

The role of science and innovation in blue economy



Fabio Trincardi

CNR, Director

Department on Earth System Science and Environmental Technology

Outline



1

Ocean and economy

Healthy ocean through restoration and sustainable use



2

Climate change

Global, regional, local



3

Mediterranean hotspot

More rapidly impacted by climate change



4

Exploiting the ocean

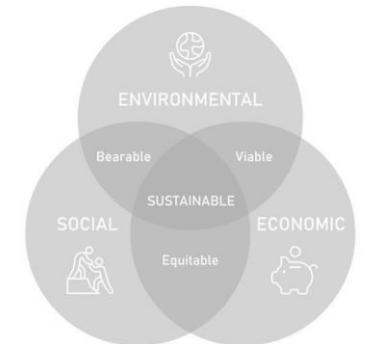
Maintaining its natural capital



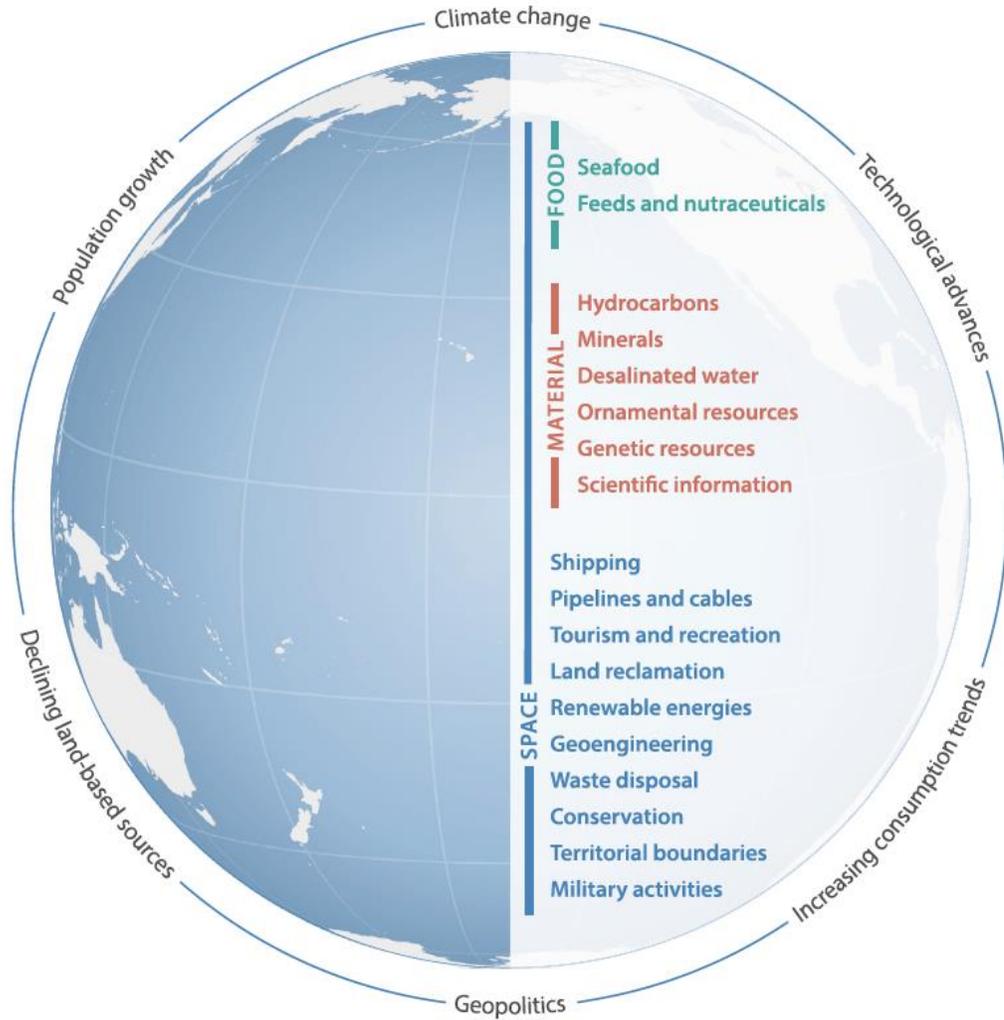
5

Science for sustainable blue economy

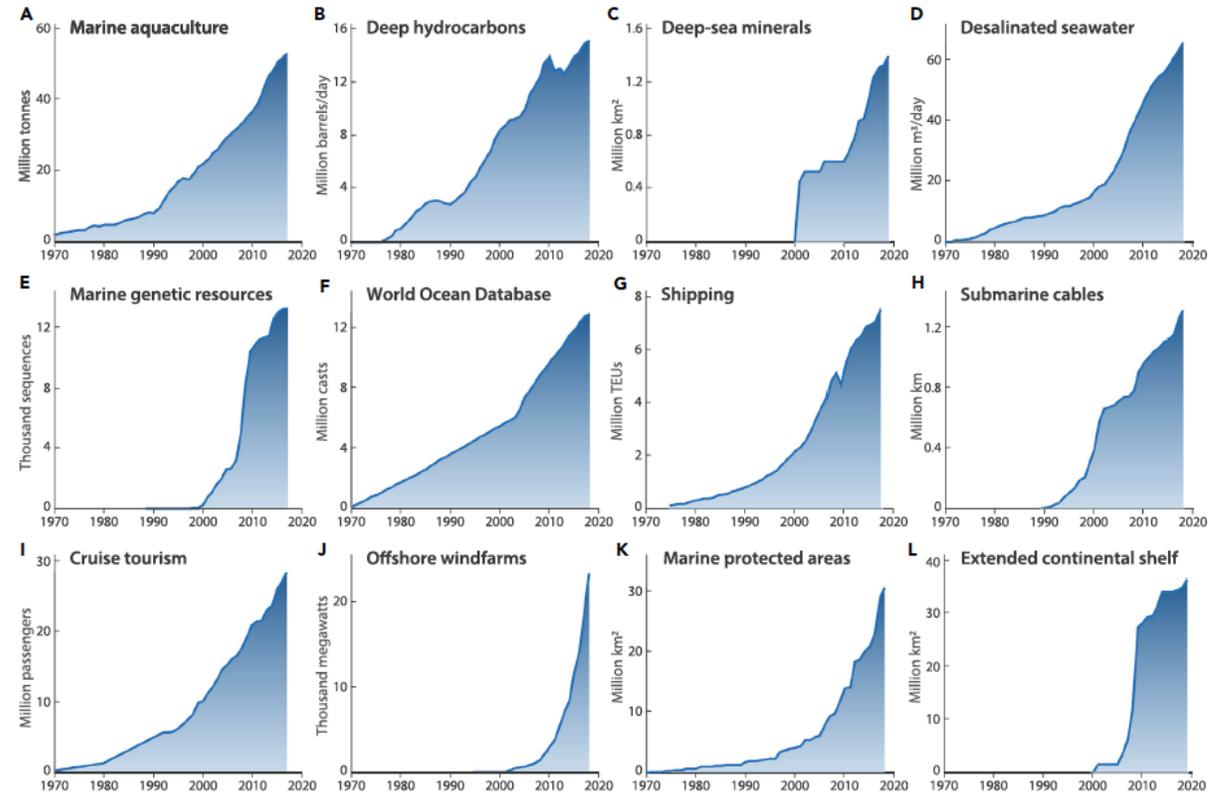
