Ocean Predict

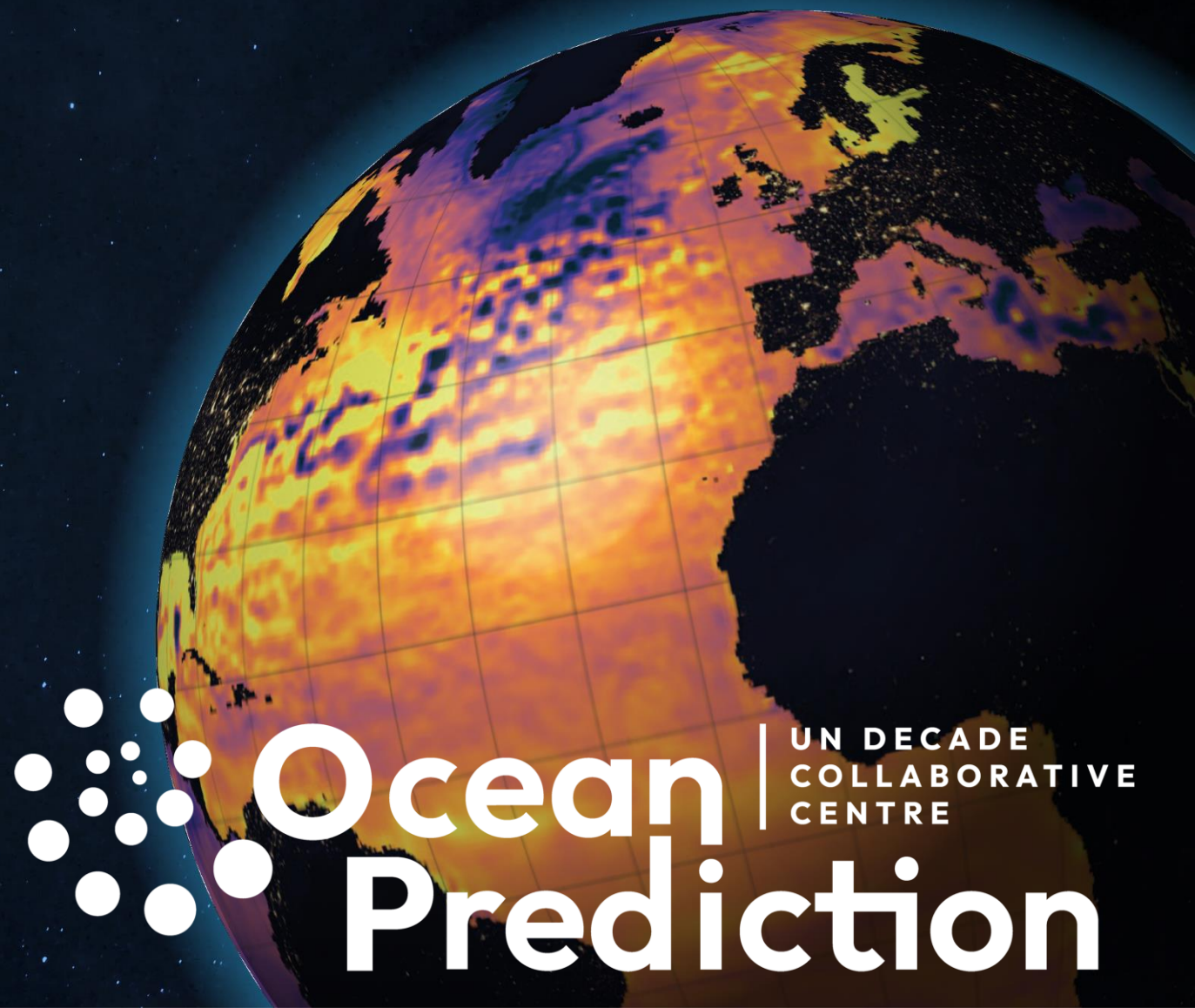
SYMPOSIUM OP'24

In partnership with unesco Intergovernmental Oceanographic Commission

2021 2030 United Nations Decade of Ocean Science for Sustainable Development

OceanPrediction DCC: connecting the world around ocean forecasting

Enrique ALVAREZ
MERCATOR OCEAN INTERNATIONAL



Ocean Prediction | UN DECADE COLLABORATIVE CENTRE

Ocean Prediction

2020: THE OCEAN FORECAST
WE HAVE

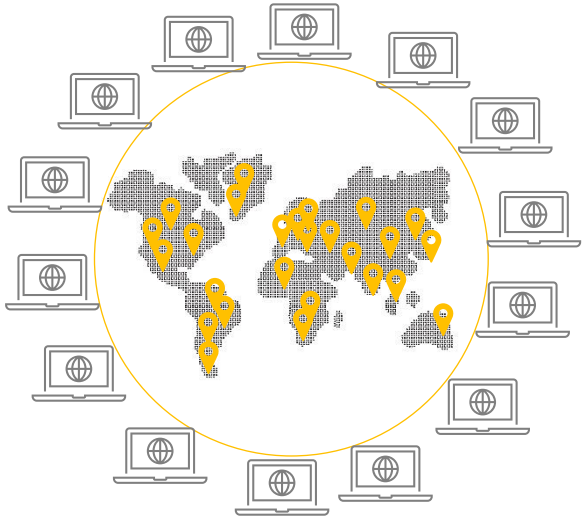
- Useful but partially disconnected services
- Poor presence in developing countries

OceanPrediction DCC VESSEL

Captain: UN Ocean Decade
Chief engineer: Decade actions and DTO
Crew: OceanPrediction DCC community
Navigator: OceanPrediction DCC

Ocean Prediction UN DECADE COLLABORATIVE CENTER

2030: THE OCEAN FORECAST
WE WANT



- Connected community and services
- Many robust systems worldwide

OceanPrediction DCC in the framework of the Decade

GOVERNANCE & COORDINATION FRAMEWORK

PRIMARY ENDORSED PROGRAMMES

Ocean Predict

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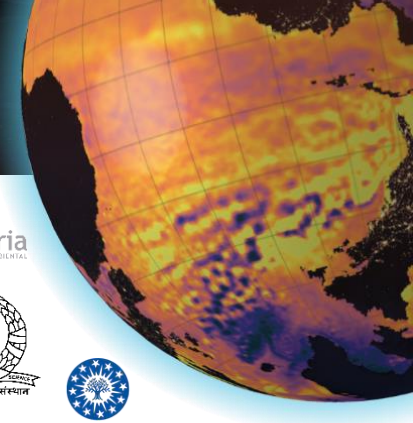
OceanPrediction pillars (1/2): A community, 9 regional teams



IH cantabria

OceanPrediction ARCTIC

Danmarks Meteorologiske Institut

CSIC

EuroGOOS European Global Ocean Observing System

भारतीय विज्ञान संस्थान

CIHEAM CHANIA

FRA

FIO

INPE

hereon

NERSC

Environment and Climate Change Canada

OGS

UNIVERSIDADE EDUARDO MONDLANE

ORION Joint Research & development Centr.

SOCIB

OceanPrediction NORTHEAST ATLANTIC

SINTEF

HIDROMOD

CNI

Universidade Federal Fluminense

Deltares

Meteorologisk institutt

