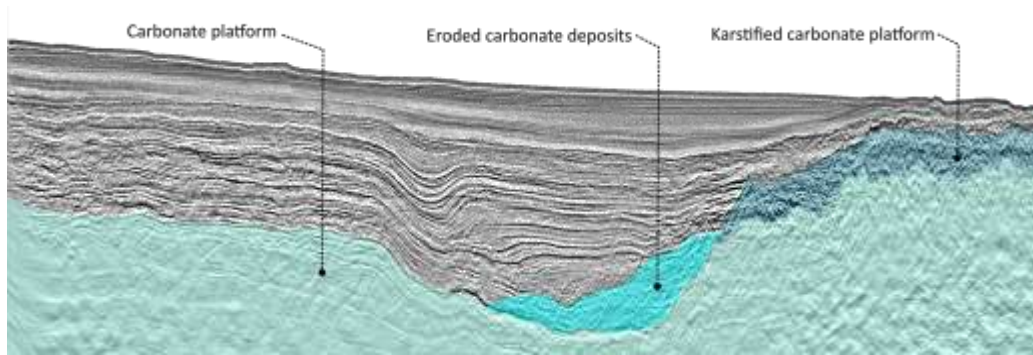


## Tectonic setting : Central Ionian Sea





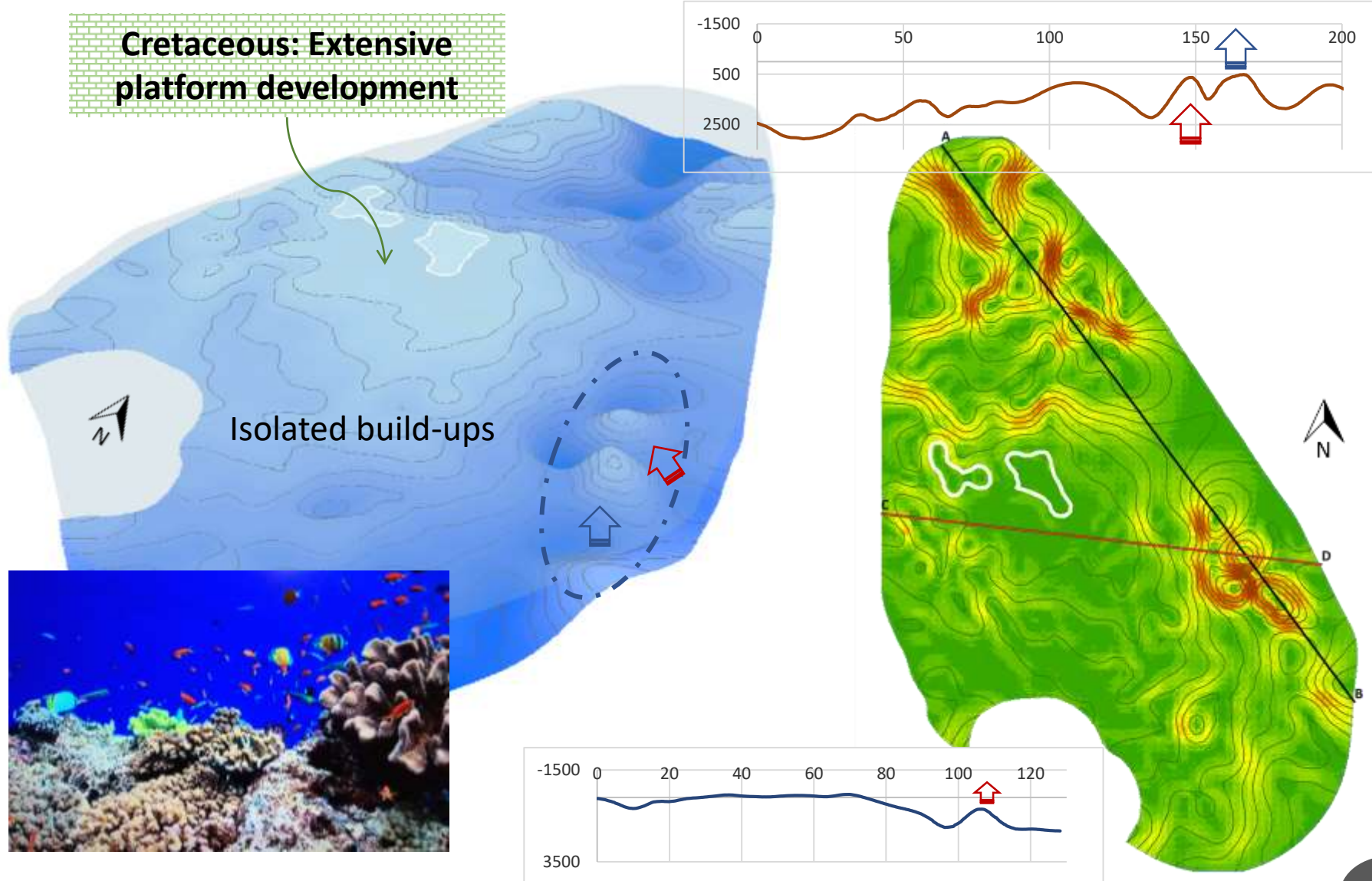
## What we are currently studying in Offshore Western Greece





