



# **New frontiers in the habitat mapping of the Mediterranean Sea**

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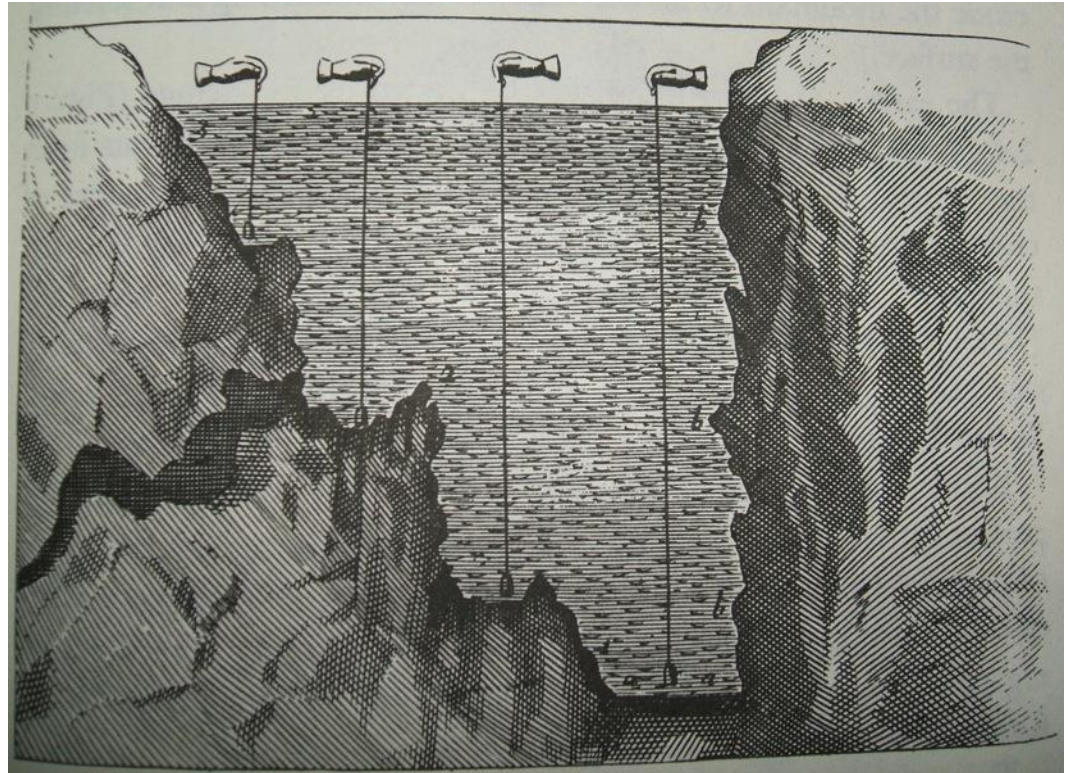
*Il sistema marino costiero – Networking territoriale della conoscenza: “un’opportunità per la Regione Emilia-Romagna”*

*Bologna, 8 Giugno, 2015*

# The knowledge of the seafloor

*“...it would be of very good use to have natural maps of the earth [...] every Prince should have such a draught of his own country and dominions...”*

Thomas Burnet,  
Telluris Theoria Sacra  
(1684-1689)

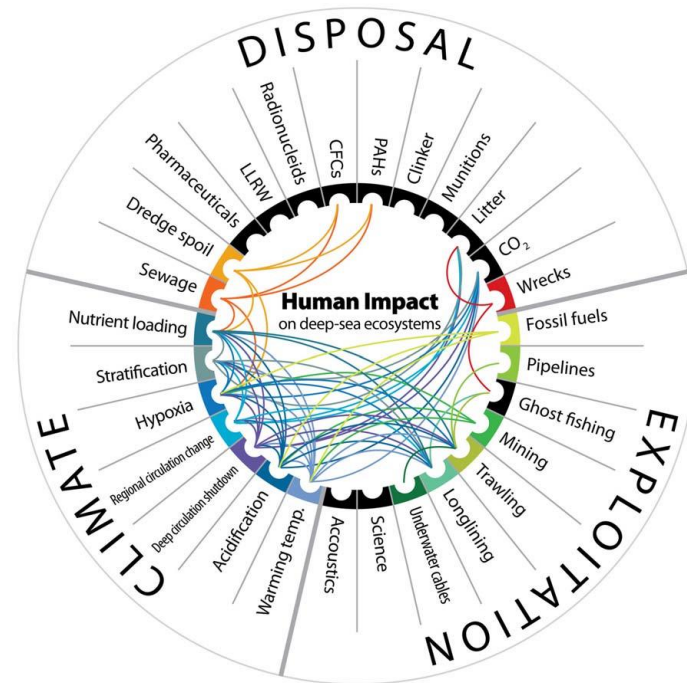






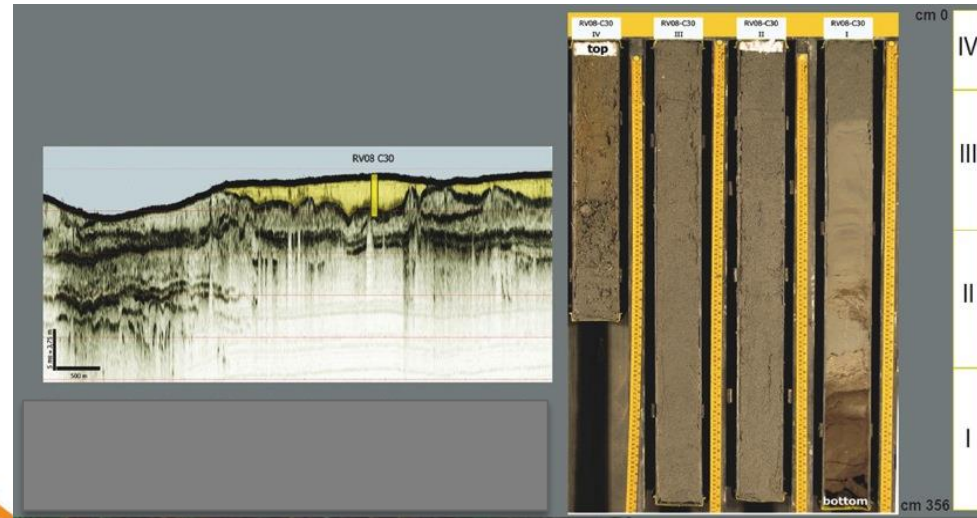
# The impacts of humans on the seafloor are increasing but still poorly known

- **Exploitation of goods**
  - Not renewable goods (Mining)
  - Renewable goods (Fish Trawling)
  - Foundation for oil rigs, wind farms pipelines, cables
- **Area of waste disposal**
  - Dumping (legal and illegal)
  - Littering
- **Impact of climate change**
  - Hypoxia
  - Stratification
  - Acidification



