



University of West Attica (UNIWA)

School of Applied Arts and Culture

Dept. of Conservation of Antiquities & Works of Art



Climate Change and Underwater Cultural Heritage in the Mediterranean Scenery



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CLIMATE CHANGE
IMPACTS ON
CULTURAL HERITAGE:

"FACING THE CHALLENGE"
International Conference
June 21-22, 2019
Athens, Greece



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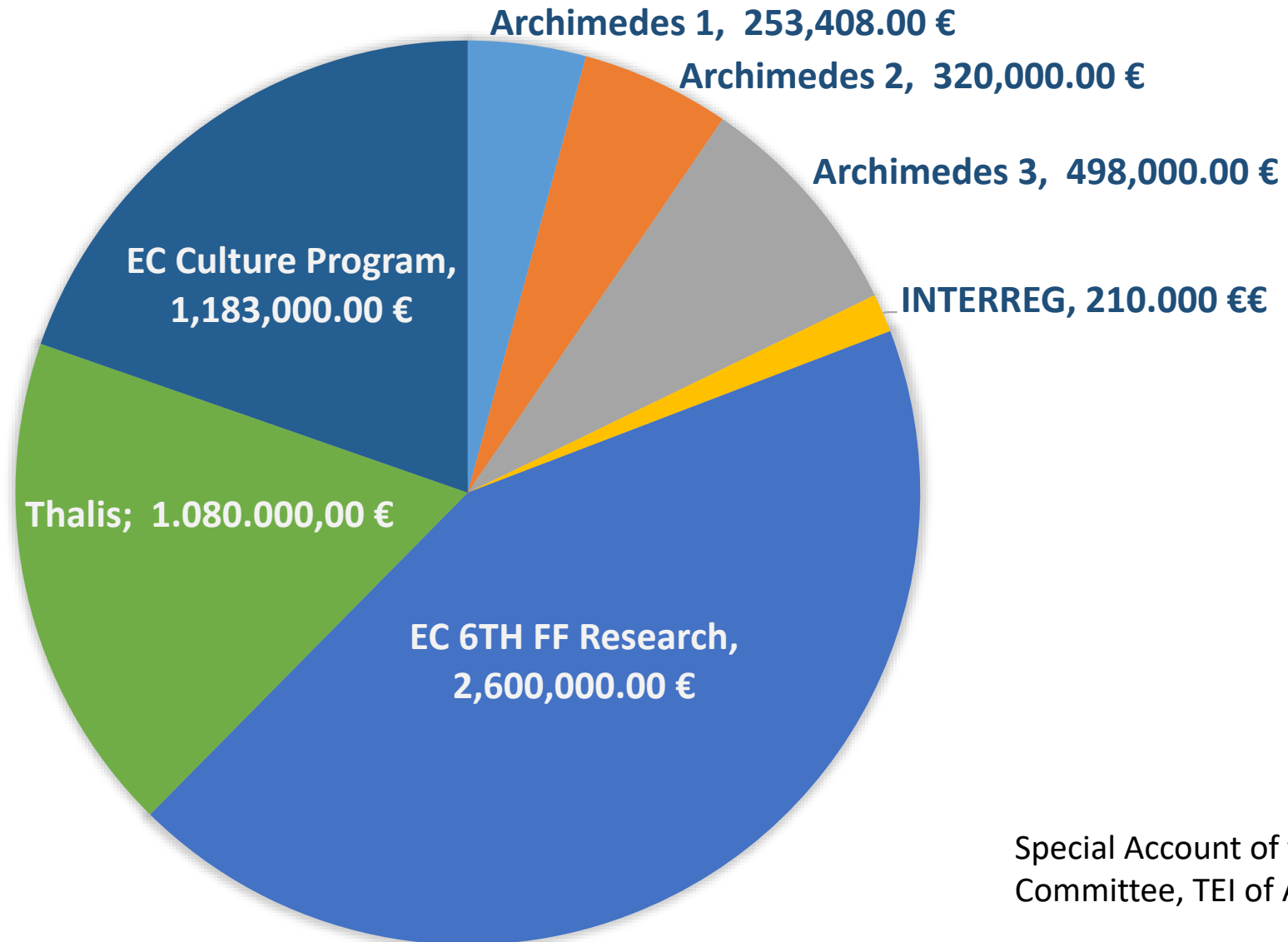
Dept. of Conservation of Antiquities & Works of Art

**Since 1980 & only one of its kind in Greece
Bachelor's, Master's, and Ph.D. in Conservation**

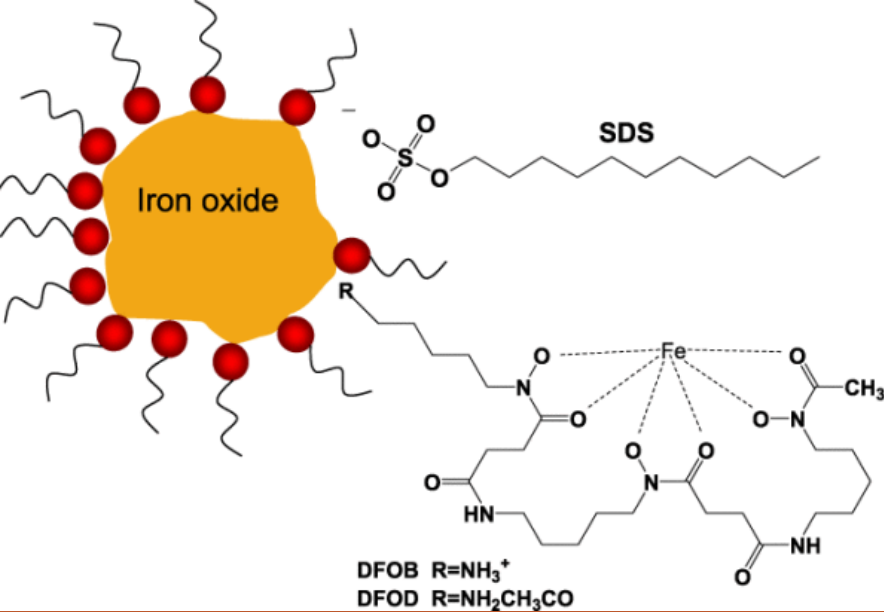


International Conference “Impacts of Climate Change on Cultural Heritage: Facing the Challenge”
Athens, 21-22 June, 2019

Total Projects funded for Conservation at UNIWA in Euros between 2000-2018 (6,144,408€)