## Cretaceous

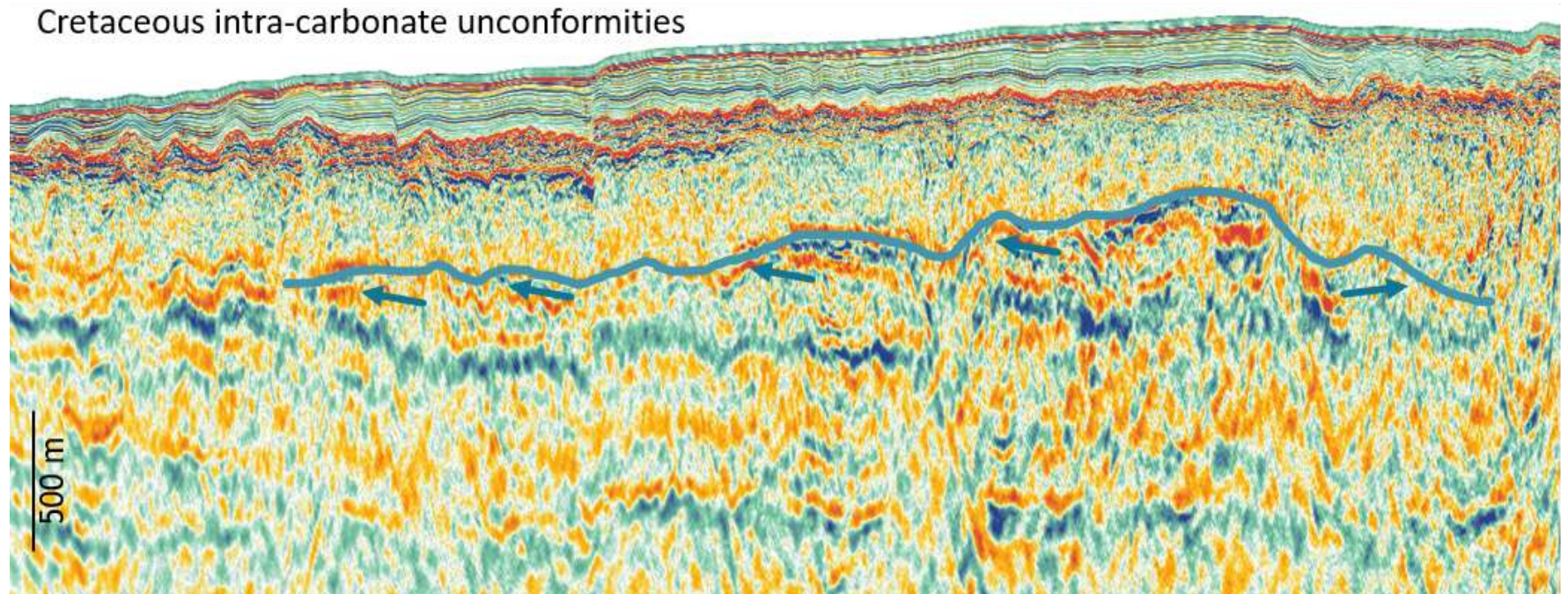
**Cretaceous: Extensive platform development**



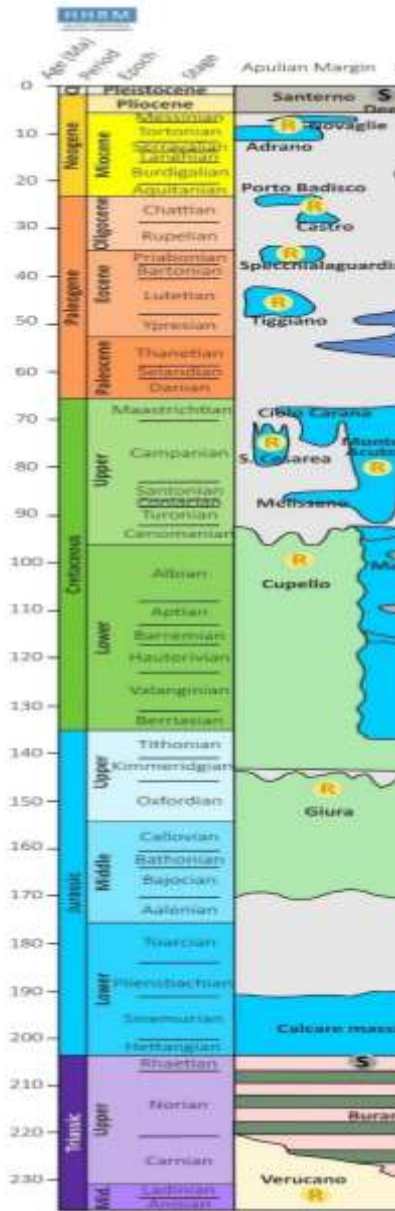


## Apulian Platform: Seismic character

### Cretaceous intra-carbonate unconformities

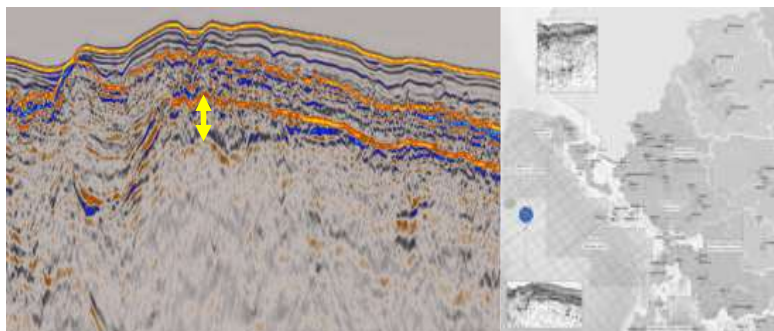


- Intra Platform Unconformities and
- Truncations on intra-cretaceous unconformity