*Ramirez-Llodra et al., 2011*

# Marine sand extraction

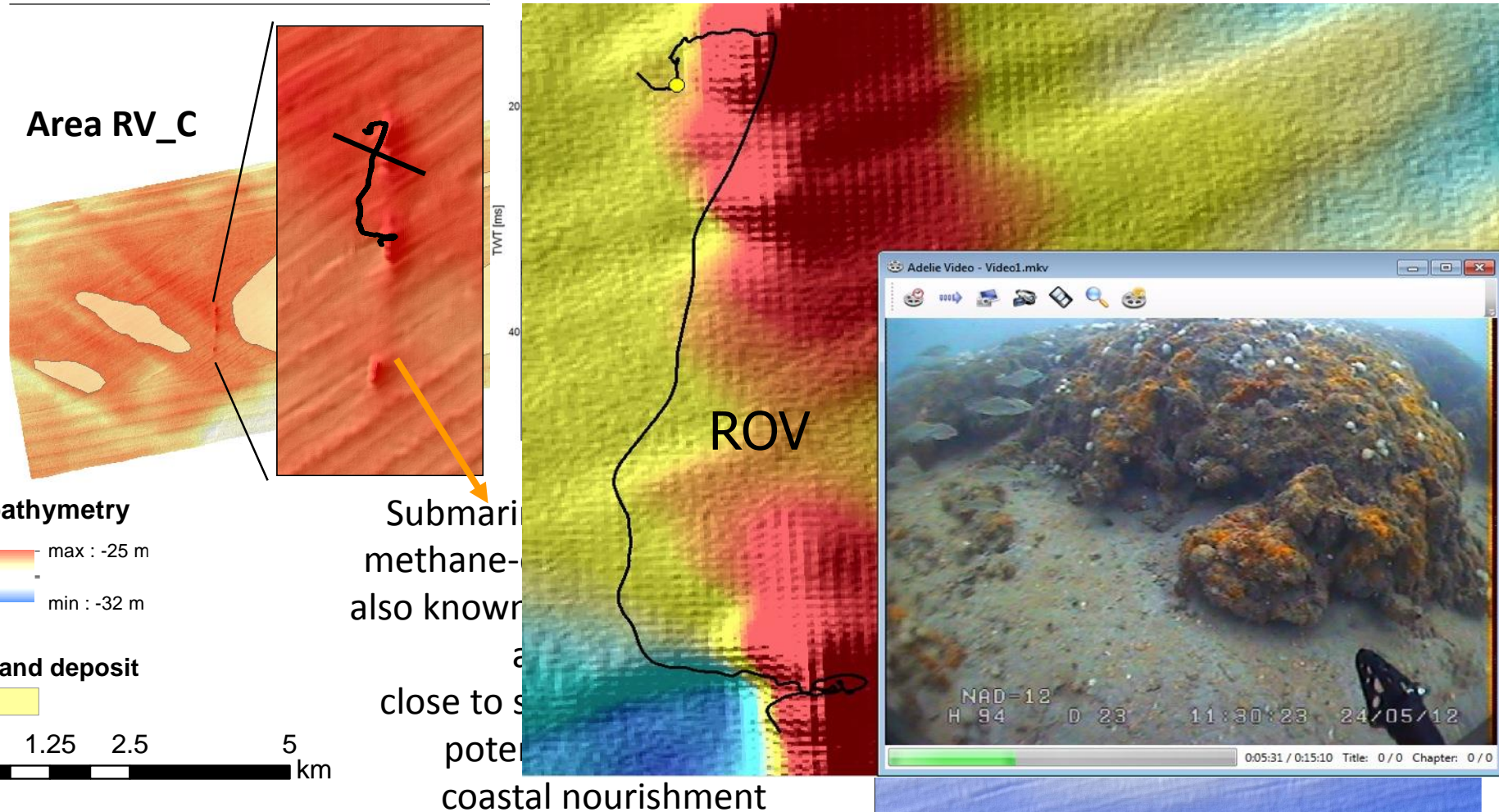


 **TRANSGRESSIVE SAND DEPOSIT**  
**marine sand extraction**

ISMAR-CNR cooperate with:  
 Regione Veneto  
 Regione Emilia Romagna  
 Regione Marche



# The mid Adriatic shelf: protect vulnerable habitat



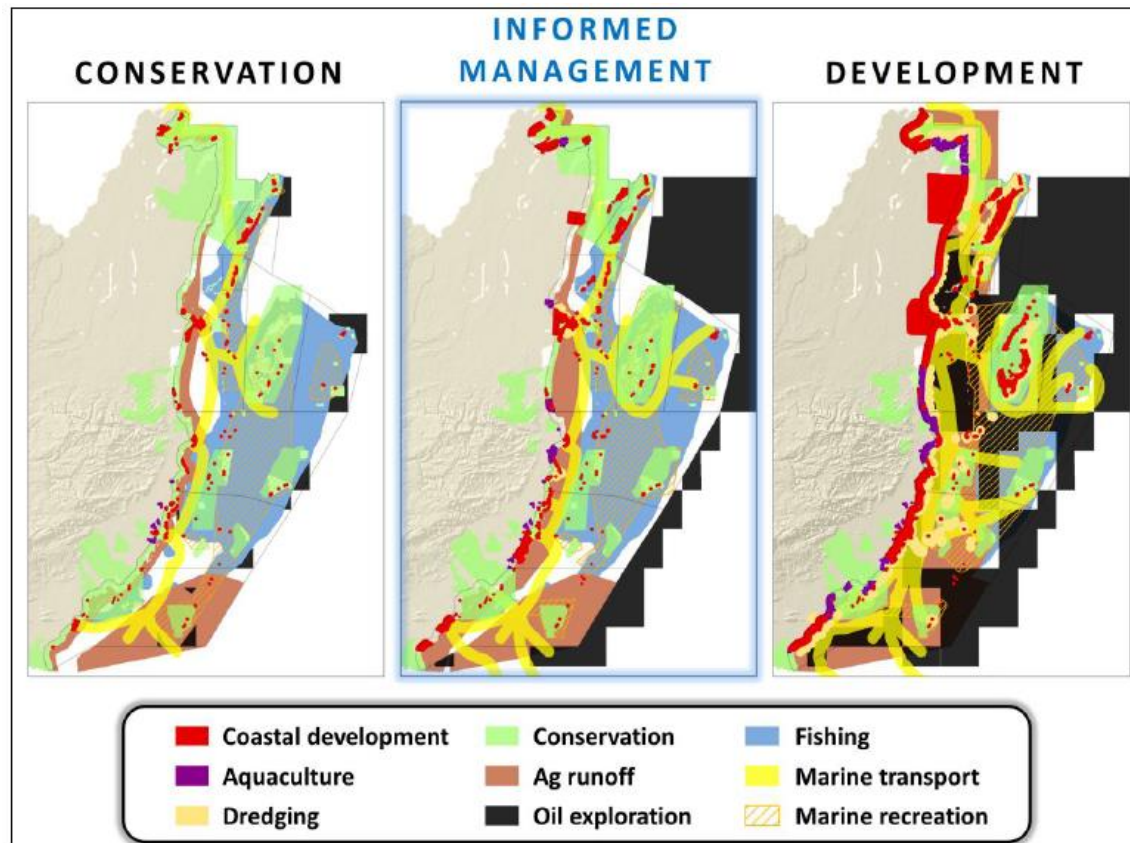
**Dredging activities should be limited to sand deposits and areas with particular biotic communities must be identified.**