Digital ocean beyond our sea blindness

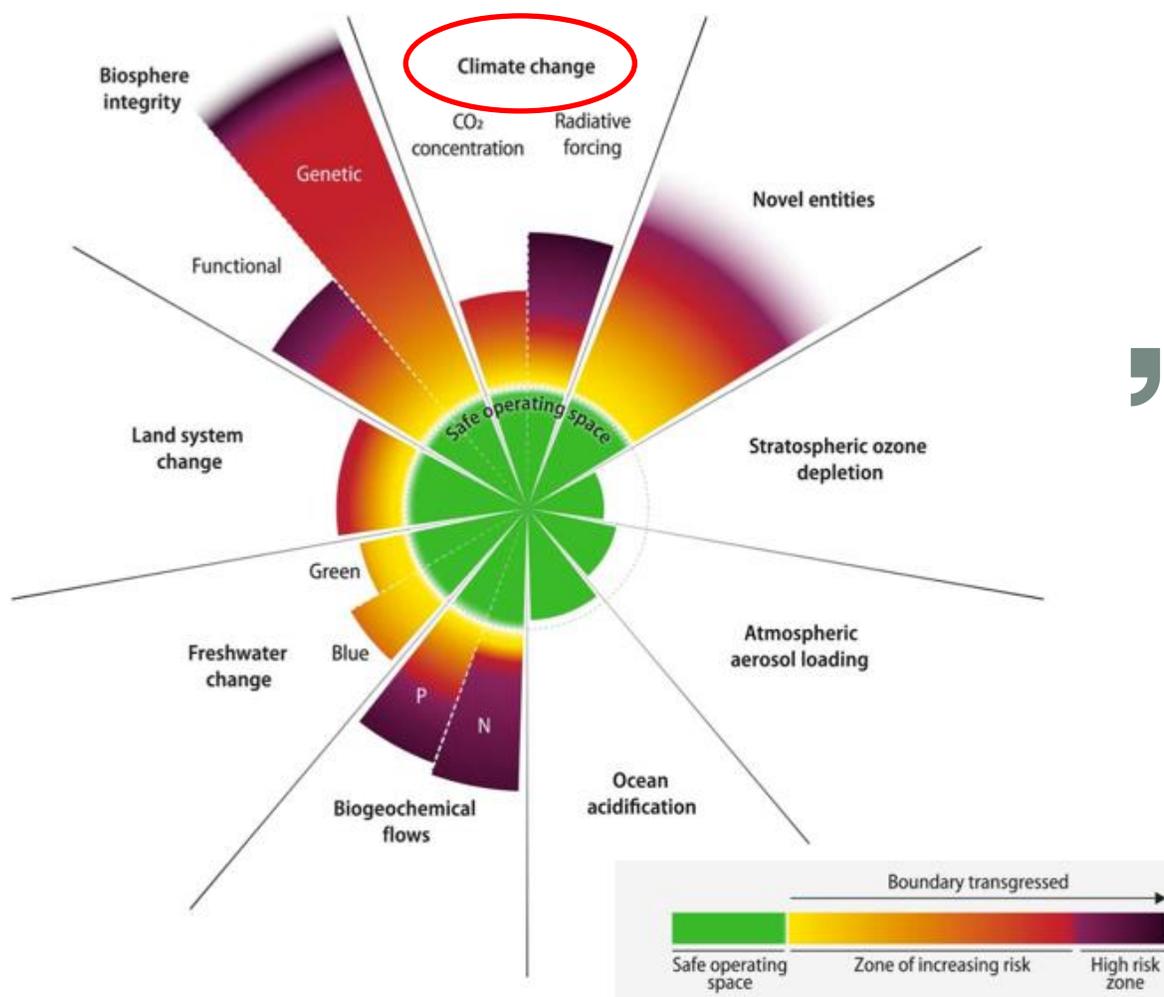


Ocean and economy



Jouffroy et al., 2020 NATURE



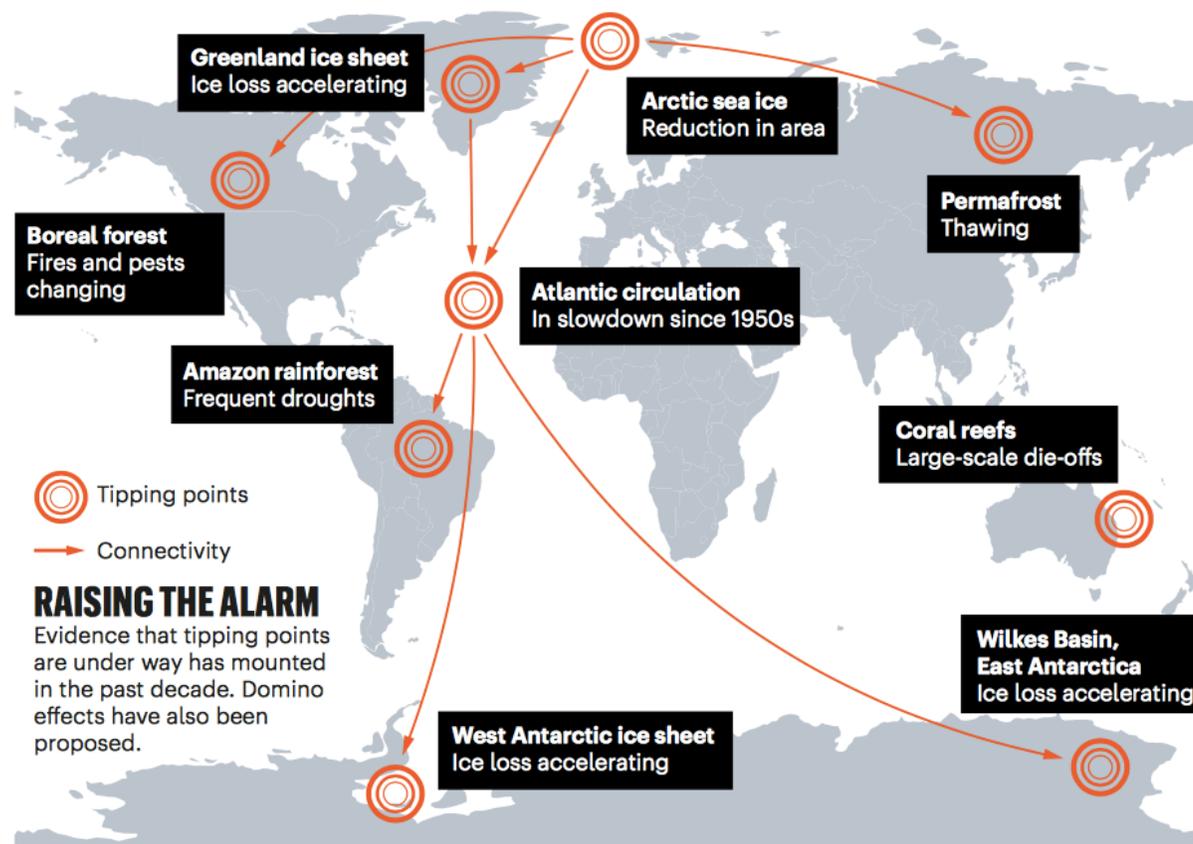


Climate change

” Climate change and other 5 planetary boundaries are now transgressed.