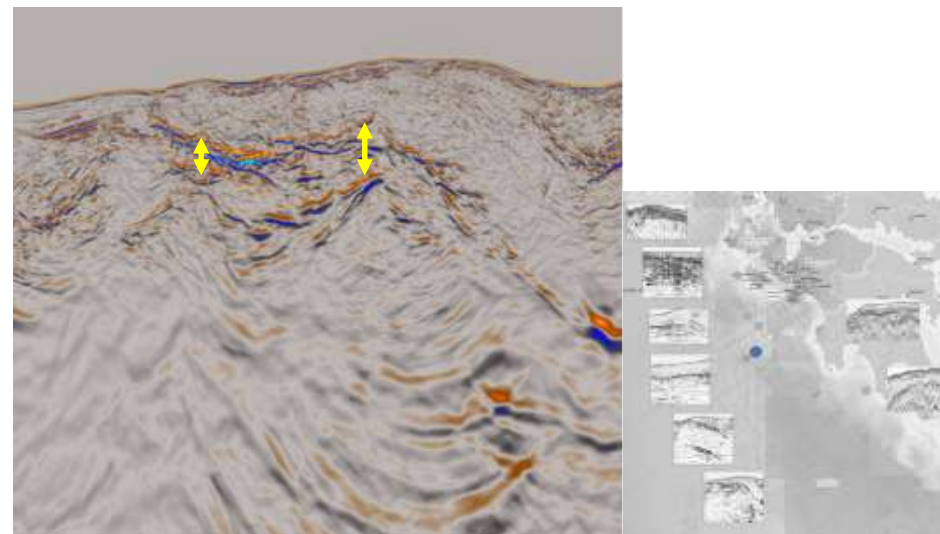




## Plays in offshore Central Ionian available acreage

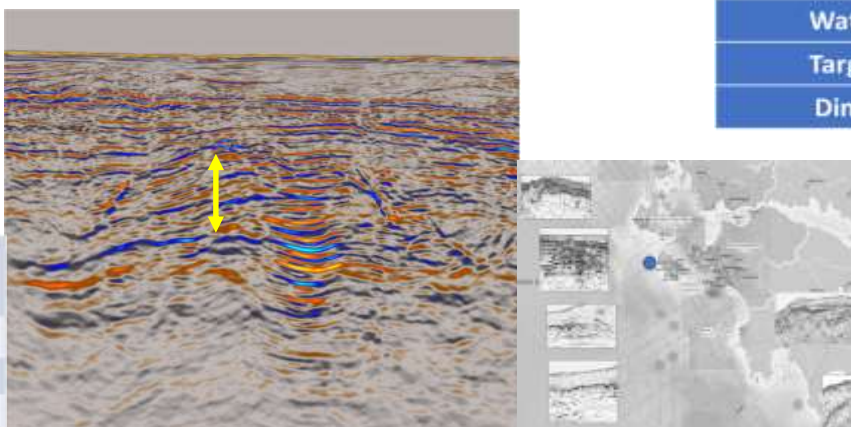


Type	Karstified Carbonate Platform
Water depth	840 m
Target depth	1,100 m
Dimensions	6685*160 (m)