*Correggiari et al., unpublished*

**Around them a buffer zone where monitoring the condition of the water column must be established .**

# Vision and Objectives for MSP

Develop and agree on a **VISION**, and then define **MANAGEMENT OBJECTIVES**  
 (“think transnationally but act regionally / locally”)







# What/how do we know about the Sea Floor?

- Bathymetry, morphology, acoustic properties
- Repeated bathymetric surveys in dynamic areas
- Multi-parametric seafloor stations
- Sampling
- Images
  - limited accuracy from the ship
  - Improved accuracy from near-sea-floor tools/vehicles



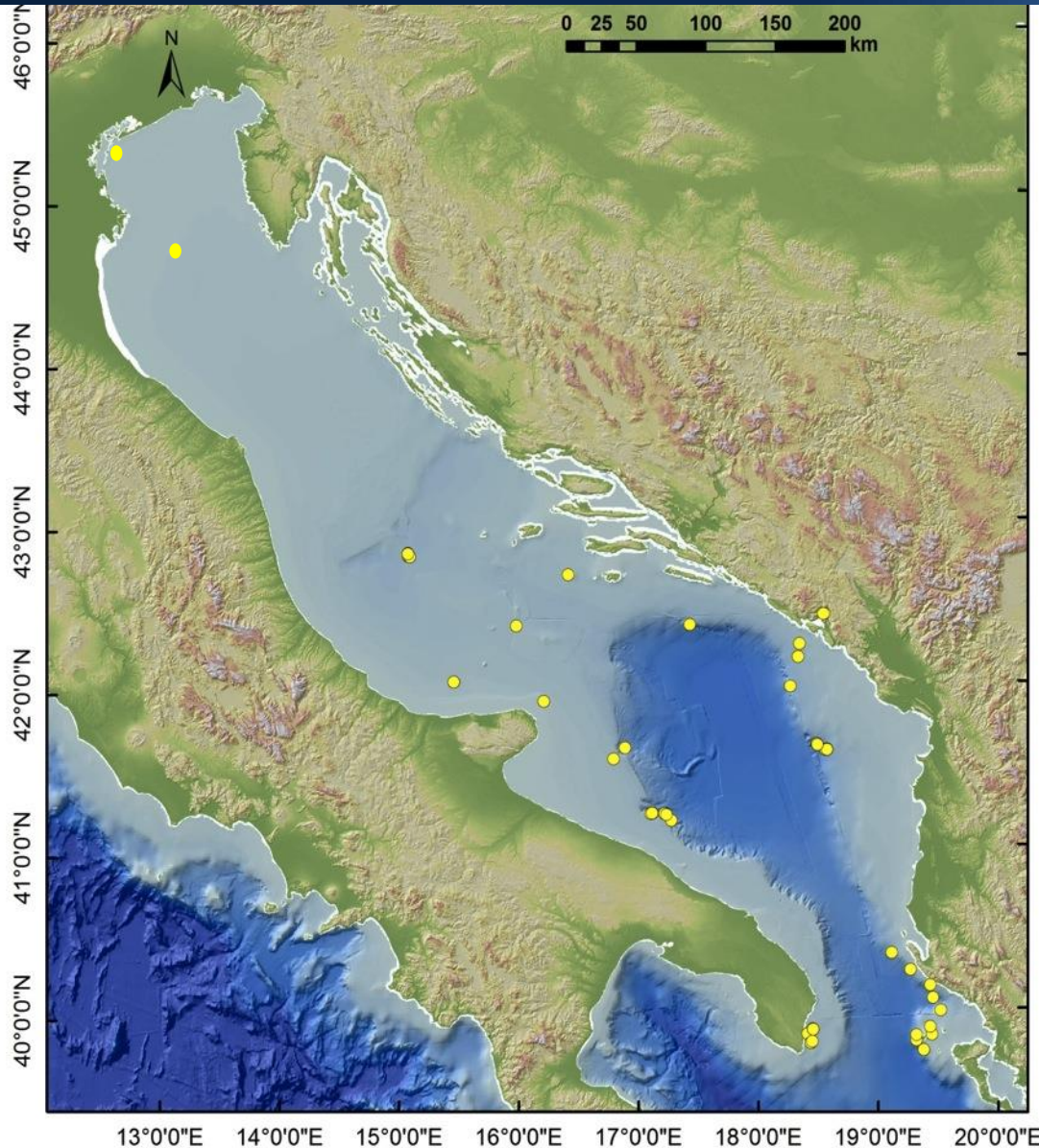


# ISMAR-CNR database in the Adriatic

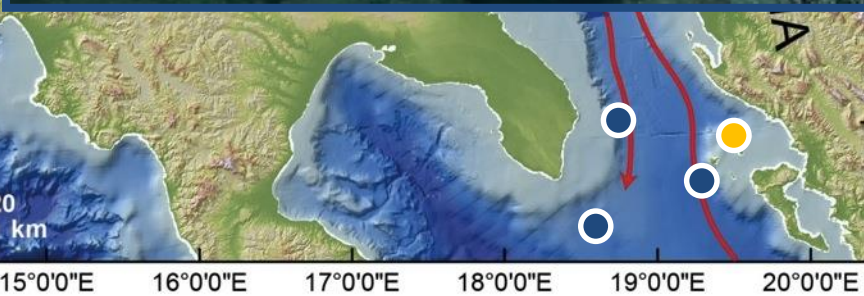
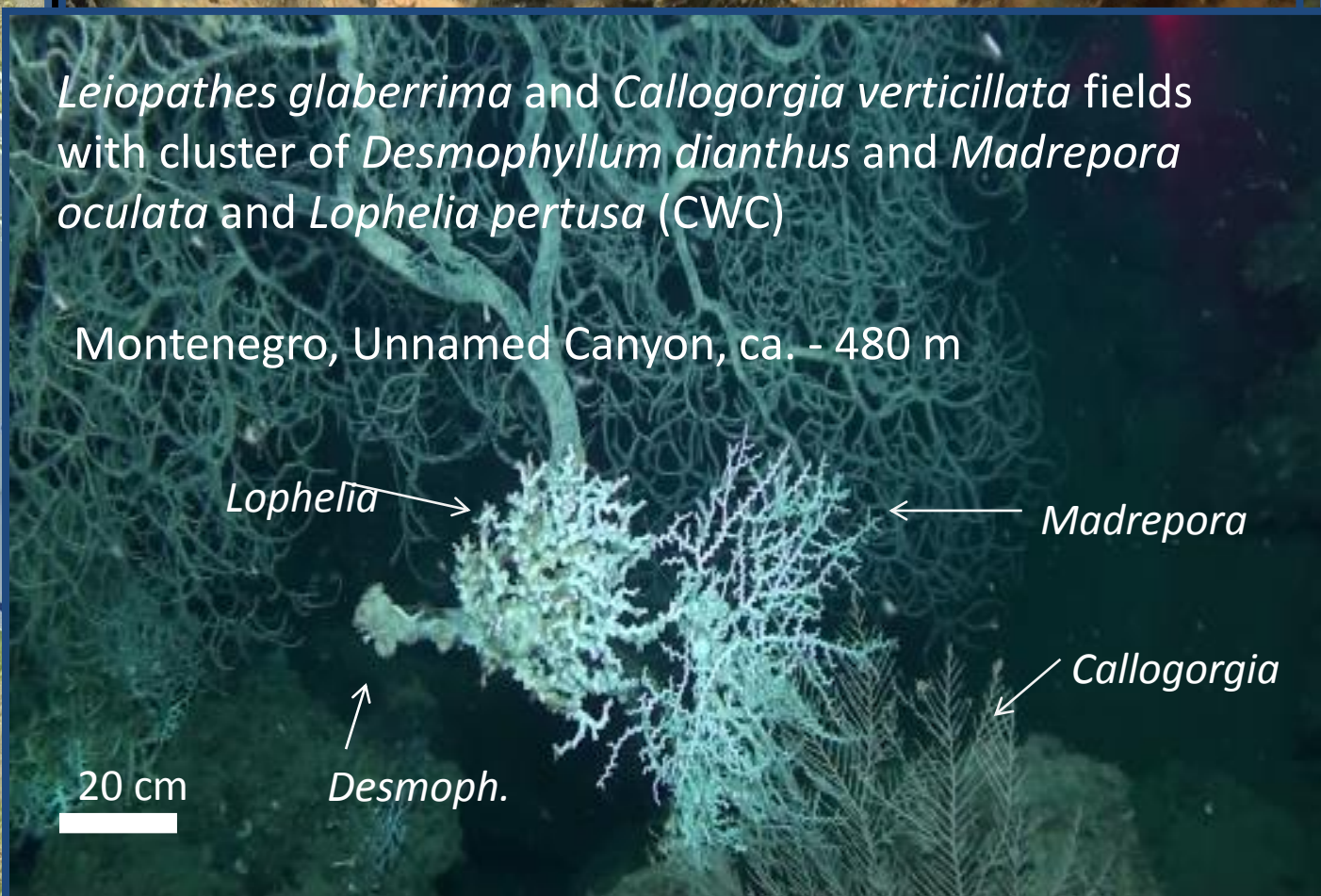
Geophysical data

