Sustainable Blue
Economy Partnership

SUSTAINABLE BLUE ECONOMY PARTNERSHIP
Intervention Area 1 & 2

Emilio F. Campana - CNR

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Intervention areas

Sustainable Blue Economy Partnership

IA 1

- Digital Twins of the Ocean at regional sub basin scale

Blue economy sectors, development of marine multi-use infrastructures

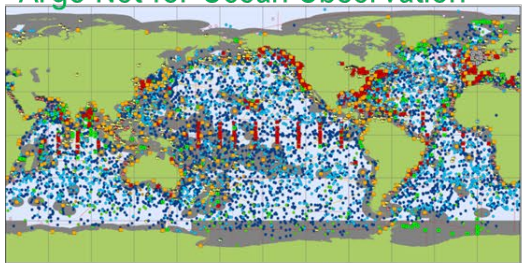
Planning and managing sea-uses at a regional level

Blue Bioresources

The Ocean Digital Twin

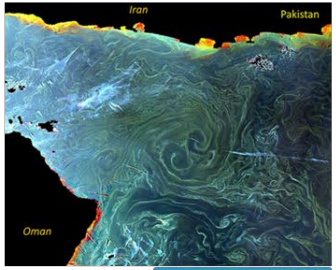
The Oceans as complex system: let's start from DATA

Argo Net for Ocean Observation



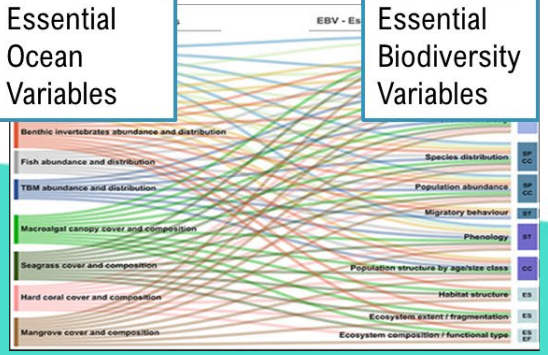
Copernicus

North-western Arabian Sea. Outbreak of *Noctiluca scintillans* algal blooms, highlighting large vortical structures



Essential Ocean Variables

Essential Biodiversity Variables



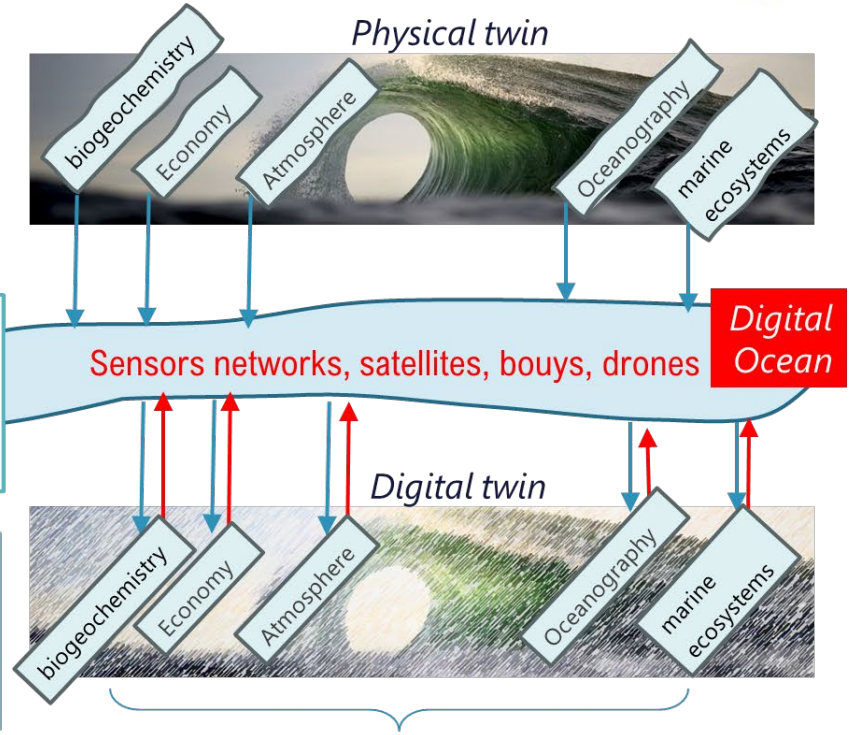
Ecosystem models also need other type of information, models, sensors, data

… but we have also models!

