CoastPredict

with The Global Ocean Observing System

CoastPredict: Observing and Predicting the Global Coastal Ocean

Program endorsed under the United Nations Decade of Ocean Science

https://www.coastpredict.org/

2021 2030 United Nations Decade of Ocean Science for Sustainable Development

UNESCO IOC WMO UN environment International Science Council

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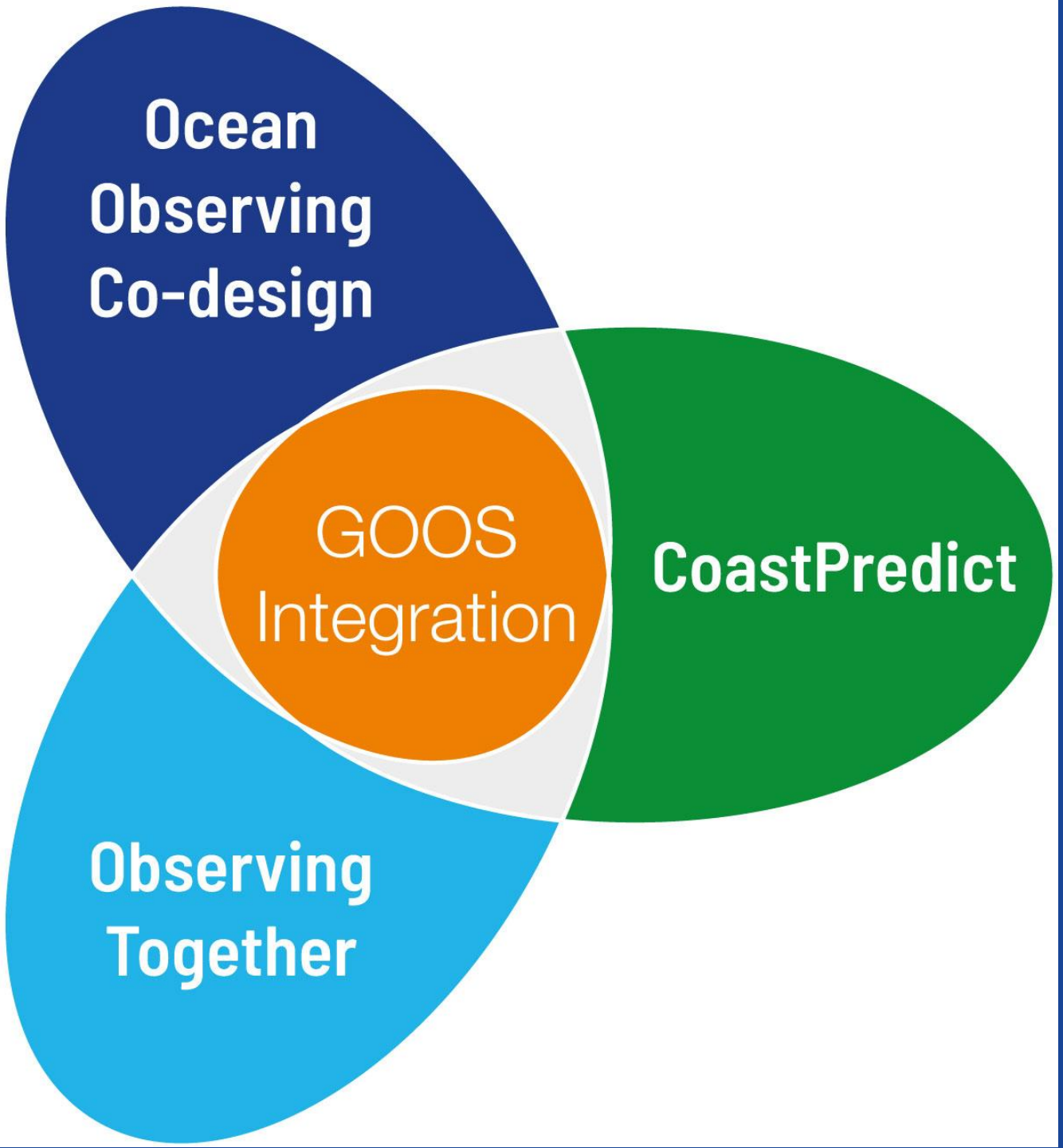
Revolutionising Global Coastal Ocean observing and forecasting