Nine planetary boundaries are critical for maintaining the stability and resilience of Earth system as a whole.

Richardson et al., 2023 SCIENCE ADVANCES



Lenton et al., 2020 NATURE

Climate change

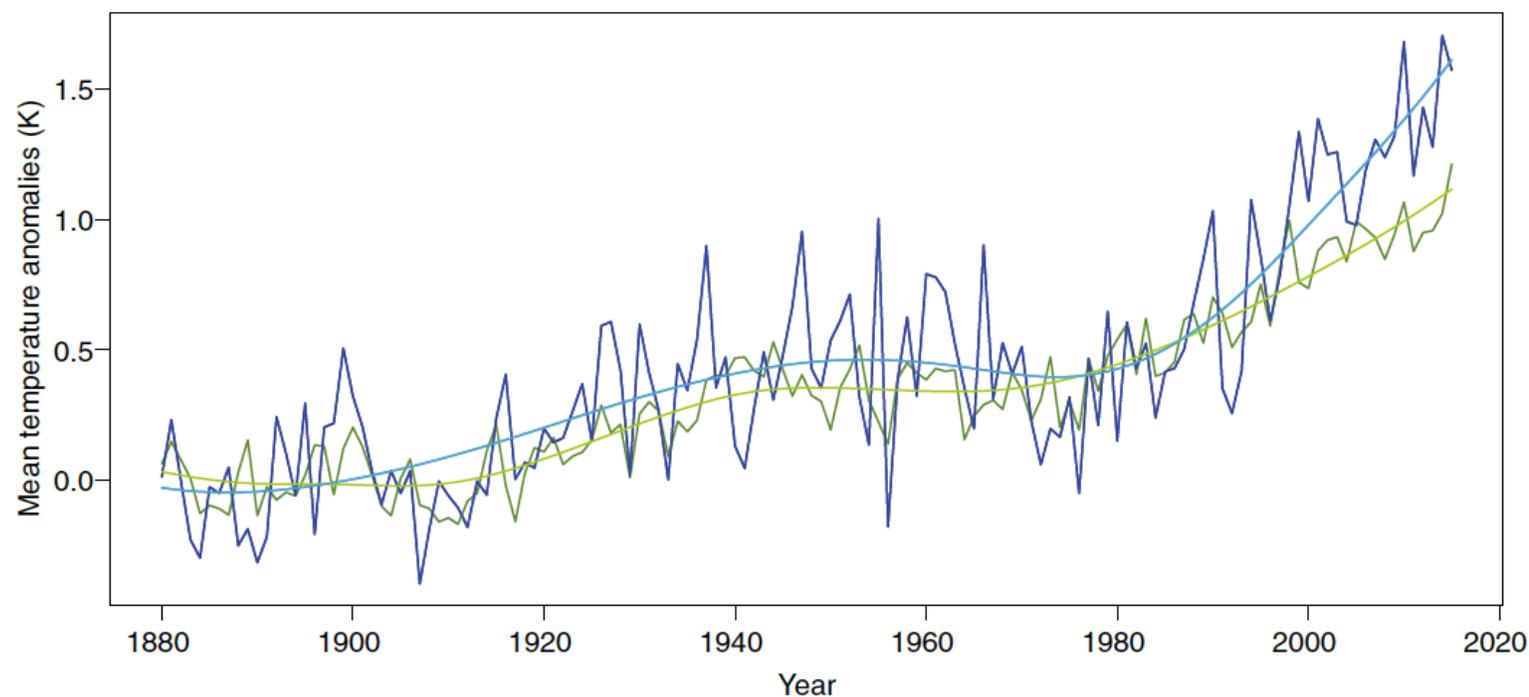
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Beyond planetary boundaries:

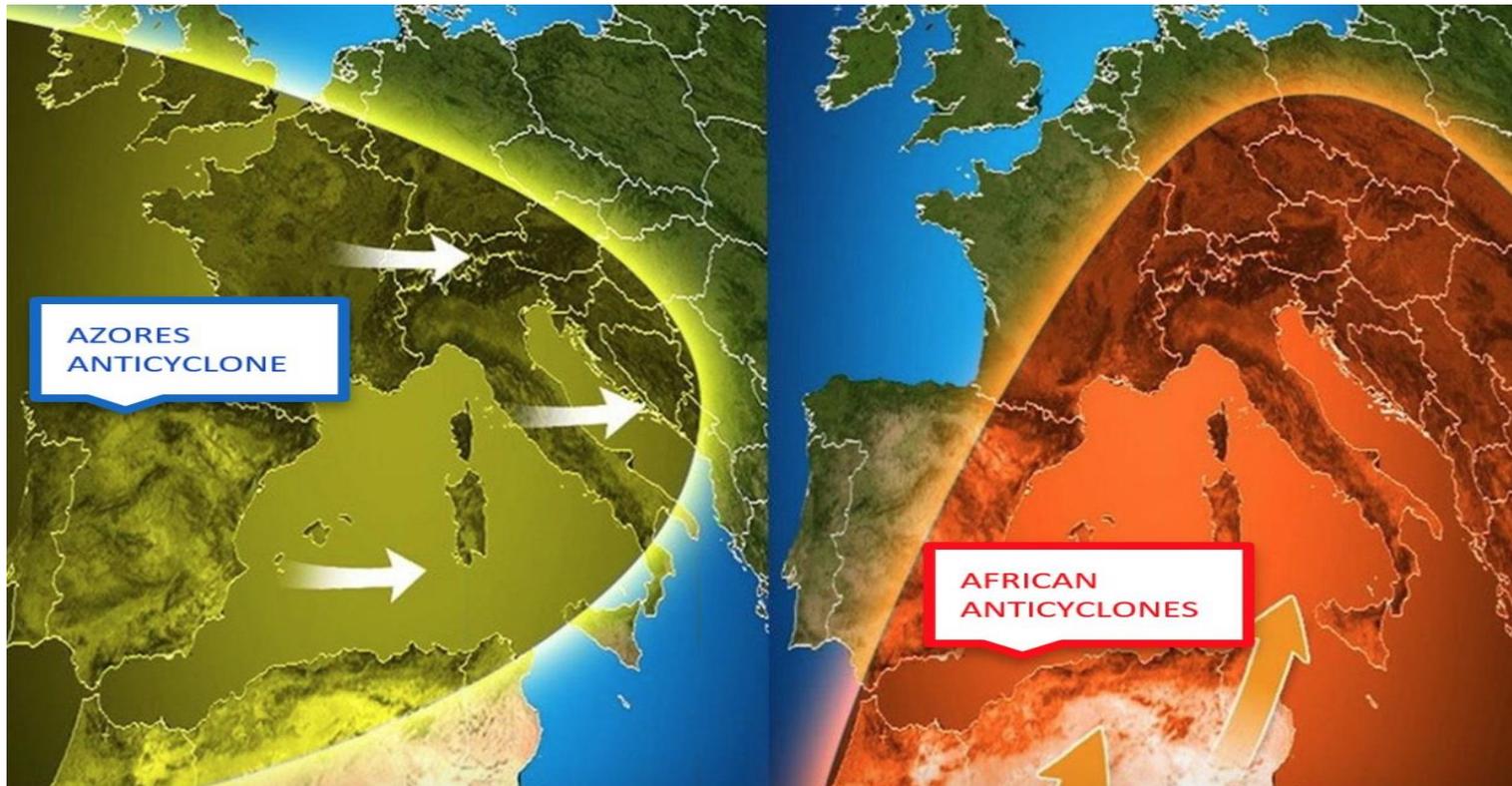
- we generate several irreversible transitions (tipping elements)
- they develop far from us, but impact the entire Earth
- the main risk is to enter a super-interglacial