3D, spatially-explicit, trophodynamic ecosystem models integrate: biology, physics, chemistry and human impacts to provide an integrated view of marine ecosystem

Models: Building a bridge between digital and physical world - **virtual replica of the Ocean and of its systems, AND their interactions**

Understanding Ocean Dynamics using **observational and measured data**



Artificial Intelligence + Models + High Performance Computing

Mathematical models / Ecosystem models, upper oceans bl and atmosphere, bl on the beaches and sub slopes, turbulent ocean, pollution etc.

Data gathering

forcing, waves parameters

Wind, fetch, momentum

Atmosphere

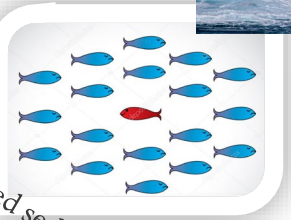
Data gathering

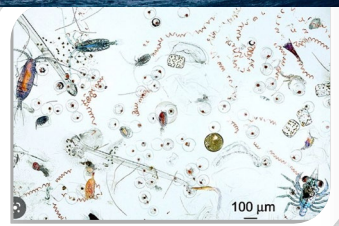
Superficial temperature

Winds, speed

Waves

Currents



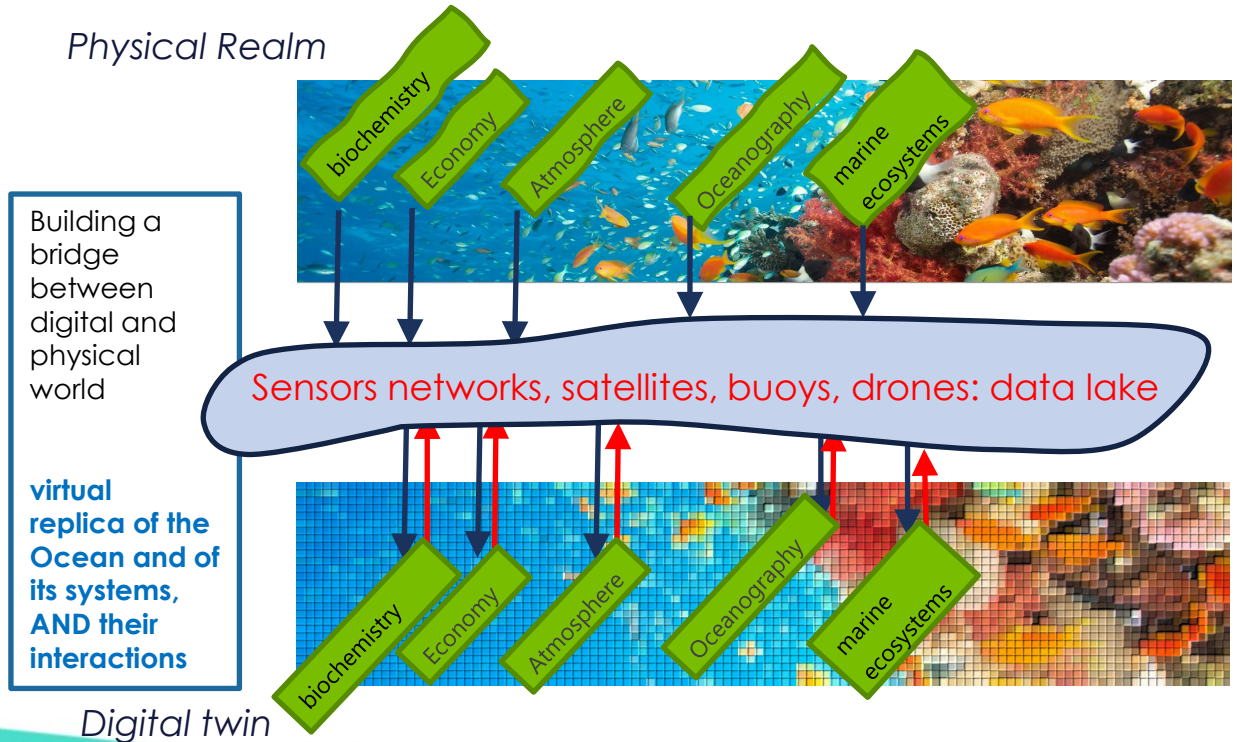


Suspended sediments, Transport

Tangential stress on the bottom

Bathymetry

Sediments



Initial focus on spatially limited areas

- start with some existing dataset of marine and biological data, and
- put more sensors for biological species
- solve at small scale (size, models, effort)
- apply the DT and learn
- expand the scale, increase systems and interactions

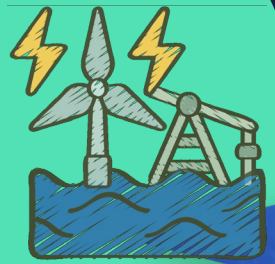
Competences:
Data Science and AI, biochemistry, statistics, oceanography, ecology, computer science, …