Special Account of the Research
Committee, TEI of Athens



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Green Conservation

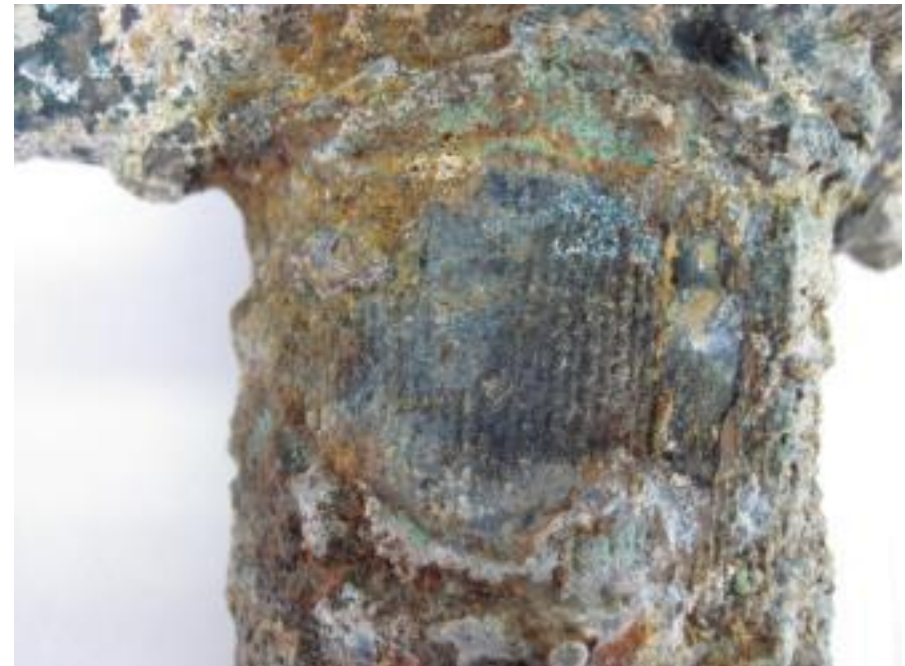


L-CYSTEINE

L-cysteine has been shown to inhibit the production of melanin (skin pigment) in at least one study



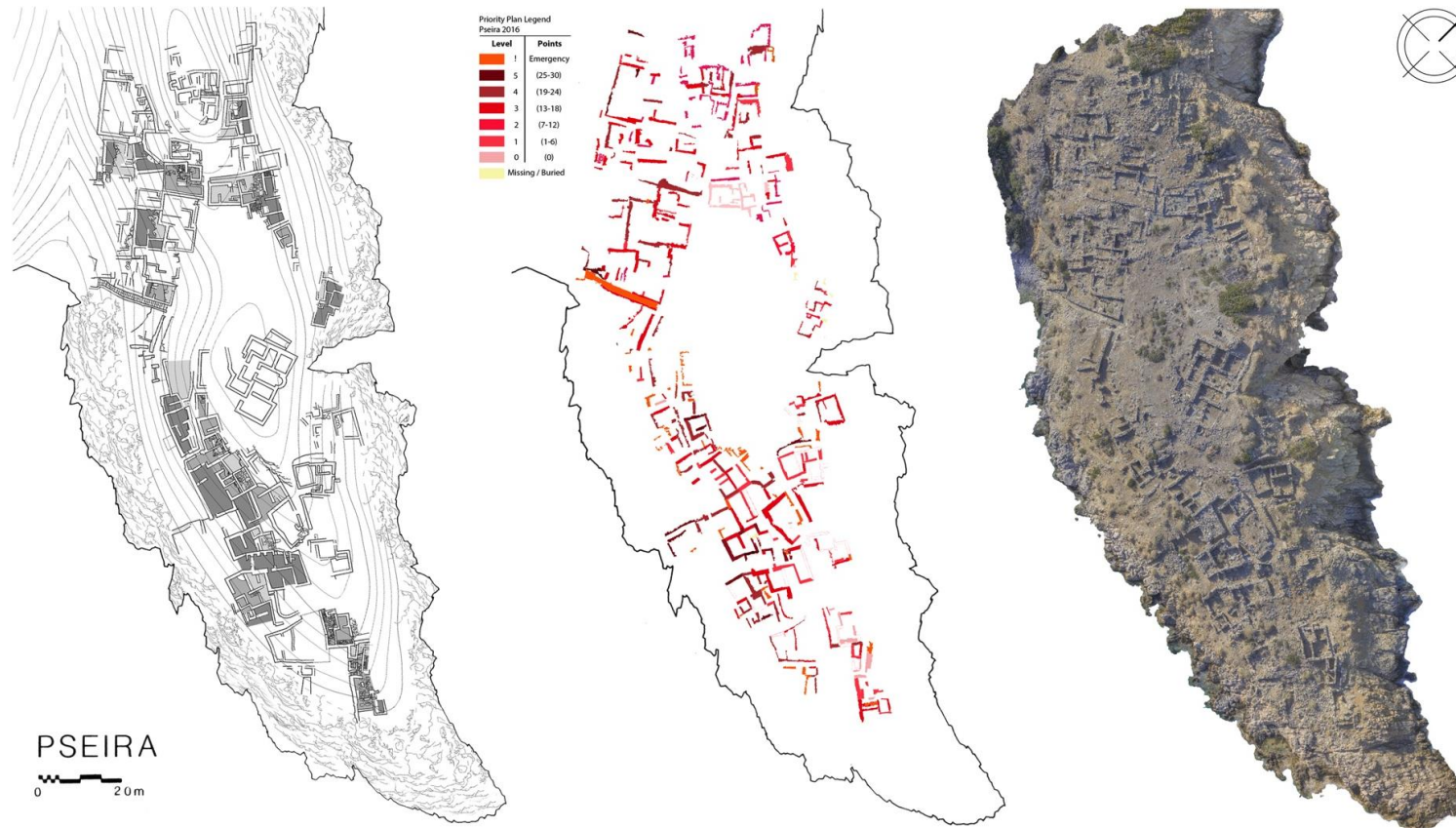
Mature Tobacco



Με τη συγχρηματοδότηση της Ελλάδας και της Ευρωπαϊκής Ένωσης

Condition survey and Vulnerability Assessment of Architectural Remains at Coastal Minoan Sites on East Crete

Training programs 2014-2018



Coordinator: Prof. Theoulakis



Strategic intervention for the
restoration of the damages
caused by the 1999 earthquake at
the Byzantine church of Ag. Petros
in Eastern Attica, Greece



Preservation & Protection of outdoor Bronze Monuments



Archimedes II Coordinator: Prof. Charalambous



MERMAID –Thalis

Coordinator: Prof. Pournou



Pilodyn measurements for assessing in situ Rhodes' wreck condition of wood



Protecting in *situ* the Rhodes wreck with TERRAM



Archimedes II

Coordinator: Prof. Argyropoulos



In-situ Monitoring of Metal Shipwrecks



Climate Change (CC) Impacts on Culture Heritage (CH)

CC is the modern story of the human journey *about the looming reality of losing the very things that **connect us to our past** and the **tangible** and **intangible** CH assets that construct the contours of our identities today.*

—Victoria Herrmann, *Scott Polar Research Institute,
University of Cambridge*



MED: The FOCUS so far on CC impacts on CH on Land / Coastal Areas

- ❑ Large number of UNESCO World Heritage Sites
- ❑ Mostly located a very short distance from coastline
eg., Greece, Portugal, Italy, Malta, Tunisia, Egypt, Cyprus
- ❑ Major touristic attractions
- ❑ Heritage Management Research well documented even for MED sites

CURRENT PRACTICE



UNESCO label



THE MOTIVE

**“ Oceans have more
historical artifacts
than all museums of the world
combined ”**

Snyder (2017)