The Mediterranean is a hotspot for climate change

Cramer et al., 2018 Nature Climate Change



The Mediterranean is a hotspot for climate change



Gramenos Mastrojeni

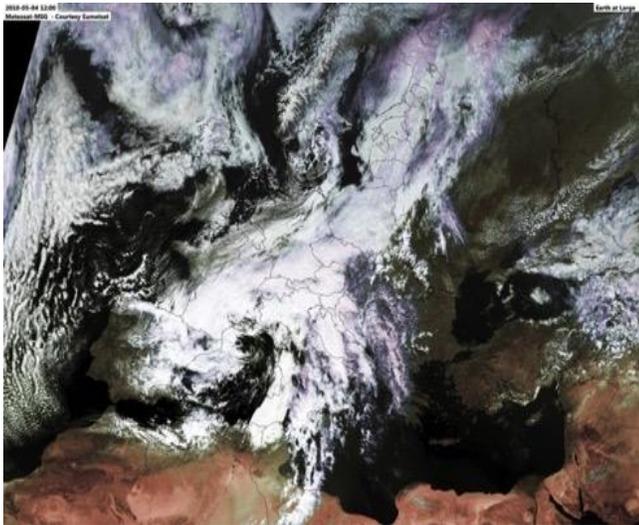
Science for Action... together

Rapid disruption of a 10.000 years old, climate stability

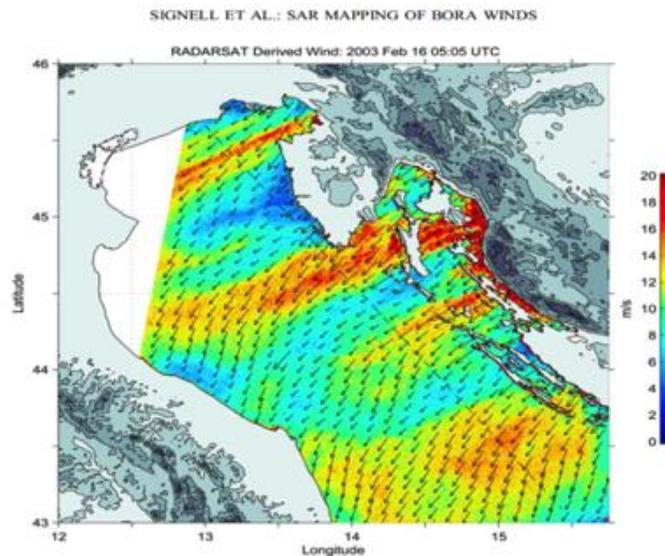
- Europe and the Mediterranean – a «climate exception» that enabled agricultural revolution and human civilization
- Increase resilience to climate change
- Turning this into an opportunity for a just and sustainable economy