Co-chairs:
Nadia Pinardi, *University of Bologna*
Villy Kourafalou, *University of Miami*
Joaquín Tintoré, *Balearic Islands Coastal Observing & Forecasting System*

2021 2030 United Nations Decade of Ocean Science for Sustainable Development

This programme is endorsed by the **UN Decade of Ocean Science**



- **3 x GOOS Ocean Decade Programmes**
- **Working together for the Decade**
  - Challenges
  - Opportunities

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CoastPredict high level objectives

1. A **predicted** global coastal ocean;
2. The upgrade to a **fit-for-purpose** oceanographic information **infrastructure**;
3. Co-design and implementation of an **integrated coastal ocean observing and forecasting system** adhering to **best practices and standards**, designed as a global framework and implemented locally.

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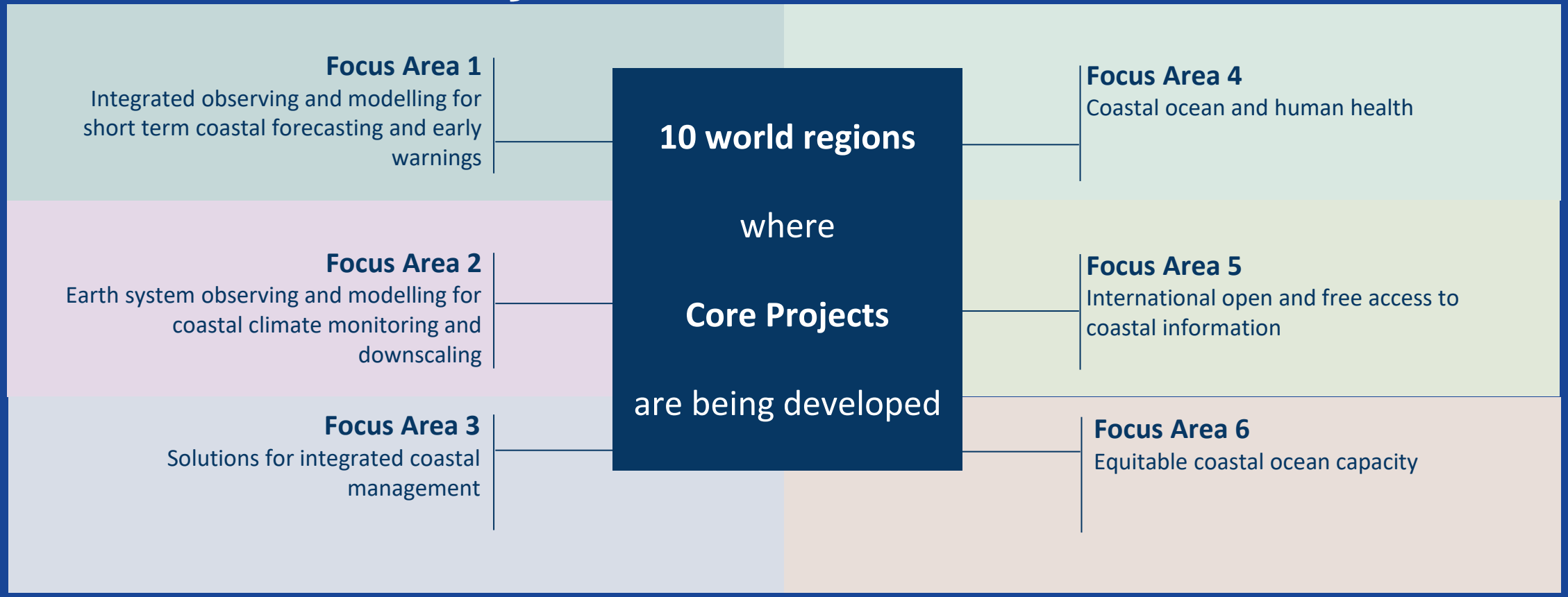
Focus areas and Projects *(Core Projects & Affiliated* Projects)



Three Core Projects and three Affiliated Projects were submitted Jan. 2022 and were evaluated for endorsement under Focus Areas 1, 2; one affiliated Project has been approved for Meerwissen funding under FA-3, one being prepared in collaboration with Co-design

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Focus Areas
(each is advised by Expert Members incl. at least one ECOP representative and the Core Project leaders)
~10-15 people

Projects – Core
proposed for endorsement by UN Decade

Projects - Affiliated
proposed for endorsement by UN Decade

Core Projects submitted for Decade endorsement (Jan. 2022)

Focus Area 1: PredictOnTime - will develop systems to observe and predict natural extreme events in the global coastal ocean in due time and with the appropriate accuracy so that impacts on natural and human resources and assets will be minimized . ENDORSED (6/2022)

Focus Area 2: FLAME - Future Coastal Ocean Climates will generate innovative, high-resolution, downscaled projects of future coastal ocean climates and impacts. - ENDORSED (6/2022)

Focus Area 5: CORE - Coastal Ocean Resource Environment will provide sustainable delivery of high-quality environmental data and information, products to research, industry and government for purposes such as ecosystem health, hazard response and resource management.