Sampling data

ROV dives data

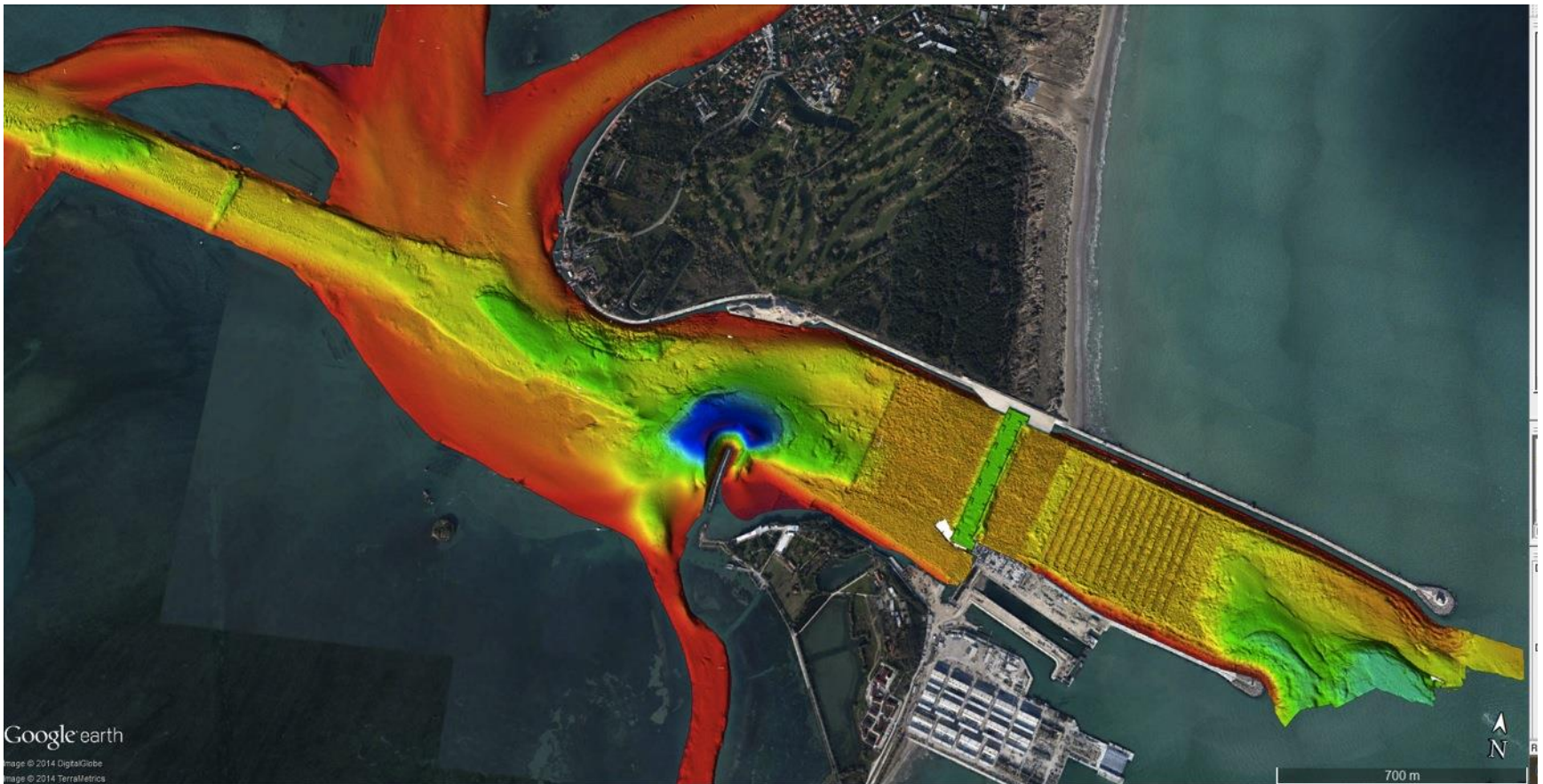








# Multi-beam bathymetry of the coast

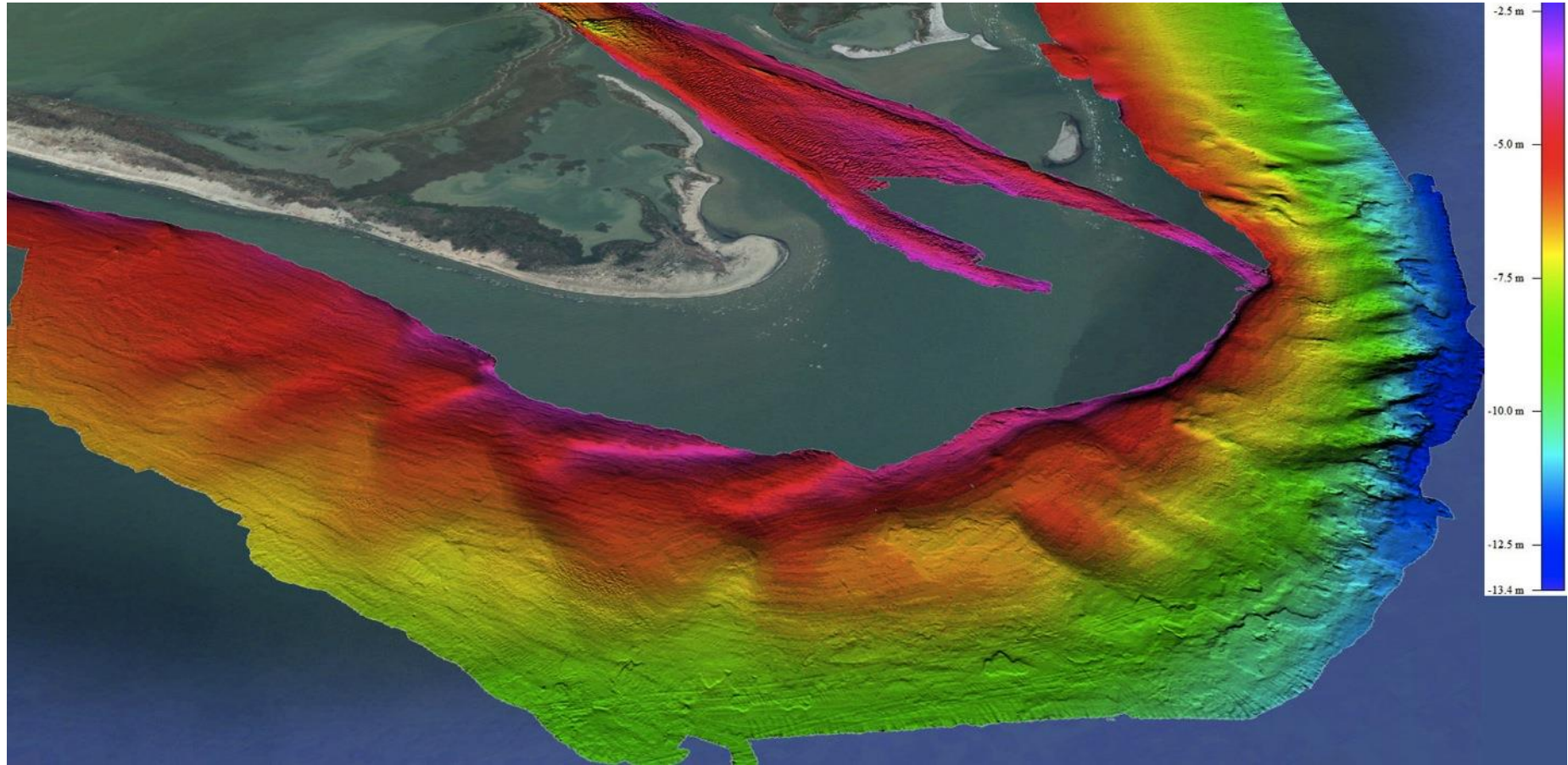


ISMAR survey of the entire Lagoon under the RITMARE-MIUR Grant  
Example from *Canale dei Petroli – Malamocco Inlet*