The Mediterranean is a hotspot for climate change

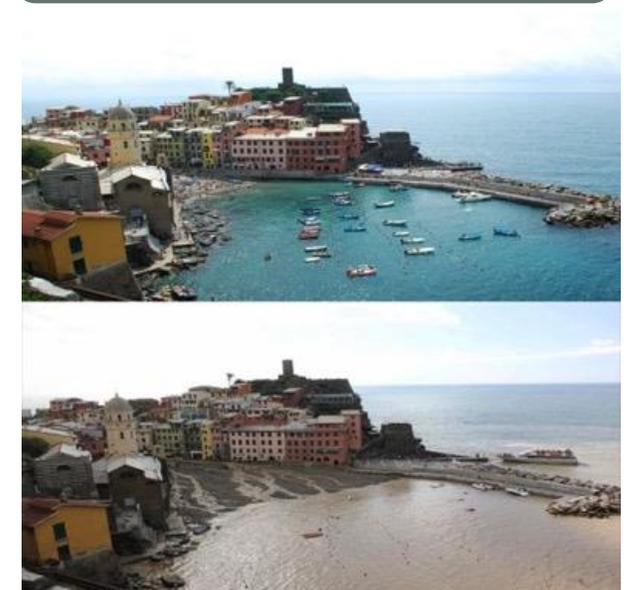
Severe cyclogenesis



Wind storms

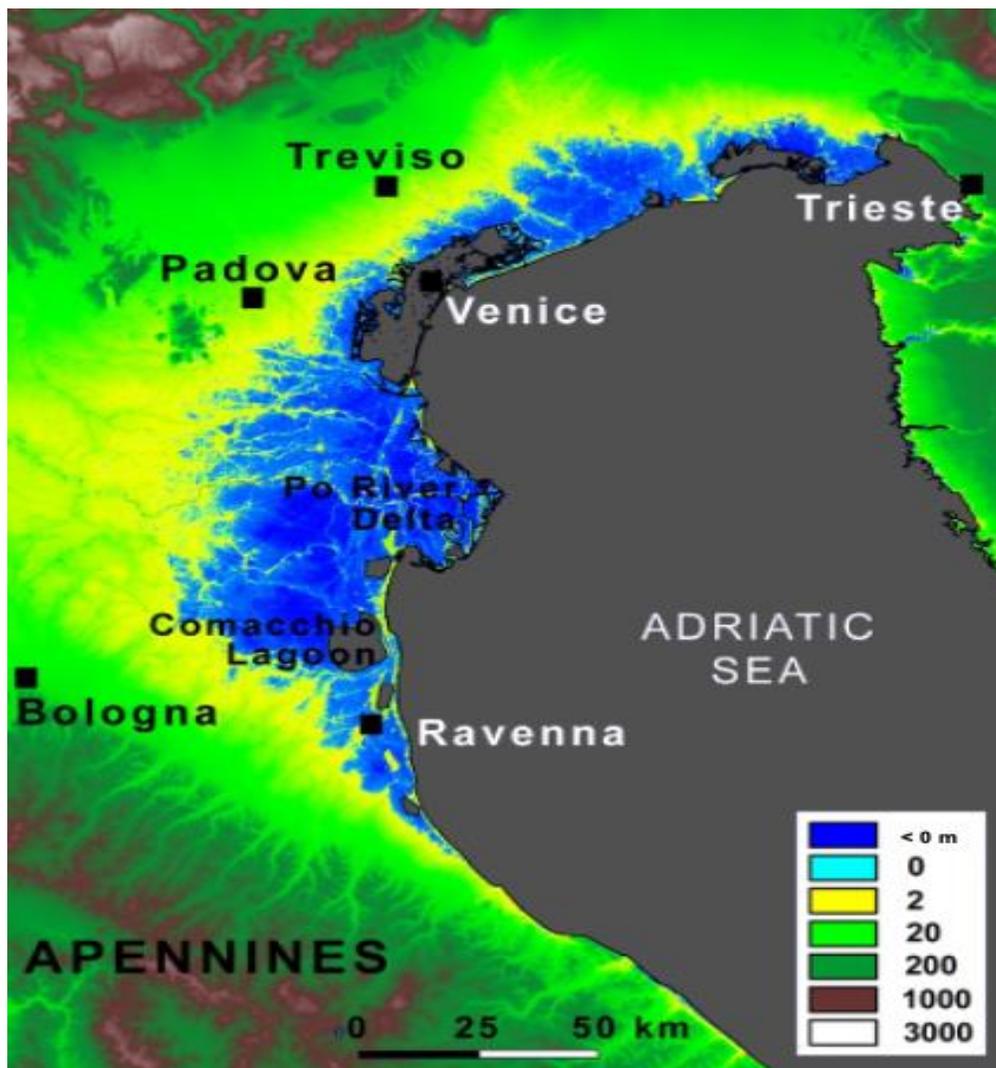


Flash Flood Heavy Precipitation



- An increase of 1 °C generates 7% more water vapour in the atmosphere
- The ongoing T increase is already generating longer droughts and extreme flood events