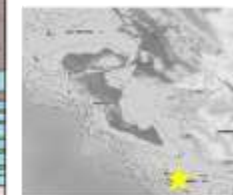
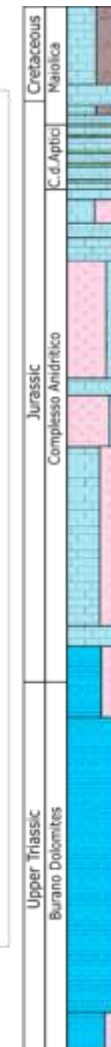
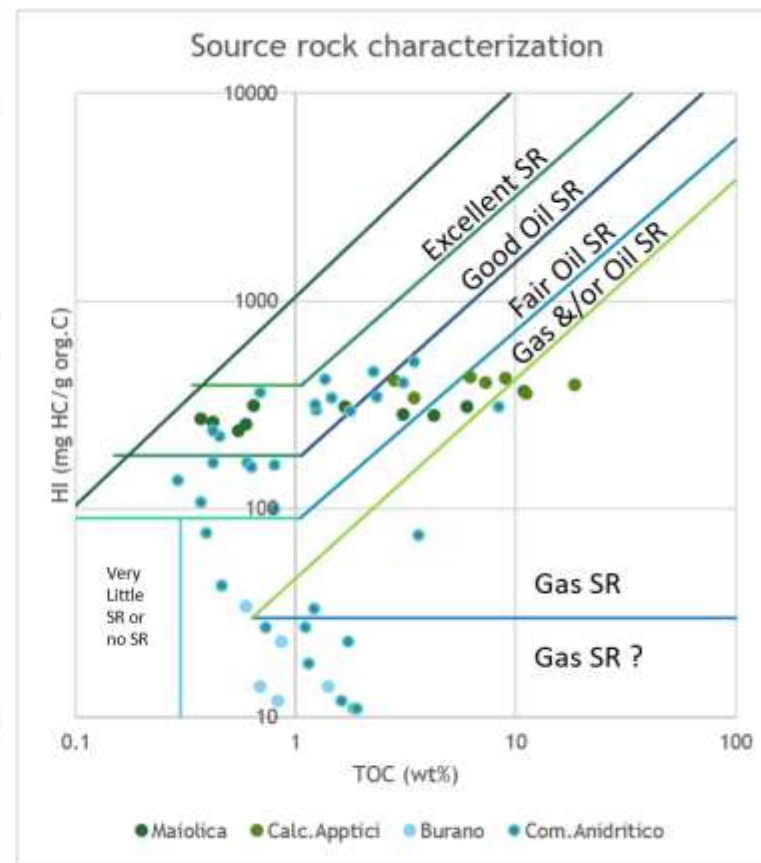
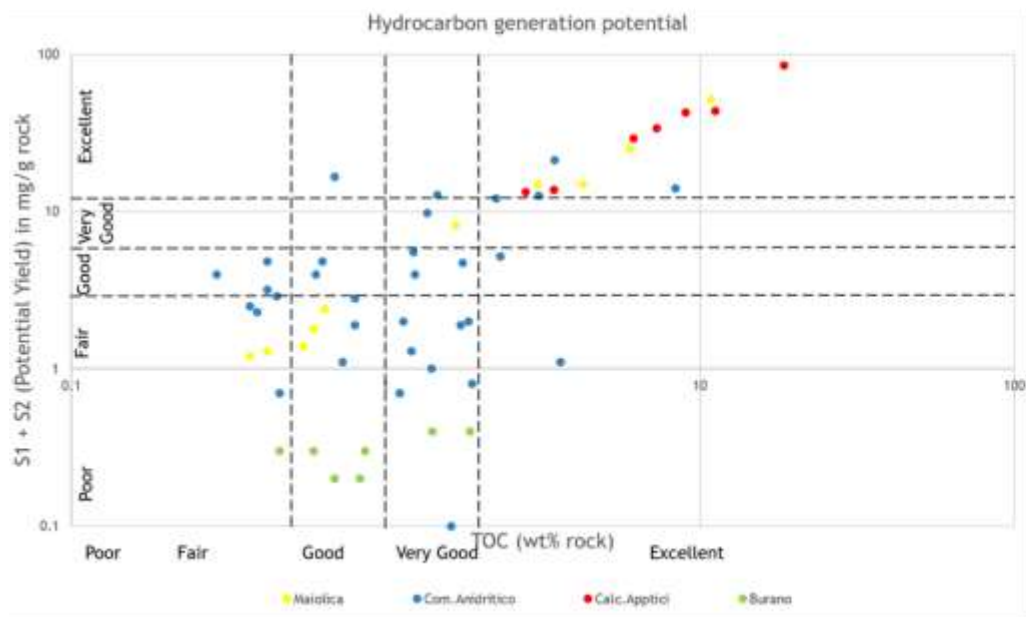
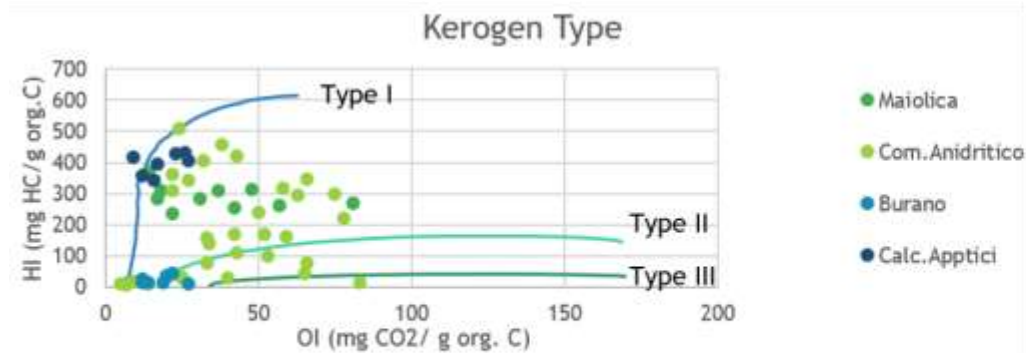


Type	Isolated Carbonate Build-up
Water depth	2,160 m
Target depth	3,060 m
Dimensions	4,260*720 (m)