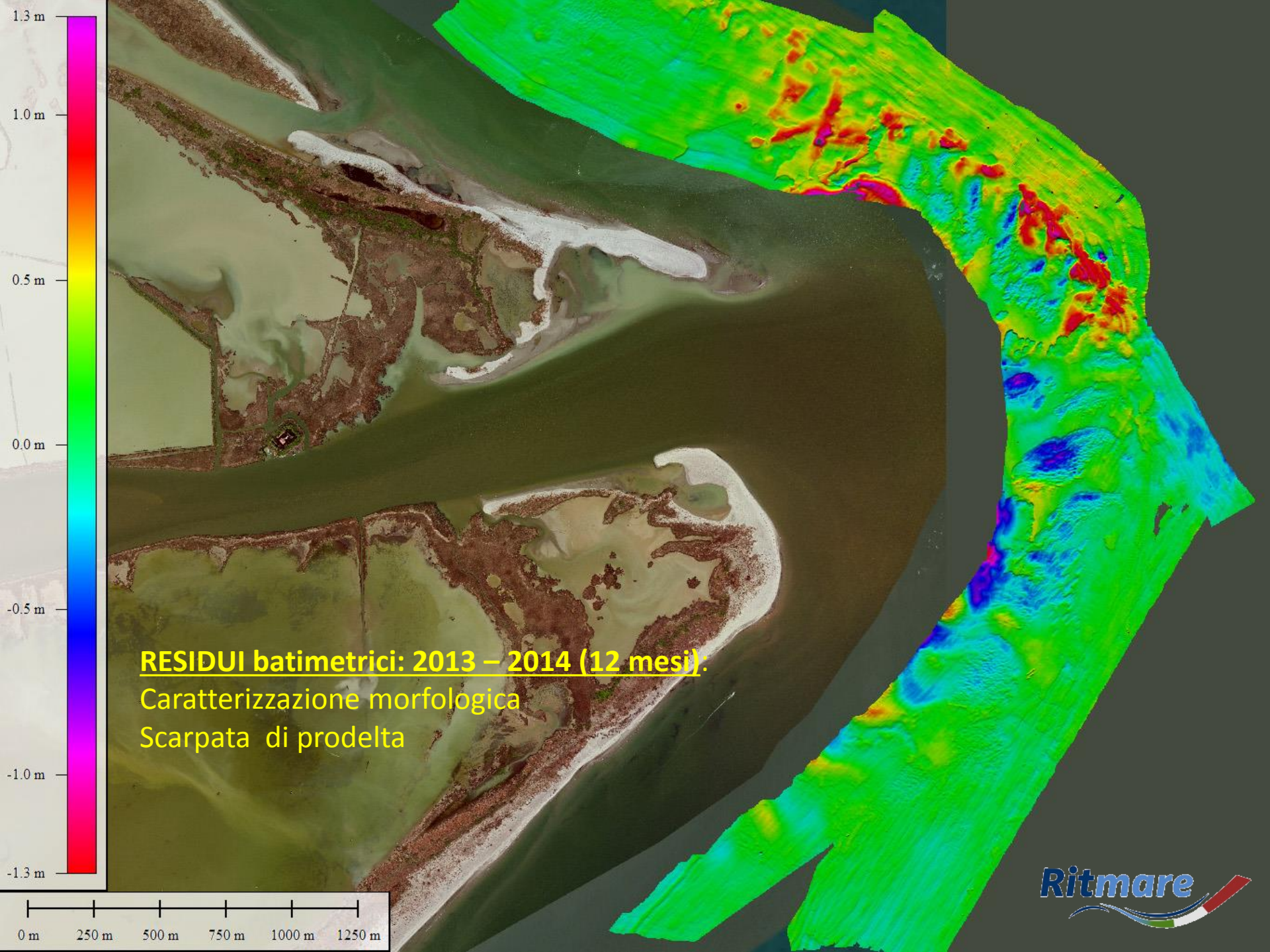




# The need/opportunity of repeated bathymetric surveys







**RESIDUI batimetrici: 2013 – 2014 (12 mesi):**  
Caratterizzazione morfologica  
Scarpata di prodelta

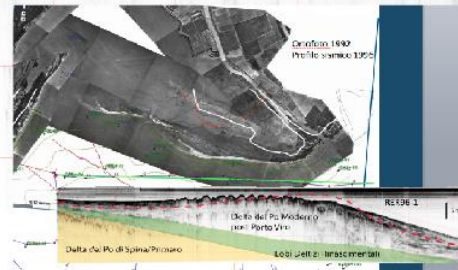