CC IMPACTS may change label of land CH to UCH

→ UCH DEFINITION

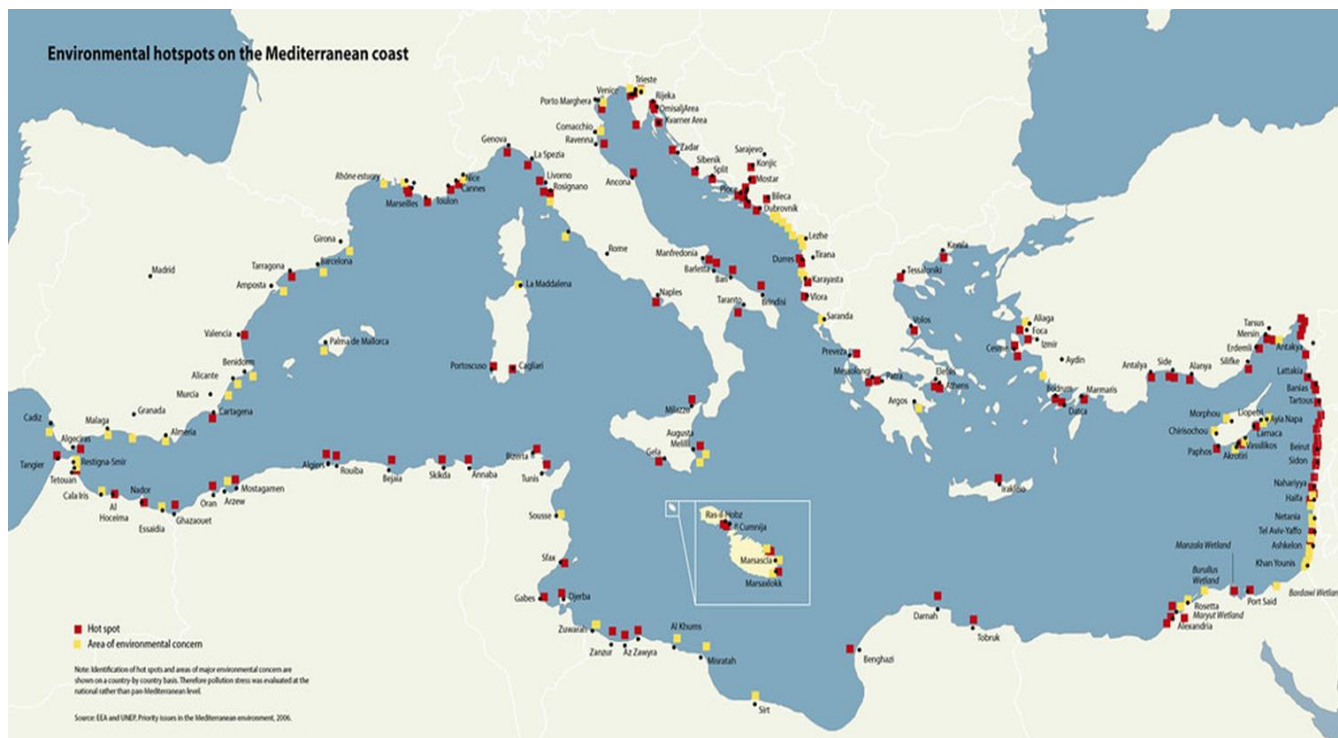
- ☐ **Shipwrecks / Plane wrecks**
- ☐ **Artefacts, structures and deposits buried and/or submerged - originated from human activities on land - Submerged Prehistory**
- ☐ **Artefacts, structures and deposits that originated from inhabitation or use of coastal zones**



Specialties engaged so far

Land/Prehistoric Archaeology, Maritime Archaeology, Aviation Archaeology, Coastal Archaeology

UCH stability at *Risk*



Predominant issues

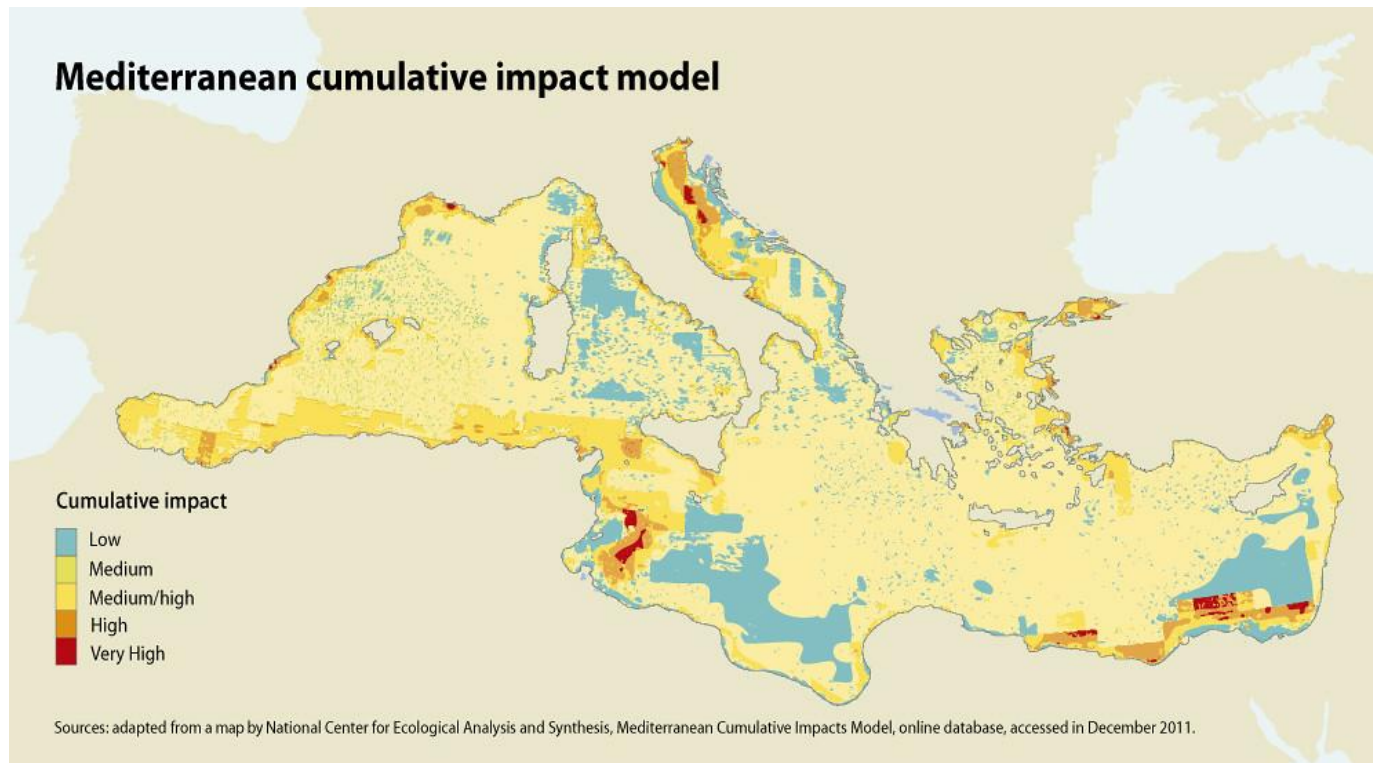
CC, marine pollution, urbanization, aggregate extraction etc.