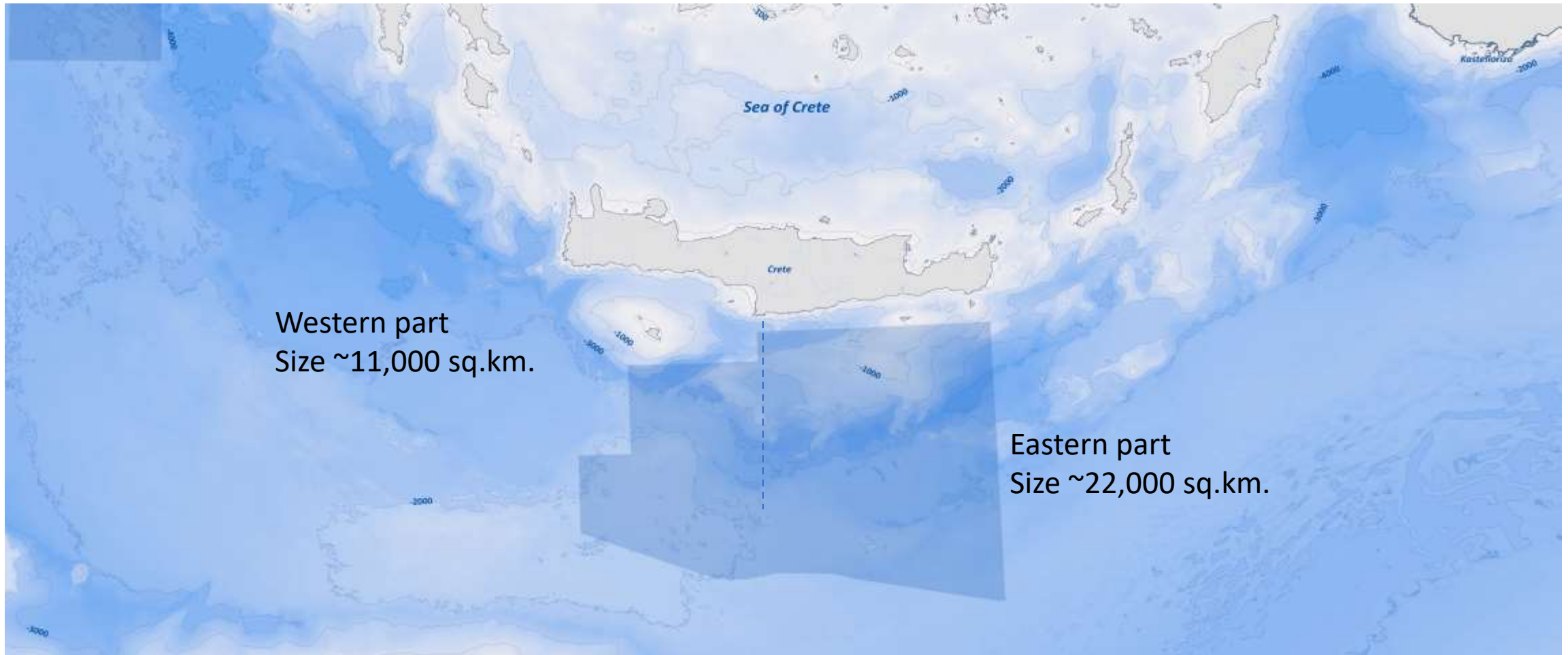
Type	Carbonate mounded feature (mound build up)
Water depth	1400 m
Target depth	2,160 m
Dimensions	3,800*630 (m)