Rate of sea level rise is doubling

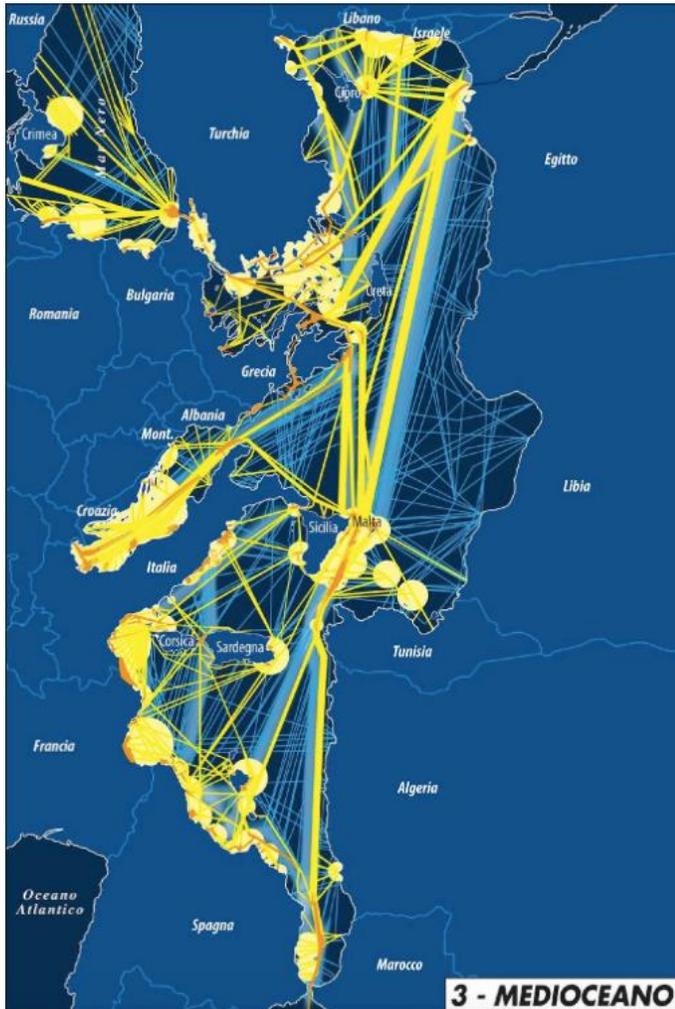


2015 - 2019 SLR
4.8 mm/yr

2000 - 2015 SLR
< 3.6 mm/yr

1880 - 2000 SLR
< 2 mm/yr

The exploitation of Mediterranean (so far)



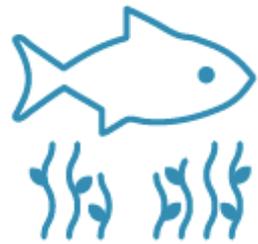
- **Key connecting area** between the far East and the Atlantic
- **Crossed by 25% of global marine trades** (though the 400 local ports do not take full advantage of this)
- **30 % of global tourism**

BUT ALSO

- **Impacted** by 7% of global mismanaged plastic garbage
- **Overfished** (88% of stocks overexploited)
- **1000 alien species** and biodiversity loss
- **Heavily polluted** (chemicals)

The main economic “drivers” for blue growth

03. FROM SOCIETAL/ECONOMIC DRIVERS TO THEMATIC BLUE OBJECTIVES



FISHERIES & AQUACULTURE

3.2
BILLION €



TRANSPORT & SHIPBUILDING

8.0
BILLION €



BLUE BIOTECHNOLOGIES

~0.5
BILLION €



OIL AND GAS
(FROM THE SEA)

4.4
BILLION €



COASTAL TOURISM

16.1
BILLION €

- Tourists use 3-4 times as much water as residents
- Tourists contribute to 52% of coastal/marine litter
- 43% coastline is urbanized



Science for a sustainable blue economy

Urgent need to overcome three orders of problems:

- Natural hazards
- Ecosystems degradation and biodiversity loss
- Enhanced regional warming (hotspot of climate change)



Circular Economy should now:

- Revitalize endangered areas (e. g.: coastal industrial plants, offshore dumping sites, obsolete infrastructures, etc.)
- Prevent further environmental impacts
- Use resources sustainably (not solely in terms of “extraction” of the natural capital)

Conclusions



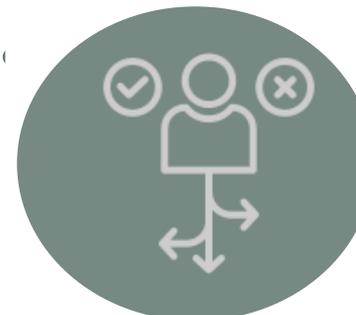
Gaia Blu, CNR's new ocean going research vessel



Make all data and interpretations available



Push towards the use all data in decision making



Support decision making beyond our sea blindness