Intervention areas

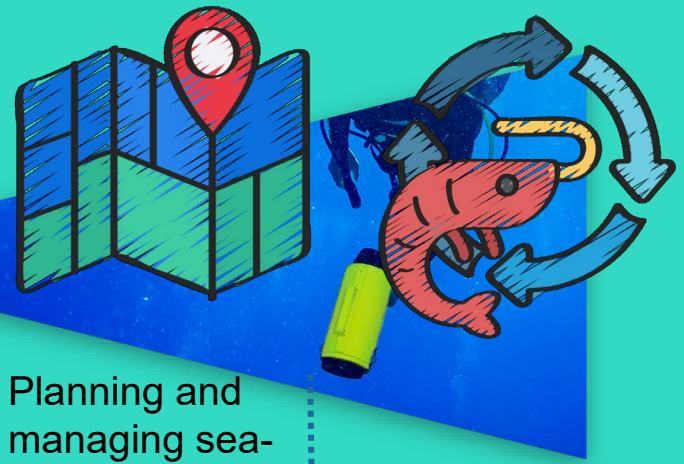
Sustainable Blue Economy Partnership

- Digital Twins of the Ocean at regional sub basin scale

IA 2



Blue economy sectors, development of marine multi-use infrastructures



Planning and managing sea-uses at a regional level

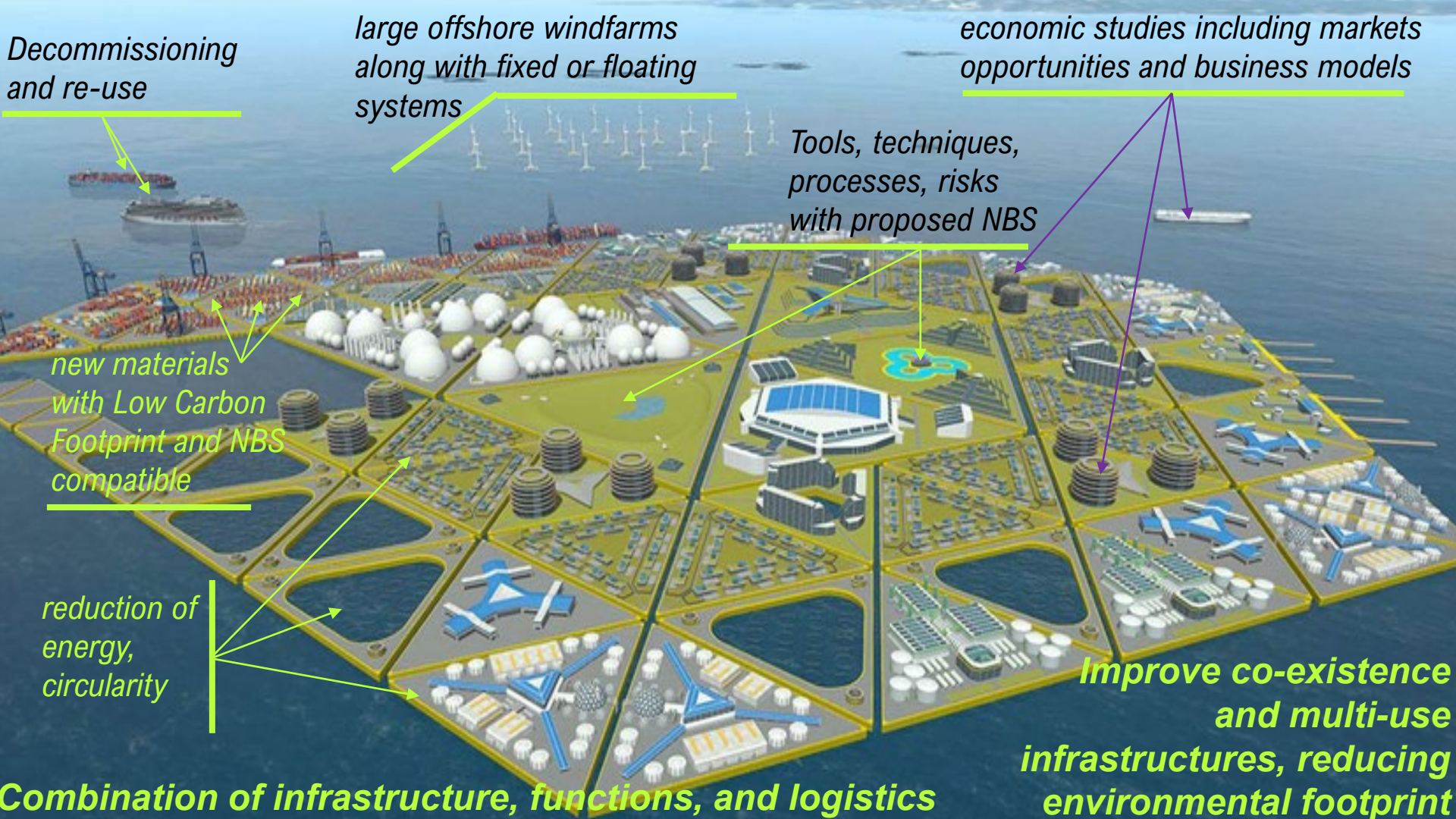
Blue Bioresources

Blue economy sectors, development of marine multi-use infrastructures

The projects need to

- engage the different actors of the sectors including **industrial partners** and other **relevant stakeholders**.
- include **regulatory** and legal aspects,
- **economic and social aspects** with social acceptance of the developments for existing and emerging sectors,
- **socio-economic considerations** for a just transition, and broad and inclusive approaches…

Emphasise technology and process development, solution orientation, and integrated approaches promoting circularity and minimising the pollution


Decommissioning and re-use
large offshore windfarms along with fixed or floating systems
economic studies including markets opportunities and business models
Tools, techniques, processes, risks with proposed NBS
new materials with Low Carbon Footprint and NBS compatible
reduction of energy, circularity
Combination of infrastructure, functions, and logistics
Improve co-existence and multi-use infrastructures, reducing environmental footprint

Sustainable Blue Economy Partnership

Co-funded by the European Union

EUROPEAN PARTNERSHIP