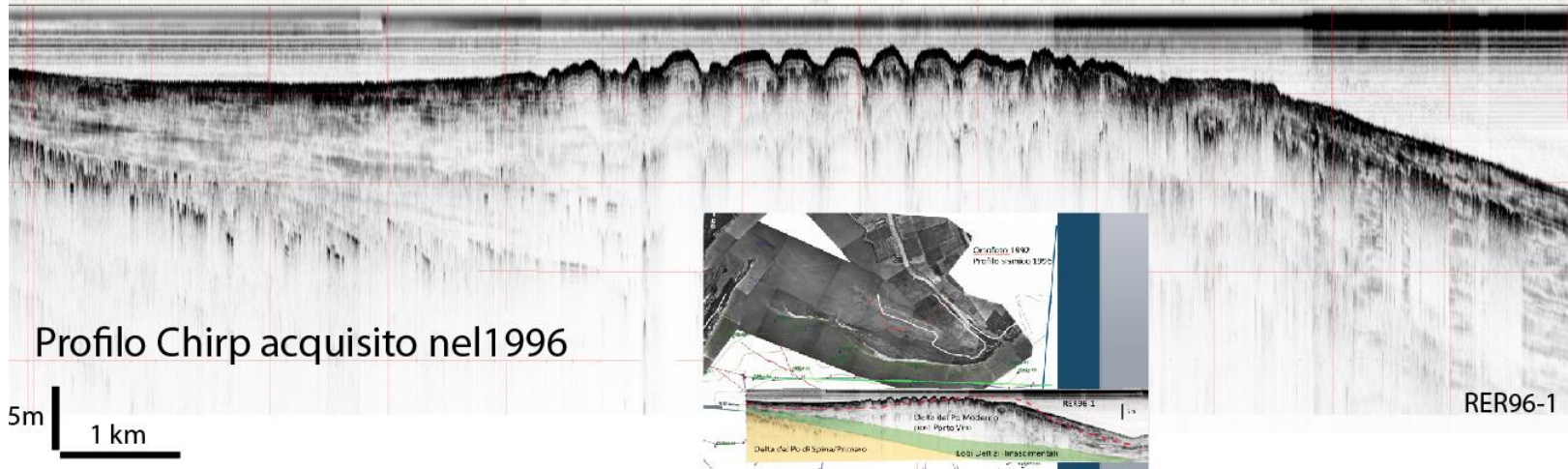
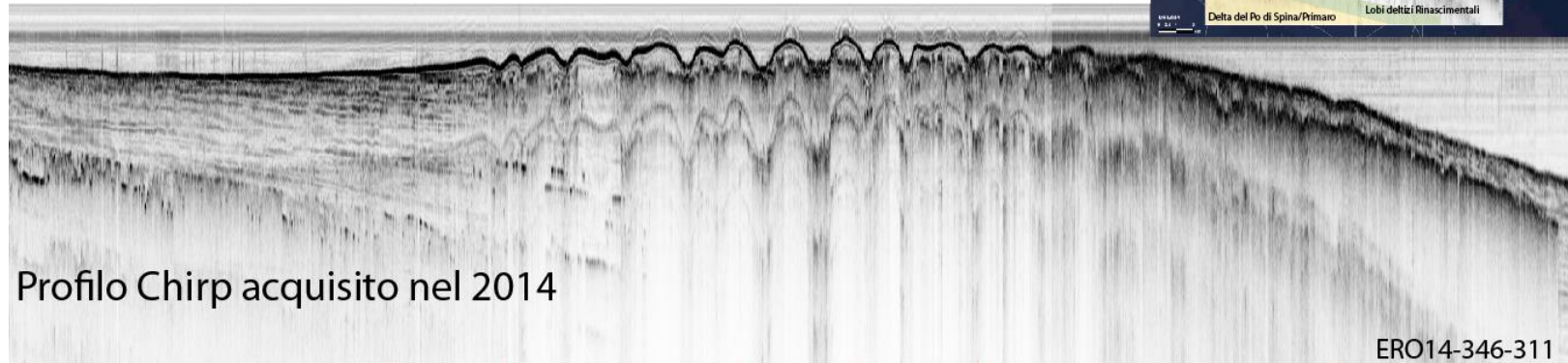
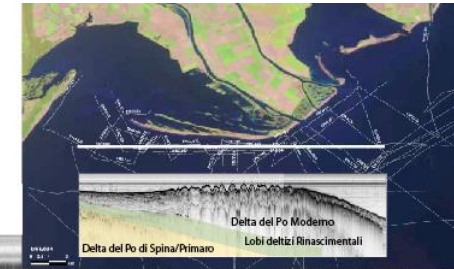




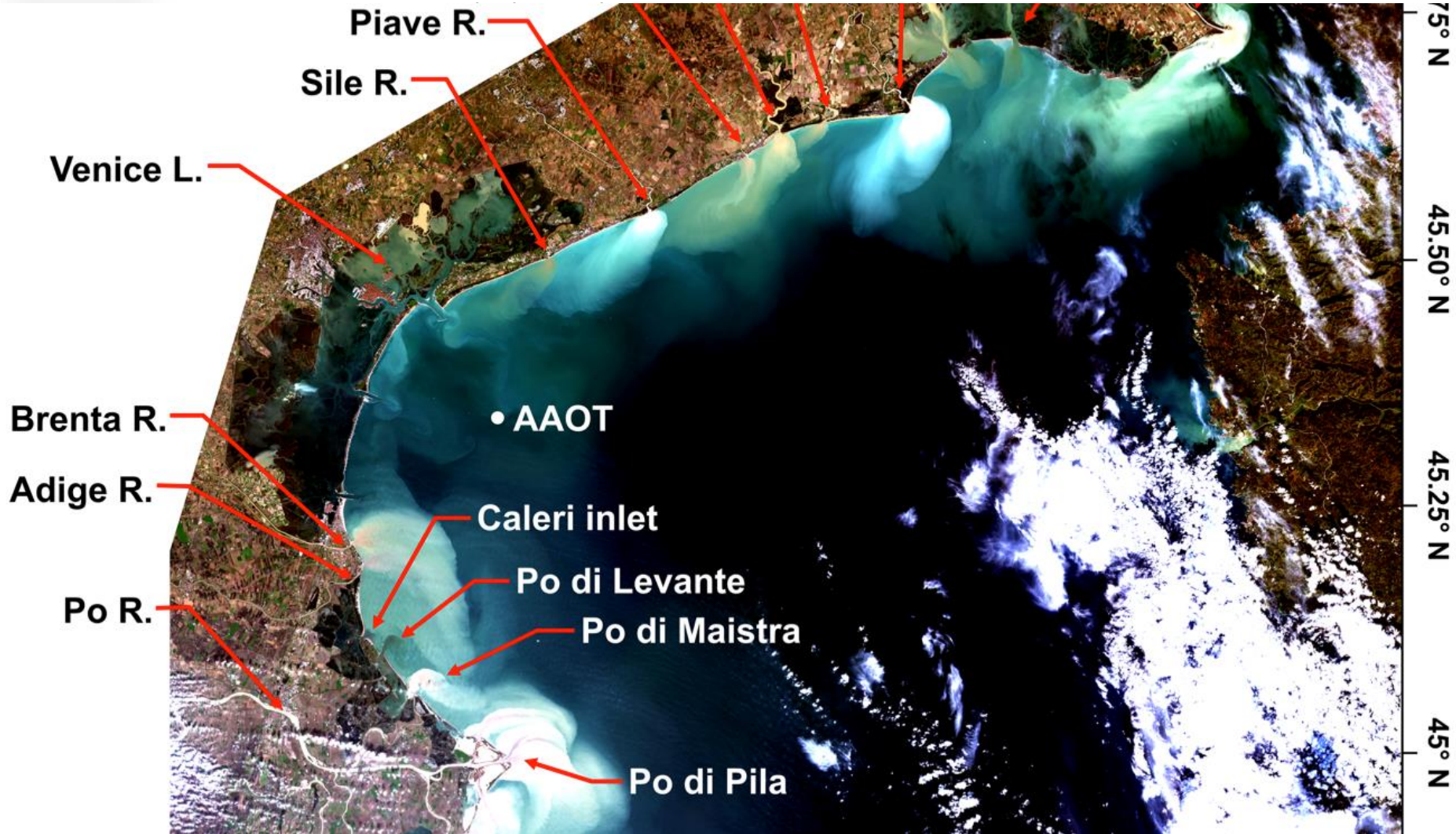
# Coastal dynamics: need/possibility of repeated geophysical surveys