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Projects – Core
proposed for endorsement by UN Decade

Projects - Affiliated
proposed for endorsement by UN Decade

Affiliated Projects submitted for Decade endorsement (Jan. 2022)

Focus Area 1: Integrating Coastal Hazards Early Warning Systems in the Tropical Americas and Caribbean submitted by the Regional Office for the Americas and the Caribbean Sea ENDORSED (6/2022)

Focus Area 1: Forecasting the Argentine Sea – accelerating the capacity for operational forecasting in Argentina

Focus Area 2: European Knowledge Hub on Sea Level Rise - Coastal Ocean Resource Environment will provide sustainable delivery of high-quality environmental data and information, products to research, industry and government for purposes such as ecosystem health, hazard response and resource management.

Focus Area 3: Mangroves as Nature-based Solutions to Coastal Hazards in Eastern Ghana (MANCOGA) ENDORSED FOR FUNDING by Meerwissen

OTHER: Collaborative project with Ocean Observing Co-Design: Coastal inundation and storm surge exemplar project of the Ocean Observing Co-Design Programme will be a project affiliated to Focus Area 1 PredictOnTime core project.

DECADE COLLABORATIVE CENTRE
COASTAL RESILIENCE IN A CHANGING CLIMATE

@University of Bologna

MAIN FUNCTIONS

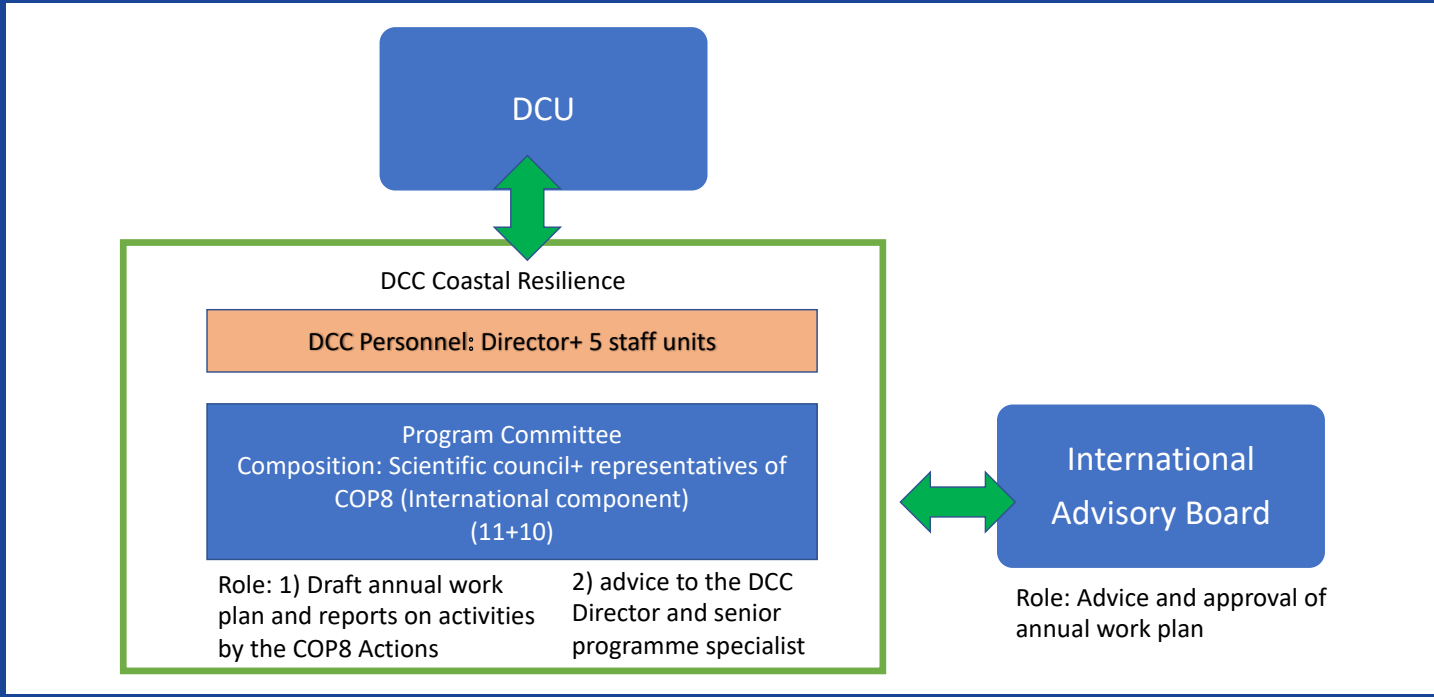
Catalyst/strategic: be a place for strategic thinking and planning of the UN Decade transformative science for sustainable development