Mediterranean
“a *Hot Spot region*”

CC Impacts on Med Sea
“*tropicalization*”
Focus on changes

- ☐ Temperature ↑
- ☐ Acidity (pH ↓ & O₂ ↑)
- ☐ Salinity ↑
- ☐ New invasive Species
- ☐ Currents

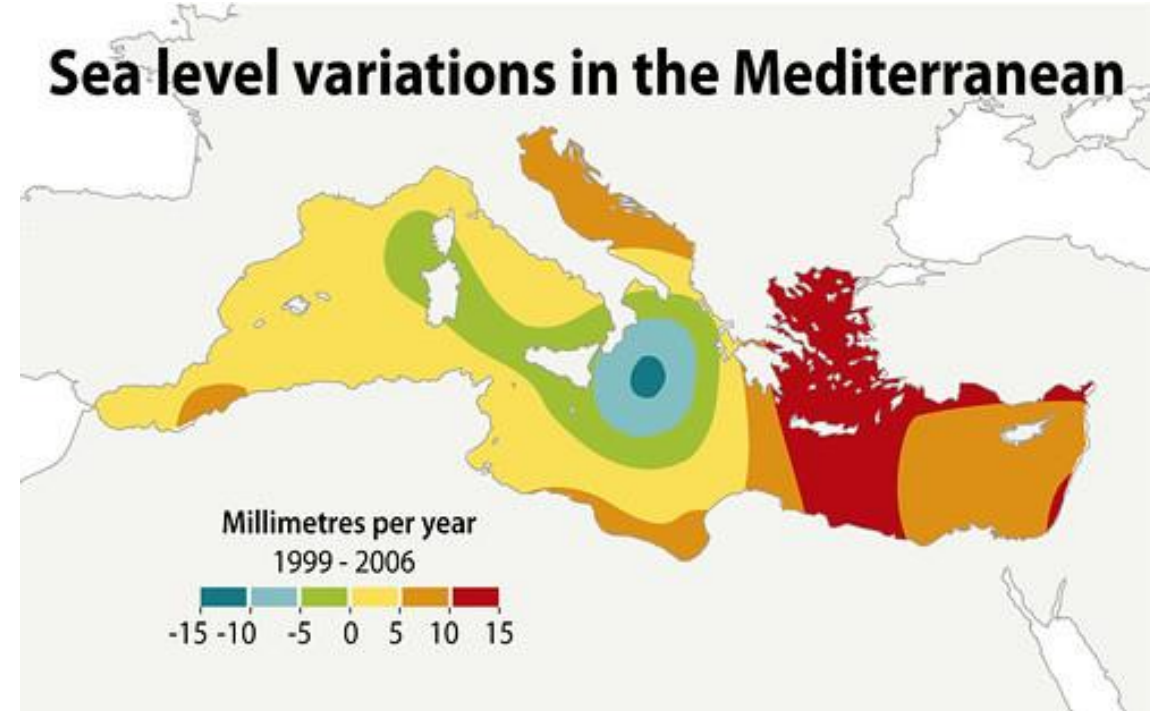
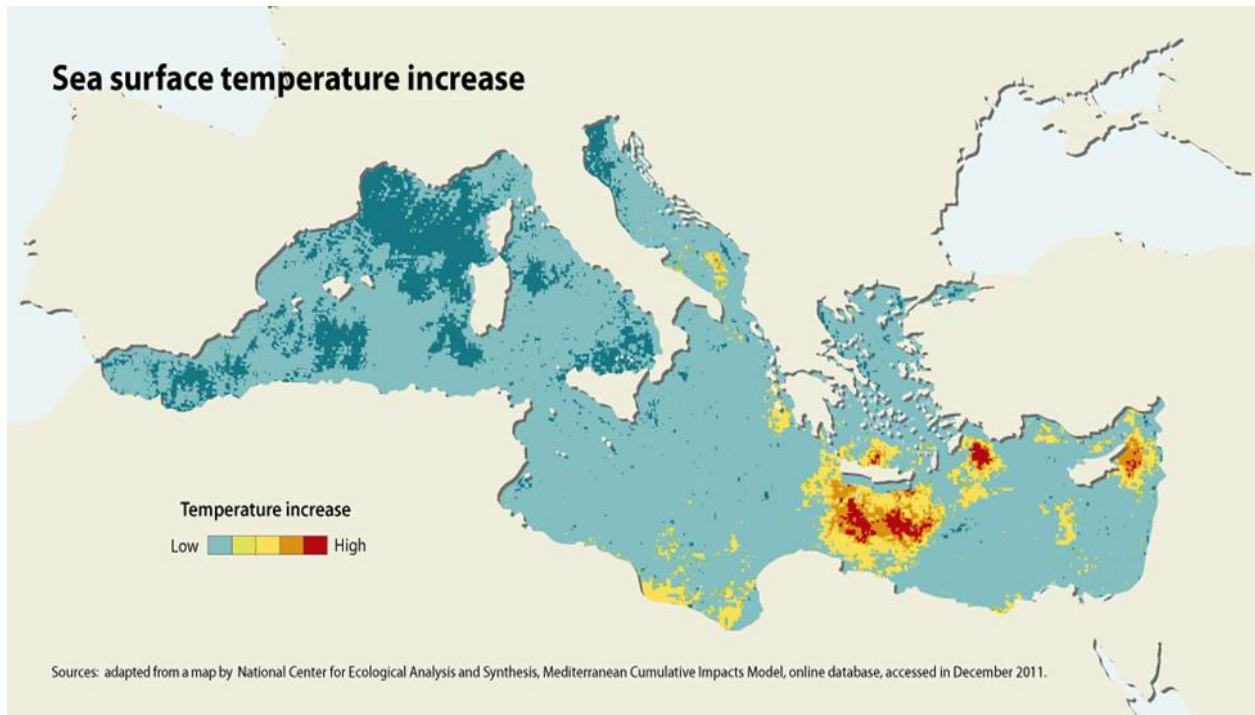
Factors affecting the Med act over time in unison to affect the resilience of ecosystems