OceanPrediction NORTH AMERICA

Consiglio Nazionale delle Ricerche

KIOST

ARSO METEO Slovenian Environment Agency

OceanPrediction MED & BLACK SEA

NOAA

Fisheries and Oceans Canada

Pêches et Océans Canada

CICESE

cmcc Centro Euro-Mediterraneo sui Cambiamenti Climatici

UFRGS UNIVERSIDADE FEDERAL DO RIO GRANDE DO SUL

OceanPrediction WEST PACIFIC & MARGINAL SEAS OF SOUTHEAST ASIA

UFRJ UNIVERSIDADE FEDERAL DO RIO DE JANEIRO

CSIRO

Autoridad Nacional para la Innovación Gubernamental

UNIVERSIDADE FEDERAL DE SANTA CATARINA

MonGOOS

OceanPrediction AFRICAN SEAS

OceanPrediction INDIAN SEAS

INCOIS

KLAIPĖDA UNIVERSITY

JAMSTEC

IGP Instituto Geofísico del Perú

Curat Centre Universitaire de Recherche et d'Application en Télédétection

NRF SAEON

UNIVERSITAS PADJADJARAN

Pacific Community Communauté du Pacifique

OceanPrediction SOUTH & CENTRAL AMERICA

MINISTÉRIO DA CIÊNCIA, TECNOLOGIA E INOVAÇÕES

BMKG

INRH

KAUST

AZTI MEMBER OF BASQUE RESEARCH & TECHNOLOGY ALLIANCE

AGH

ENEA

USM UNIVERSITI SAINS MALAYSIA

South African Weather Service

CEAZA

POL UNIT Physical Oceanography Unit

UAlg CIMA UNIVERSIDADE DO ALGARVE CENTRO DE INVESTIGAÇÃO MARINHA E AMBIENTAL

OceanPrediction ANTARCTIC

Dimar Dirección General Marítima Autoridad Marítima Colombiana

LIÈGE université

UNIVERSITY of TASMANIA

hcmr ΕΛΚΕΘΕ

BORI

forestry, fisheries & the environment Department: Forestry, Fisheries and the Environment REPUBLIC OF SOUTH AFRICA

nologin

SENACYT Secretaría Nacional de Ciencia, Tecnología e Innovación

Ocean Predict

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OceanPrediction pillars (2/2): A technical framework