Coordination: in consultation with the DCU at Unesco-IOC, and GOOS, coordinate Decade Programs in the Community of Practice

Communication: Make sure that adequate dissemination tools are developed

Monitoring and reporting: Develop reporting/regular reviews of all relevant Programs/Projects

Resource mobilization



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The DCC should work within the Community of Practice for coastal resilience (from UN Decade COP8)

Several **keywords** have been identified by members as core of the working group of the COP8. The keywords have been clustered as follows:

1. **Engagement and Community:** engagement to develop fit-for purpose science, Community engagement, proximity, support synergy, stakeholder engagement
2. **Culture, Awareness and Territory**: Cultural heritage, perception and interaction with coastal ocean, archeology, dissemination, history
3. **Ocean, Ecosystems and Resilience**: Ecosystem health, Ecosystem functioning, coastal ocean, climate change, estuaries, key habitats, wetland conservation link nature and resilience, land-sea connectivity, resilience, knowledge of coastal ocean, human and coastal health, clean ocean
4. **Socioeconomic and Governance:** Sustainable blue growth, usage of new science-based information products for the coasts, socioeconomics, circular and sustainable, marine spatial planning, social and build environment, best practices in coastal area, capacity building

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Preparing for more coastal networks coordination?

LARGE SCALE

SHELF/COASTAL SCALE

- MOORED BUOY ARRAYS
- VOS EXPANDABLE AND ONDULATING INSTRUMENTS
- SATELLITE MONITORING:
  SEA LEVEL,
  SEA SURFACE TEMPERATURE,
  SEA SURFACE SALINITY,
  COLOR, WINDS
- DRIFTING BUOYS
  (SURFACE AND SUBSURFACE)
- GLIDERS

OBSERVING

- TIDE GAUGES
- REPEATED MULTIPARAMETRIC VERTICAL SECTIONS
- COASTAL SATELLITE AND AERIAL SURVEYS
- COASTAL RADARS
- AUTONOMOUS UNDERWATER VEHICLES
- CABLED MULTIPARAMETRIC STATIONS
- RIVER RUNOFF AND LOADING MONITORING
- SEDIMENT/WQ MONITORING
- **CITIZEN SCIENCE MONITORING**

MODEL PHYSICS
- PRIMITIVE EQUATIONS (> 1 KM)
- TURBULENCE CLOSURE SUBMODELS

DATA ASSIMILATION
- OPTIMAL INTERPOLATION
- 3-DVAR, KALMAN FILTER

BIOCHEMICAL MODELS
- PELAGIC COMPARTMENT
- BENTHIC CLOSURE

ATMOSPHERIC FORCING
- OPERATIONAL ANALYSES AND FORECASTS FROM GLOBAL SCALE MODELS

PREDICTING

MODEL PHYSICS
- PRIMITIVE EQUATIONS (<1 KM)
- TURBULENCE AND LIGHT SUBMODELS

DATA ASSIMILATION
- KALMAN FILTERS
- ADJOINT MODELS

BIOCHEMICAL MODELS
- PELAGIC COMPARTMENT
- BENTHIC-PELAGIC COUPLING
- SEDIMENT DYNAMICS

ATMOSPHERIC FORCING
- OPERATIONAL ANALYSES AND FORECASTS FROM LIMITED AREA MODELS

Thank you

www.coastpredict.org
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GOOS is sponsored by the **Intergovernmental Oceanographic Commission of UNESCO**, the **World Meteorological Organization**, the **UN Environment Programme**, and the **International Science Council**.