Pressures that exert the greatest impacts on MED Marine ecosystems

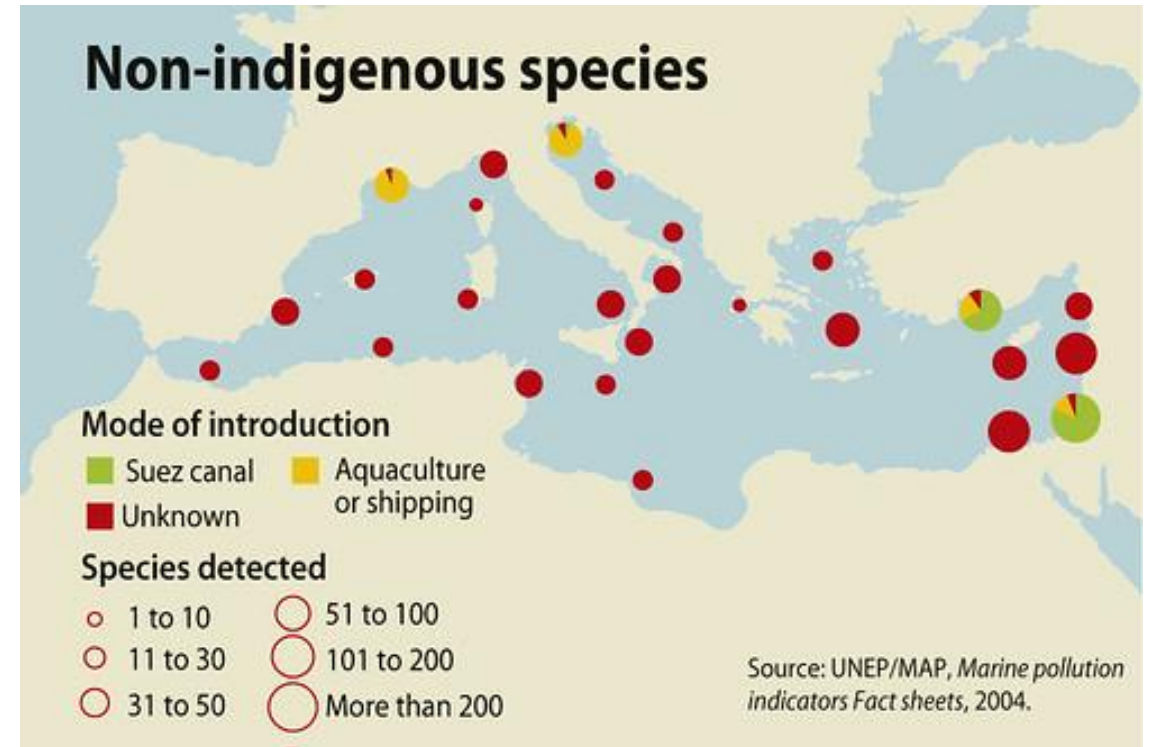
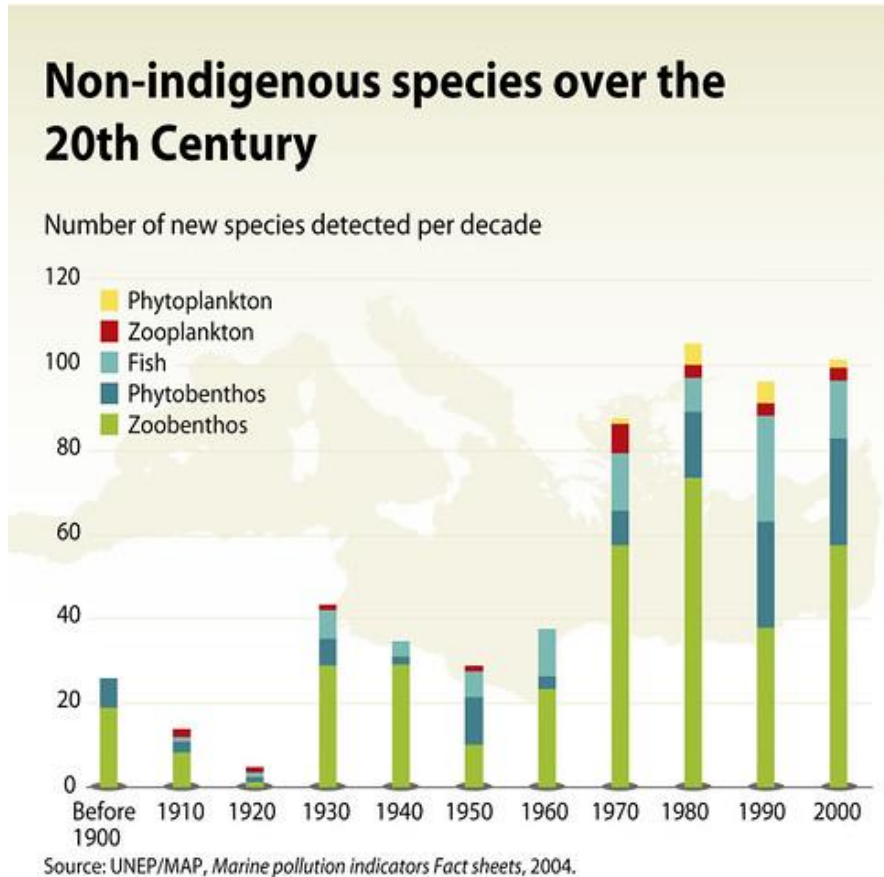
- ☐ **Climate Change**
 - ☐ **Demersal Fishing**
 - ☐ **Ship Traffic**
- and in coastal areas**
- ☐ **Run-off from land and invasive non-indigenous species.**

Increases in Temperature and Sea Levels



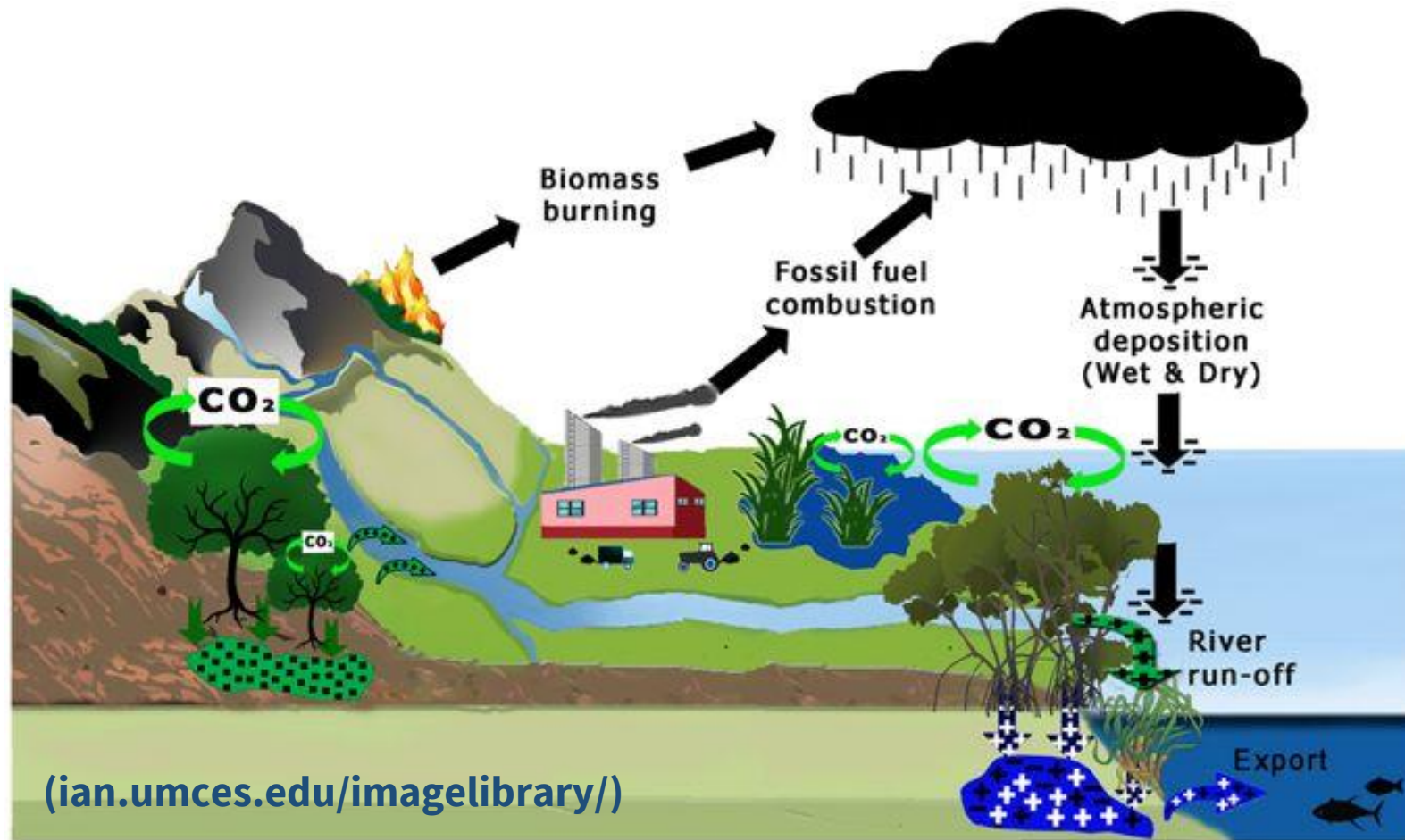
Long-term changes in monthly NHT anomalies revealed that the temperature shift located at the end of the 1990s was the most intense change that occurred in the last 158 yr (Raitsos *et al.* 2010)

Effects of CC on the MED Sea



The rate of entrance of the new invaders is greater than the temperature rate itself, presenting an important warning for the future of Mediterranean Sea biodiversity (IPCC 2007).