## Source rocks North Ionian

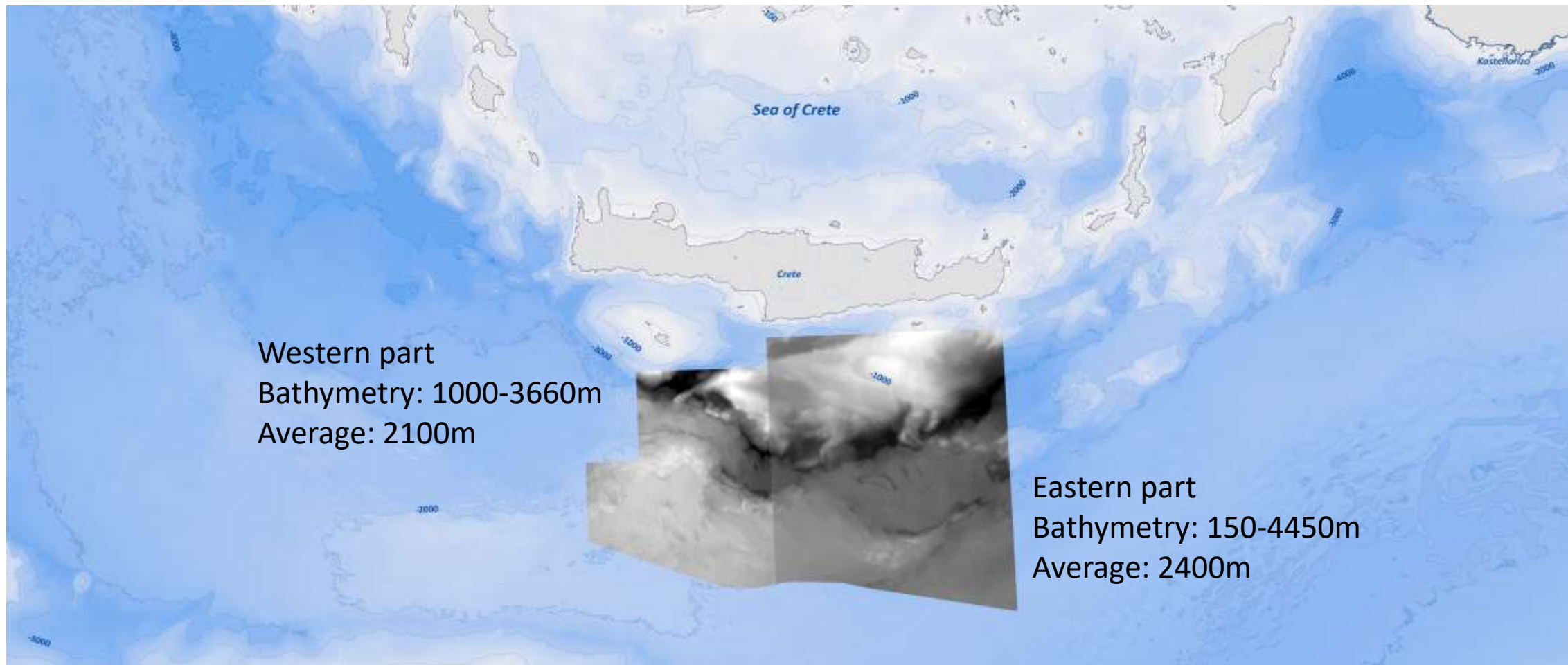


## Offshore South of Crete Available Acreage



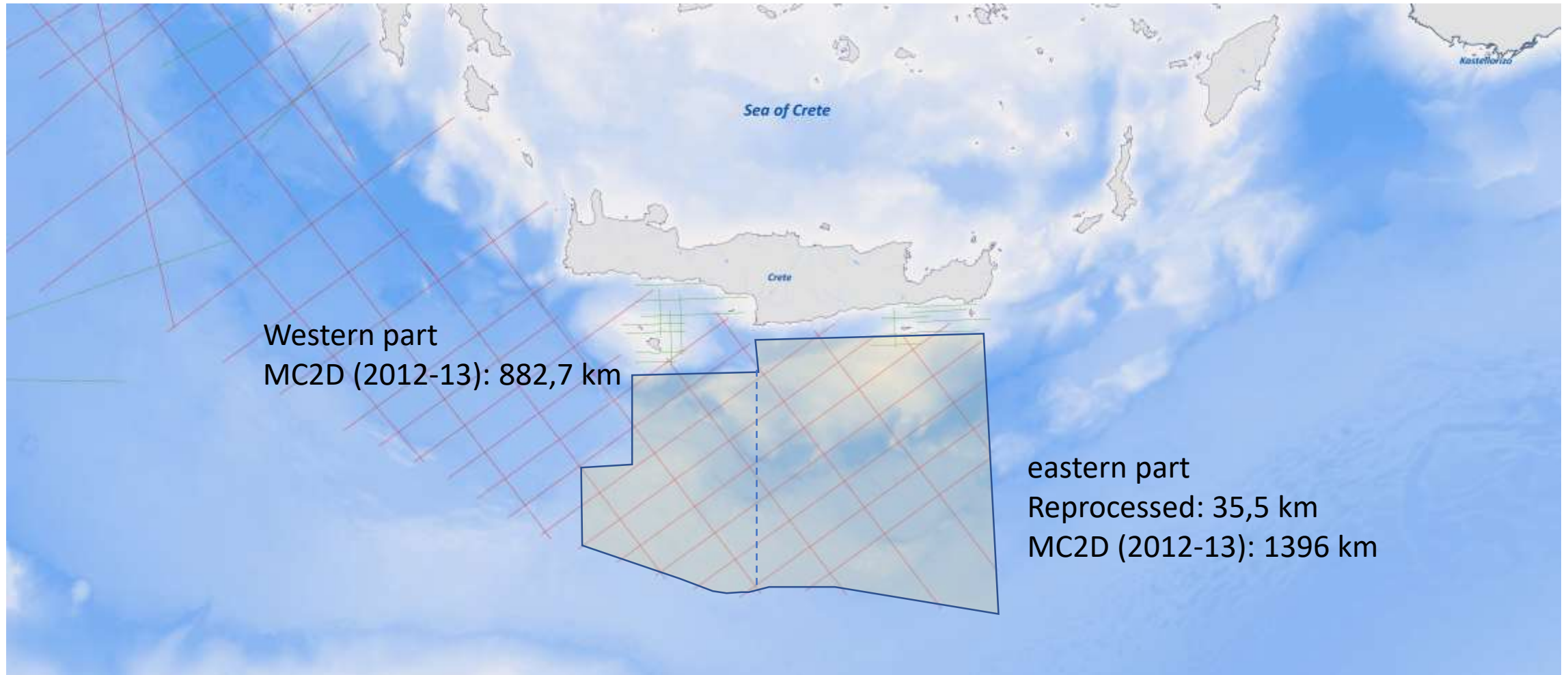


## Offshore South of Crete Available Acreage: Bathymetry





## Offshore South of Crete Available Acreage: Seismic coverage



**Geological Cross-Section NW-SE**

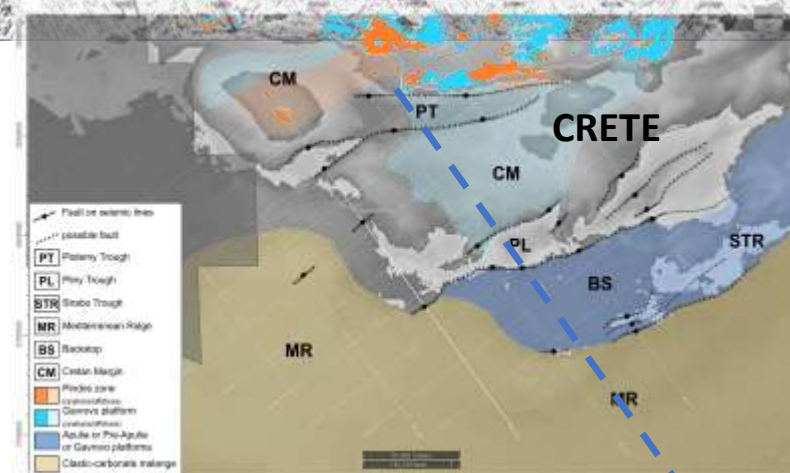
**Legend:**

- Seabed
- MSC
- Top Miocene
- Top Oligocene
- Top Cretaceous
- Intra Cretaceous
- Mid Jurassic
- Basement
- Faults

**Geological Features:**

- Ptolemy Trough
- Pliny Trough
- Strabo Trough
- Neogene Clastic and Evaporites
- Mesozoic Carbonate platform
- Seamount