SCANNO di GORO porzione a mare

Confronto tra profili Chirp acquisiti a 18 anni di distanza



# Event-scale observations are crucial



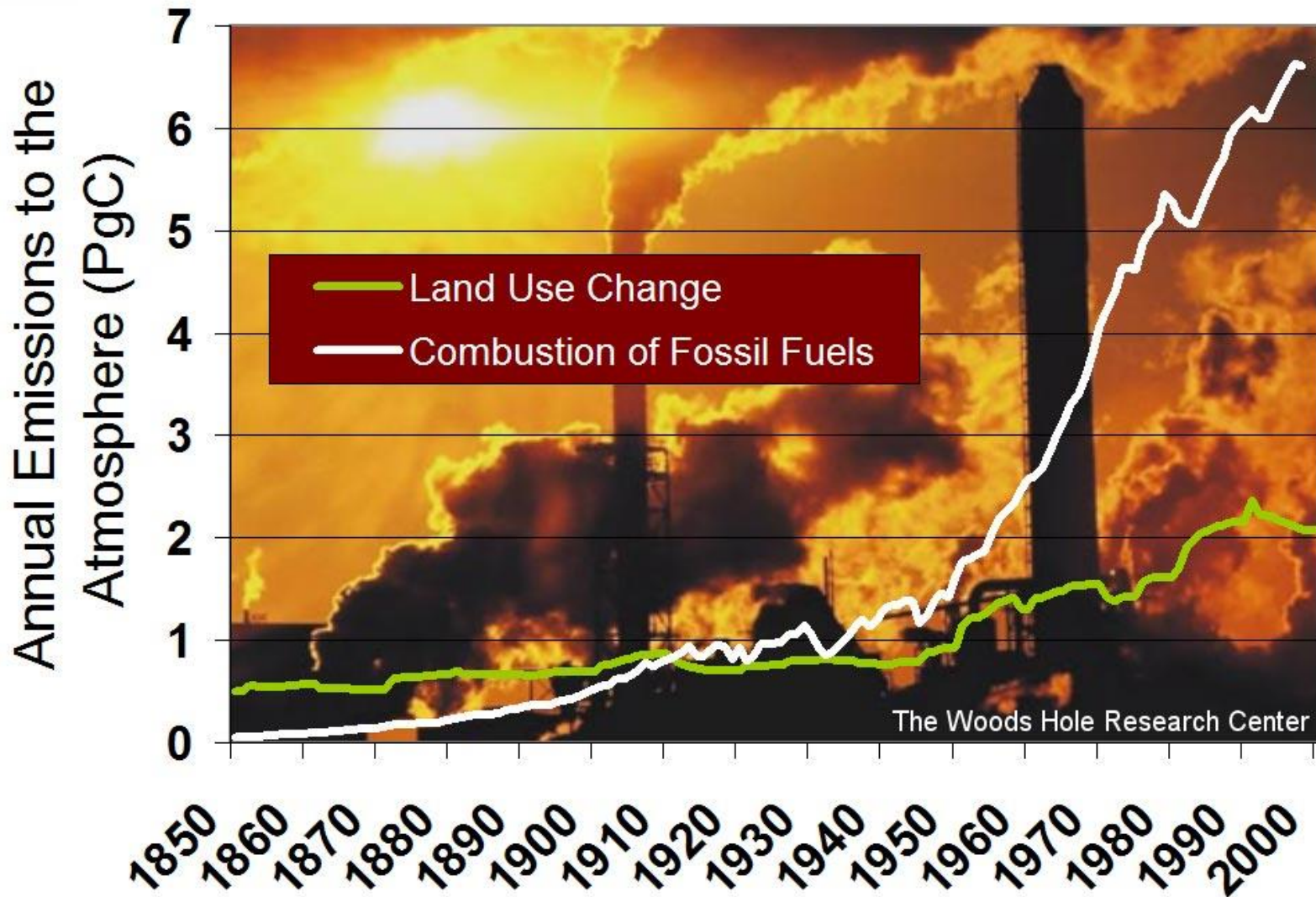




# Conclusions

1. Need of a unified knowledge of the **seafloor habitats** (public research institutions can help in a basin-scale approach beyond regional boundaries)
  
1. Need of an integrated knowledge of the **seafloor uses** (beyond interests and interventions by individual stakeholders)
  
2. New survey techniques allow
  - unprecedented spatial and vertical resolution and
  - **repeated surveys**
  - coupling repeated surveys with benthos studies and oceanographic processes
  