Carbon Sinks: coastal marine ecosystems capture up to half of the CO_2 emissions from the World's transport sector





J. Glambedakis

- **Seagrass conservation and restoration** contribute in the **protection** of submerged archaeological and historical **heritage**
- Organic matter is preserved in the underlying seagrass sediments for millennia
- wood, ceramic and other material from ships or settlements are prevented from decay

How will CC impact Underwater Natural and Cultural Heritage?



From a Sea Graveyard to a Place of Memory and Entertainment

Underwater time capsules



The Wreck of the HMHS BRITANNIC

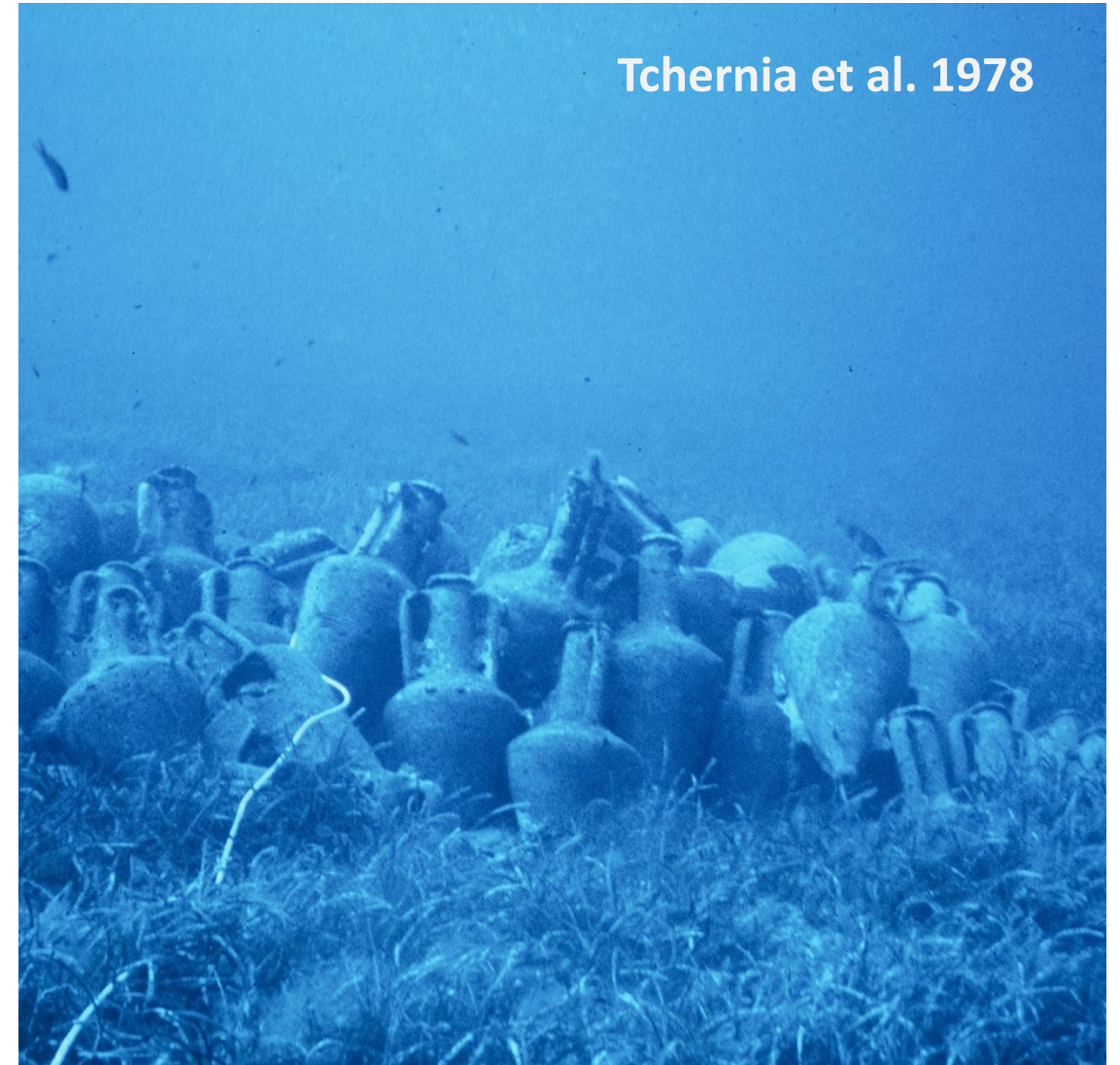
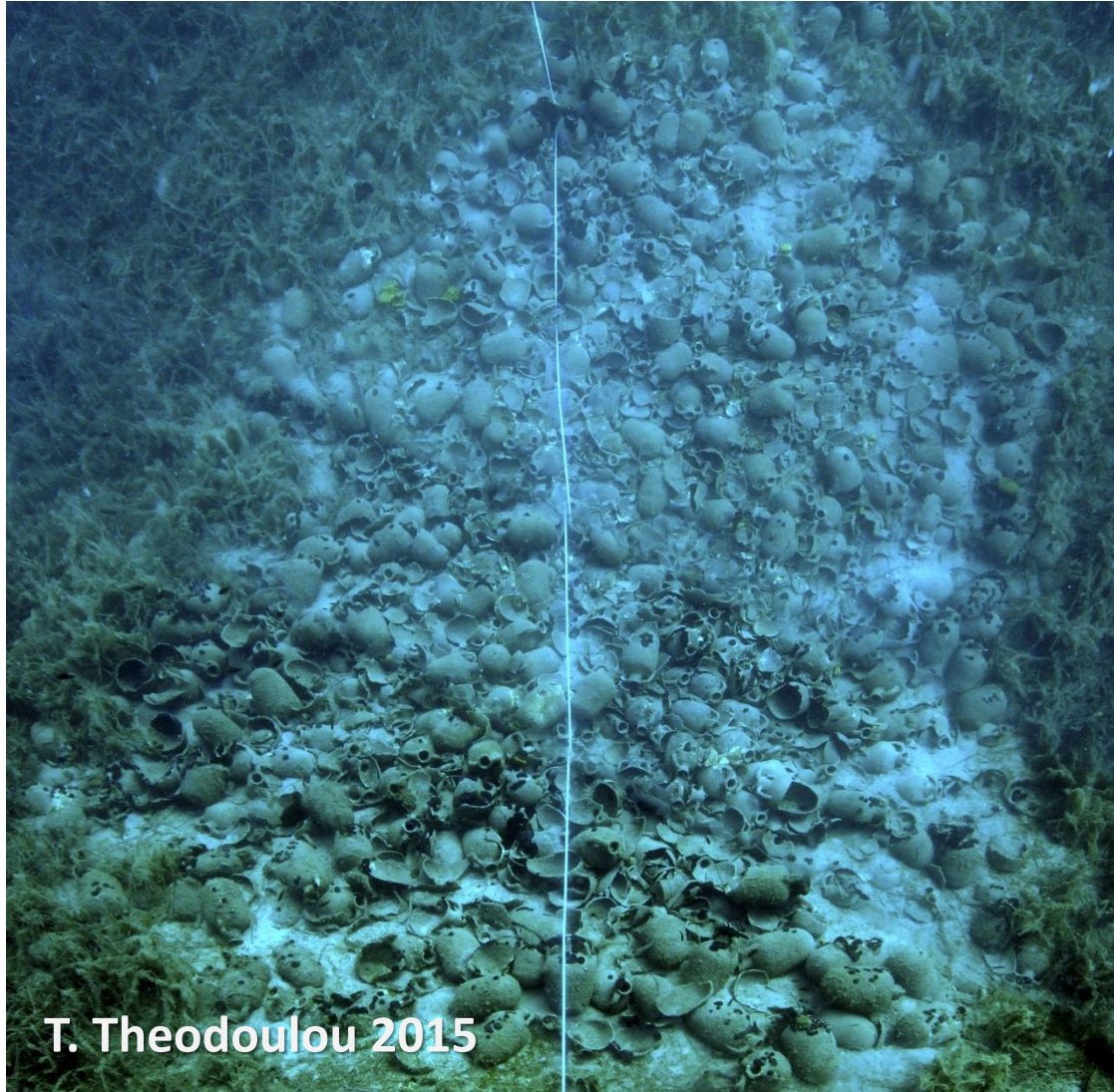