**Scale:** 20 km



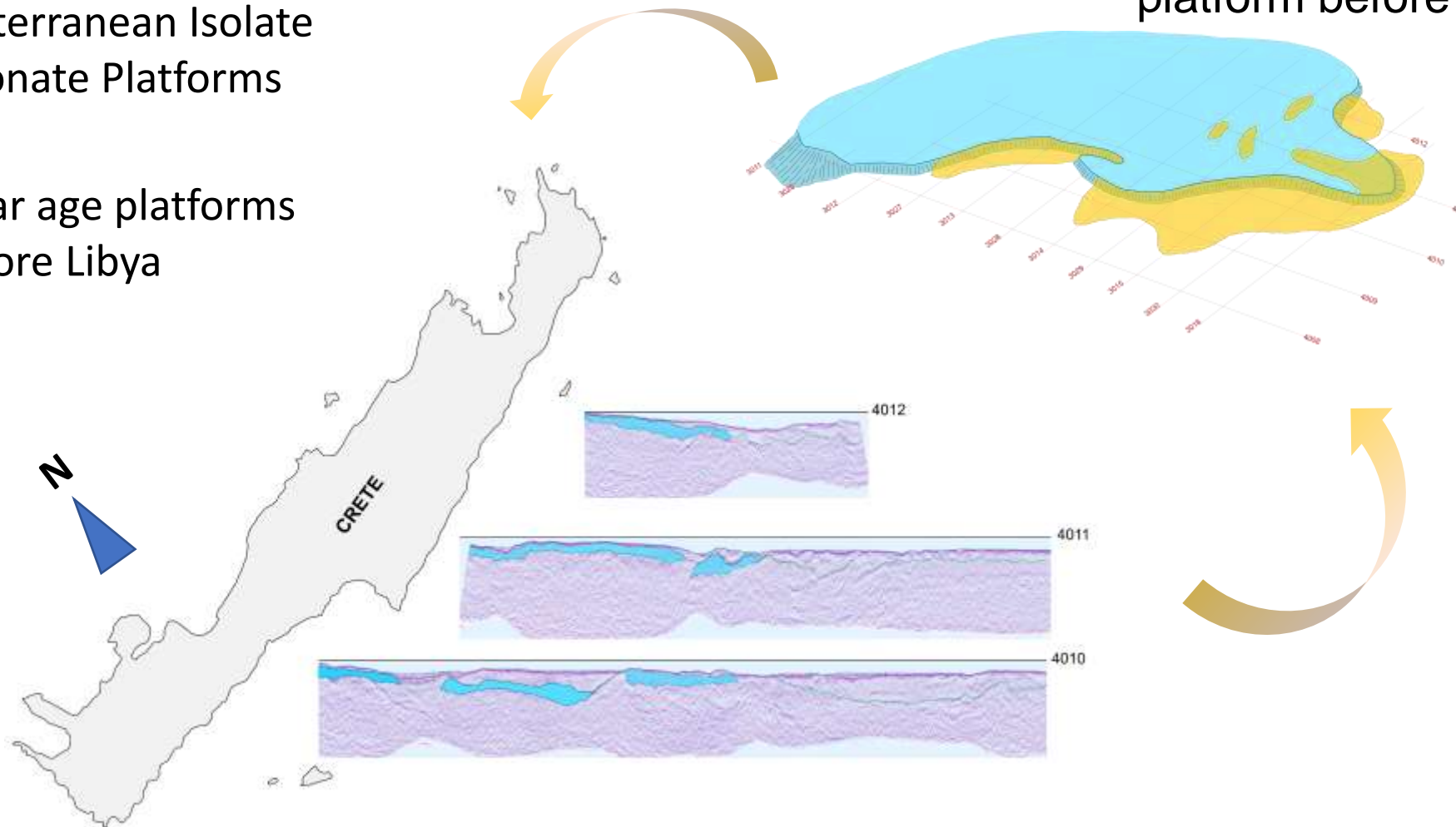


## South of Crete in seismic

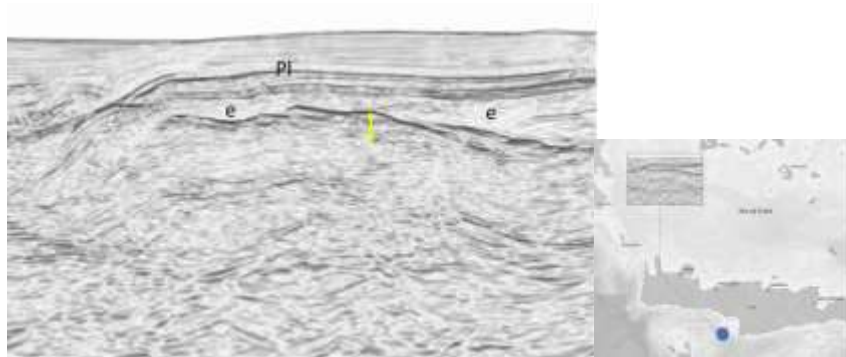
Similarities with other  
Mediterranean Isolate  
Carbonate Platforms

Similar age platforms  
offshore Libya

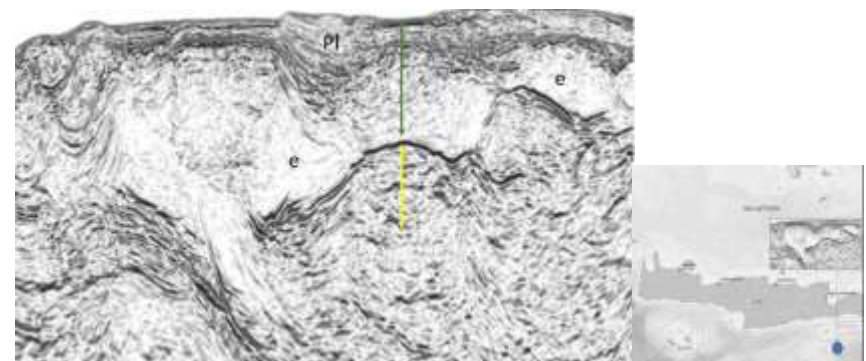
Eocene-Cretaceous carbonate  
platform before tectonism



## Plays in Offshore South of Crete Available Acreage

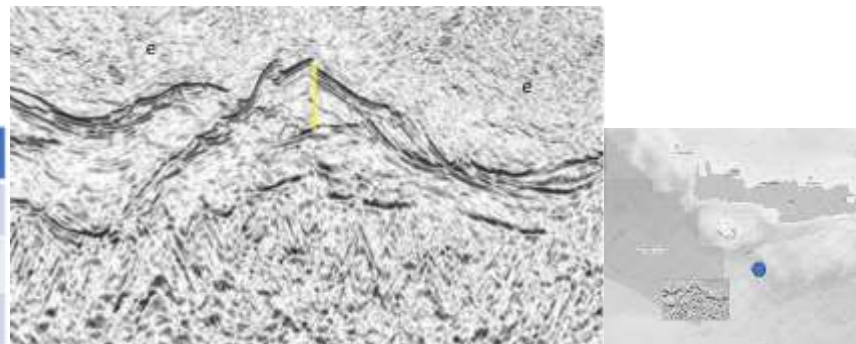


Type	Carbonate Build up
Water Depth	2,500 m
Target Depth	3500 m
Dimensions	H: 400 m , W: 1,500 m



Type	Anticline/Build up
Water Depth	2,890 m
Target Depth	3,700
Dimensions	H: 1,500 m, W: 4,000 m

Type	Carbonate Build up
Water Depth	2,650 m
Target Depth	4,630 m
Dimensions	H: 1,000 m, W: 3,000 m



## Summarizing: Hydrocarbons prospectivity

- There is Open Space for new opportunities in offshore of both western Greece and South of Crete Isl.
- Huge acreage is offered for E&P
- **Central Ionian Sea** and **South of Crete** areas provide interesting & promising structures and potential for future offshore exploration.

	<b>Ionian</b>	<b>Offshore Crete</b>
<b>Source</b>	Mesozoic/Miocene shales (e.g. Paxi)	Mesozoic/Miocene shales
<b>Plays</b>	1. Cretaceous to Paleogene karstified platform carbonates (intraplatform to slope plays)	1. Carbonate build ups (Zohr analogues)
➤ <b>Stratigraphic</b>	2. Carbonate build ups	2. Siliciclastics/ (turbidite deposits) pinch-outs
➤ <b>Structural</b>	Faulted blocks	Antiform structures (anticlines)
<b>Seal</b>	1. Neogene shales 2. Messinian Evaporites and overlying Pliocene shales (in the southern part)	1. Messinian Evaporites 2. Miocene and Pliocene shales

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**Thank you**