4. Need to change approach in seafloor studies and MSFD protocols
  - **catch “events”** when they occur

# Changes in land-use impact coastal and marine areas





# Anthropogenic impacts are “contradictory”

**pre-industrial time:**

**Increase of soil erosion**

**(50% more sediment to the ocean than 2000 years BP)**



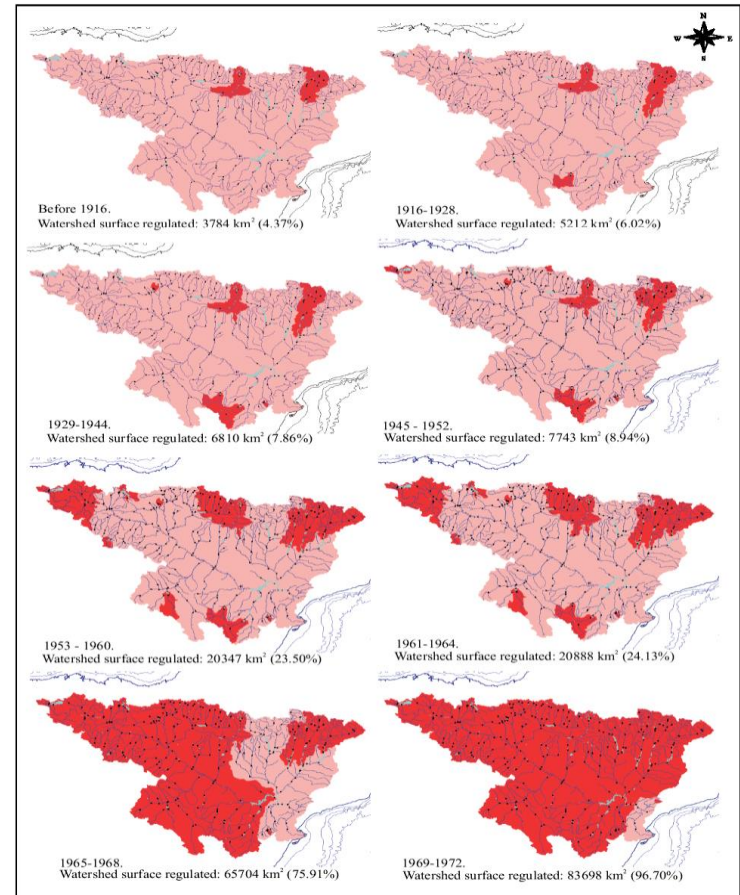
**Enhanced erosion:**

- deforestation
- excavation
- agriculture
- urbanization

**industrial time:**

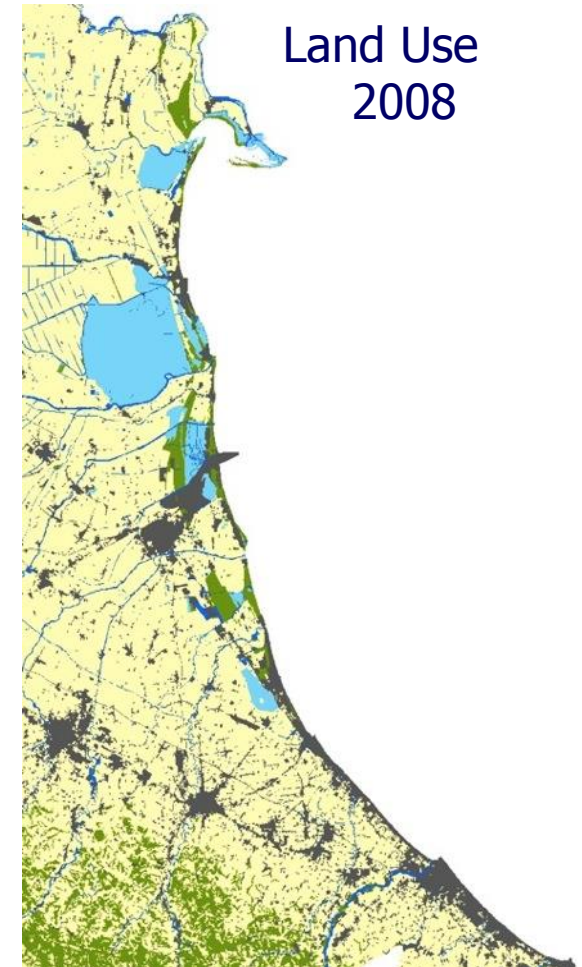
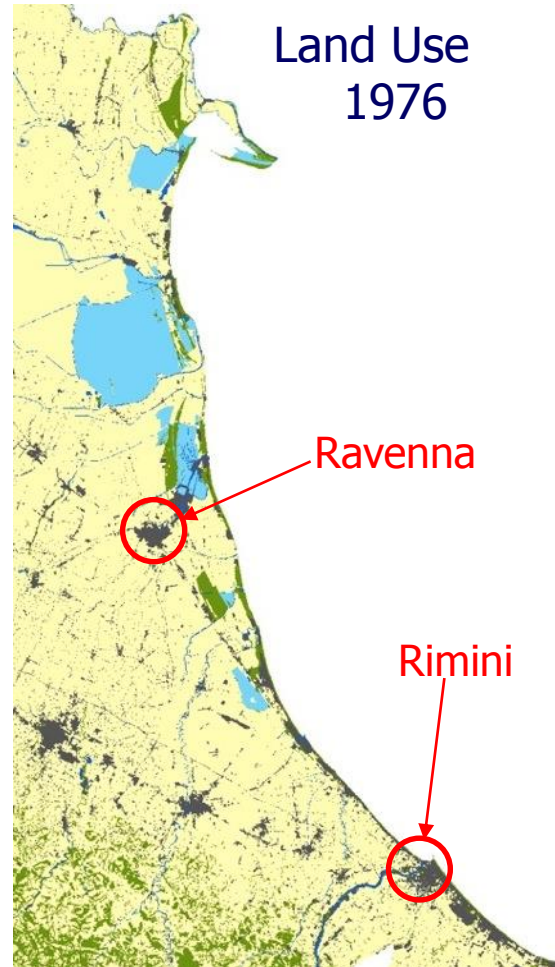
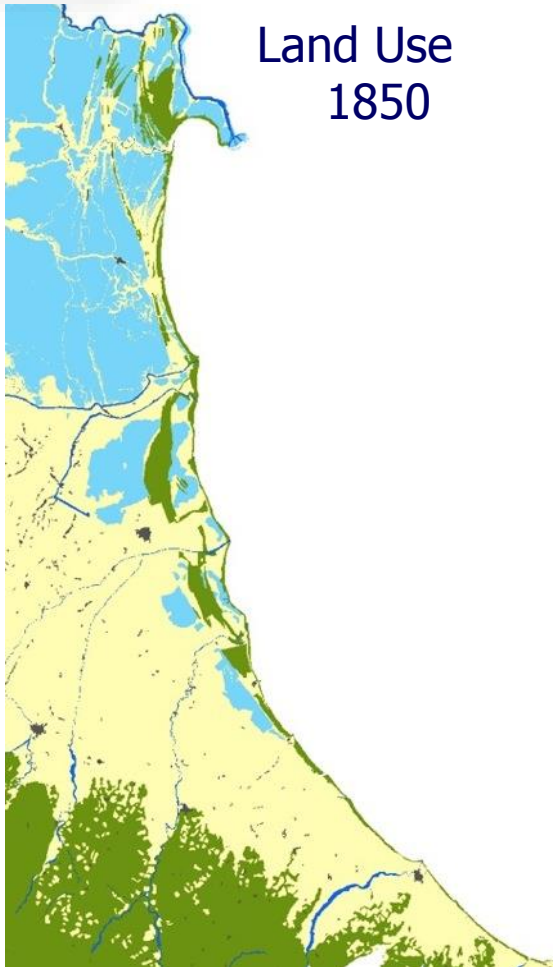
**Reduction of yield because of dams**

**(30% less sediment to the ocean than 50 years BP)**



**Dams construction in the Ebro catchment (1916-72)**

# Anthropogenic “uses” are visible on land



Urban  
Agriculture

Wood  
Wetland

Rivers

The Emilia-Romagna Coast

Mappe elaborate dai database dell' Uso del Suolo della Regione Emilia-Romagna