Painting by Ken Marschall, Madison Press Books

International Conference "Impacts of Climate Change on Cultural Heritage: Facing the Challenge"
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Cyprus, Hellenistic shipwreck (295-285 BC)

Prasonisi (Chios), Roman shipwreck (100-1 BC)



Preserve Maritime and Island traditions



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THE MED

An 'Open Museum' of the European Identity and History

WW II – Douglas Dakota DC-3 - Turkey

WW I – Britannic, Greece

MED : pivotal role in WWI & WWII - a main "theater" of fatal events

A Hidden Remains Rests in Peace in the MED Sea Bottom

From a Sea Graveyard to a Place of Memory and Entertainment

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DOCUMENTATION / MAPPING OF UCH IN THE MED

How to access, understand, preserve, exploit?



CURRENT PRACTICE

(U)CH

Physical
Material

Activity

Interpretation

shifting ... from a SILO approach

Archaeological
Norms

Conservation

Knowledge

Public
Interest

NEED: Link UCH to Sustainable Development

Diving community
Cultural, experience-
based tourism

UCH - Pillar for
Sustainable
Development

Environment

Economy

Society

... to an integrated & holistic UCH management approach

UCH sustainable management approaches need to consider the **3 pillars of CC policy**

- ❑ **Mitigation:** reduce the sources or enhance sinks of greenhouse gases
- ❑ **Adaptation:** efforts on what to do, including policy, guidance, and approach to planning and decision-making
- ❑ **Loss and damage caused by its impacts:** promote approaches to address it, including for cultural heritage and tradition and identity (UNFCCC 2016)

CONCERNS – ISSUES RAISED

Paving the way 'From a Sea Graveyard to a Place of Memory and Entertainment'

- WHAT ARE WE DOING TODAY – **CURRENT PRACTICE** ???
- DO WE KNOW WHERE THIS HERITAGE IS LOCATED - **MAPPING** ???
- HOW CAN WE PRESERVE AND SUSTAINABLY MANAGE UCH FOR **UNLOCKING ITS POTENTIAL** ??? - **PRIORITIZATION / VALUE**
- WHAT POLICY FRAMEWORKS ARE IN PLACE – **MULTIPLE POLICY DIMENSIONS** ???
- WHO CAN TAKE ACTION TOWARDS THIS DIRECTION - **RESPONSIBILITY** ???
- IS IT A LOCAL, A NATIONAL, A EUROPEAN, A GLOBAL OR A **GLOCAL** ISSUE ???
- HOW SMART (TECHNOLOGY) THIS EFFORT CAN BE ??? – UCH as a pillar for **SMART SUSTAINABLE GROWTH**



UCH AS A PILLAR FOR SMART SUSTAINABLE GROWTH

DECISION-MAKING / KEY ELEMENTS OF CURRENT POLICY CONTEXT

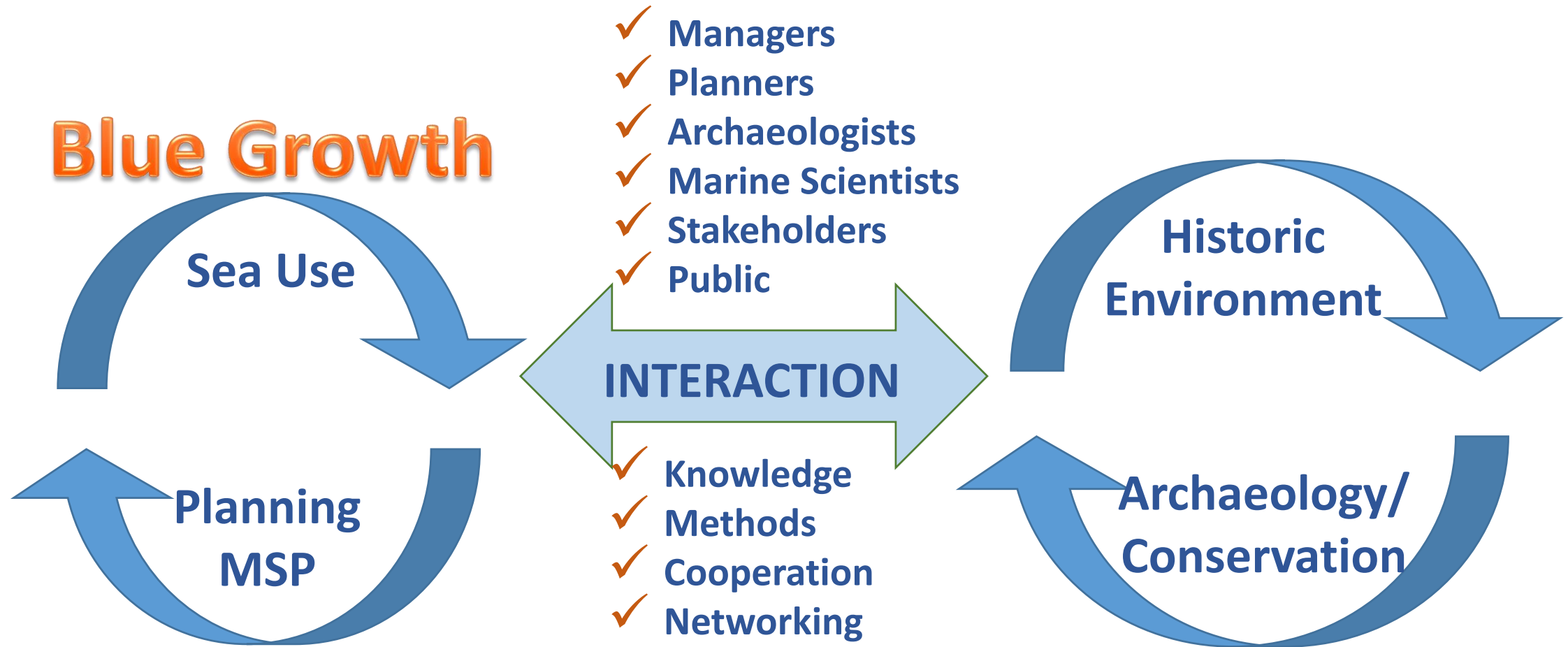
- ❑ EU - Integrated Coastal Zone Management – 2002, 2010
- ❑ EU - Sustainable & Competitive Tourism – World's No 1 Tourist Destination – 2010
- ❑ EU 2020 – Smart, Sustainable, Resilient Development for ALL
- ❑ EU - Integrated Maritime Policy – 2007
- ❑ EU - Blue Growth Strategy - 2012
- ❑ EU - Marine Spatial Planning (MSP) – 2014

**+ National
Strategic
Choices**



**Preserving Cultural and Natural Assets
Is essential for Reaching EU Objectives**

THE MED SCENERY



UCH Protection/Exploitation
... a multi- and inter-disciplinary field of research/practice

DOCUMENTATION / MAPPING OF UCH IN THE MED



- ❑ MED: a **UCH rich** region
- ❑ Important **UCH** are sunk in the MED
- ❑ **WHERE ?** NOT KNOWN the location of all of them
NEED to map them – **Voluntarism / Crowdsourcing**
- ❑ MED UCH & **Technology**:
NEED to explore UCH, assess risks, monitor, visualize, create e-content, spread stories/values/identity
- ❑ **MED UCH at risk** – natural/human threats – climate change, fishing, looting etc.

MANAGING UCH IN THE MED

Risk Assessment – Preservation Plans

☐ Conservation

- interventive (*in-situ*)
- preventive (education etc.)

☐ Scientific data

☐ Environmental impact / Safety issues



☐ Visualization - technology / tools

☐ Costs

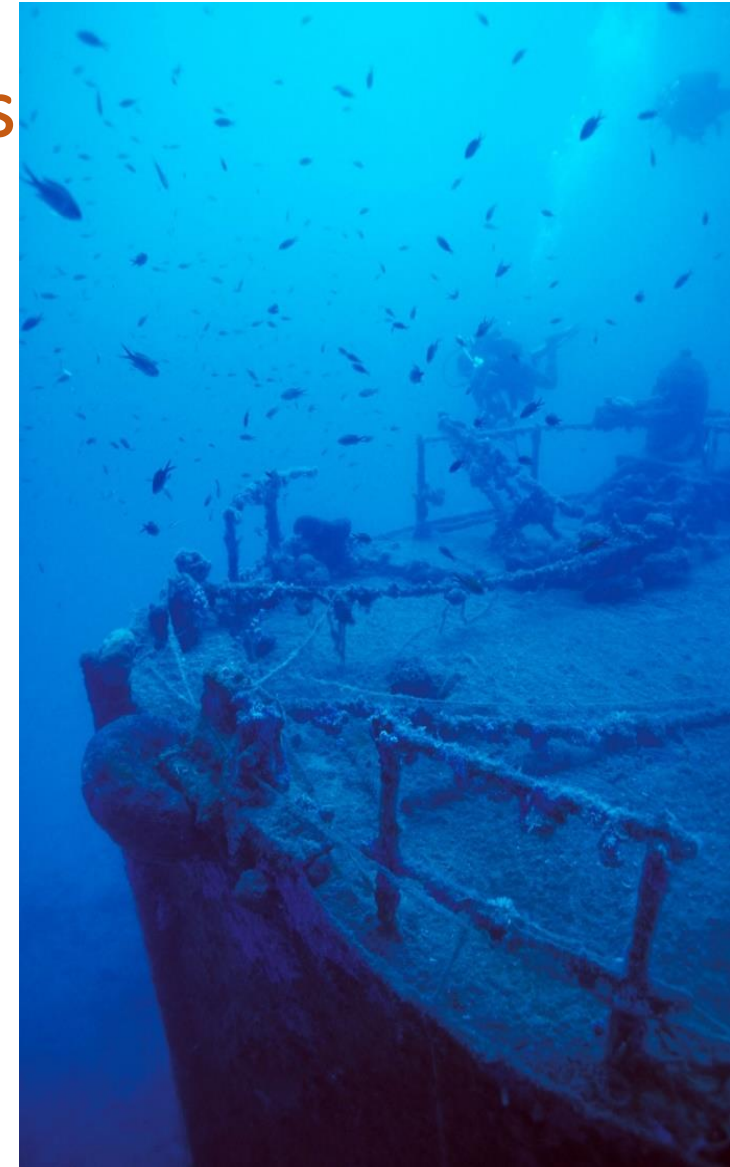
☐ Monitoring programs



UCH can act as artificial reefs
and be studied to better
understand how CC & other
stressors
may impact marine
communities
(e.g., overfishing, invasive species)



Adaptation
of UCH Management
approaches to address
impacts of CC on CH



UCH - PRESERVE AND SUSTAINABLY MANAGE



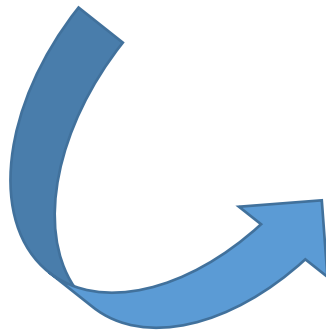
- ☐ **Costs** for protecting? Pretty HIGH
- ☐ Is it all worth/possible???
NEED for setting up a **prioritization framework** in support of decision-making
- ☐ **PRIORITIZATION CRITERIA** – **Consensus building** on the values concerned – a **multi-actor** perspective
- ☐ **NEED: wide interaction** among all interested actors involved

MANAGING UCH IN THE MED

(U)CH – Planning Heritage-led Local Development

management approaches

- ❑ Integrating land and marine (U)CH
- ❑ Participatory – engaging all relevant actors
- ❑ Spatially defined/balanced
- ❑ Value/People-centered
- ❑ Locally adjusted



- ❑ **Dark / Battlefield tourism**
- ❑ **Cultural tourism**
- ❑ **Diving tourism**
- ❑ **Adventure/experience tourism**

MANAGING UCH IN THE MED

Sustainable UCH Management – Planning

- ❑ **Current status:** fragmented exploitation/ mostly following commercial paths, eg. Croatia, MPA Gulf de Lion, Genoa, battle routes
- ❑ **Future needs**
 - ✓ Sectoral needs / Integration across sectors / synergies' creation
 - ✓ Partnerships / networks' creation
 - ✓ Stakeholders' engagement in the UCH management process
- ❑ **Remove from silo thinking - Integrated and participatory planning approaches** within the context of multidimensional EU framework for a **comprehensive approach** to the historic environment, involving all three **pillars of sustainable development**



Thank you very much for
your attention ...

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For further reading

Argyropoulos, V.; Stratigea, A.

Sustainable Management of Underwater
Cultural Heritage: The Route from Discovery to
Engagement—Open Issues in the
Mediterranean. *Heritage*, 2019, 2, 1588-1613.



<http://www.gazzetta.gr/plus/article/947531/siopilo-megaleio-nayagion-sta-vathi-tis-mesogeioy>