40 experts to develop a new scenario for Ocean forecasting:

- Common architecture
- Agreed standards & best-practices
- Operational Readiness Level

THE OCEAN FORECASTING CO-DESIGN TEAM

UN environment programme

GEMS Ocean

Ocean Prediction Capacity of the Future ForeSea

GOOS CoastPredict with The Global Ocean Observing System

DITTO Digital Twins of the Ocean

Ocean best practices

NASA SEA LEVEL CHANGE Observations from Space

OARS Ocean Acidification Research for Sustainability

Met Office

LOPS

COAPS

DALHOUSIE UNIVERSITY

INCOIS

Environment and Climate Change Canada

Deltares

MERCATOR OCEAN INTERNATIONAL

nologin

NERSC

UFRJ Universidade Federal do Rio de Janeiro

OGS Istituto Nazionale di Oceanografia e di Geofisica Sperimentale

NOAA

KAUST

NRF SAEON

JAMSTEC

UKRI Science and Technology Facilities Council

FIO

RUTGERS

University of Colorado Boulder

cmcc Centro Euro-Mediterraneo sui Cambiamenti Climatici

UNIVERSITY of TASMANIA

Fisheries and Oceans Canada / Pêches et Océans Canada

cnrs

ETT

IBM Research

lobelia.

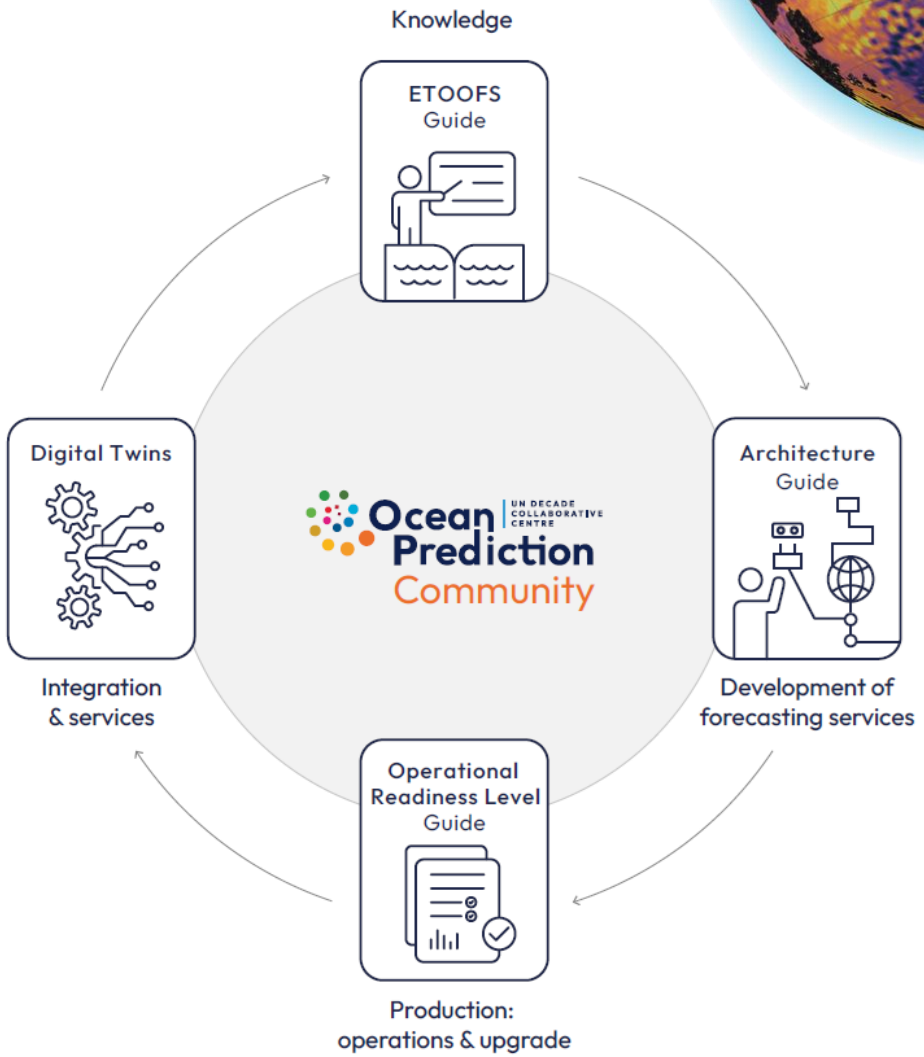
National Oceanography Centre

CEAZA

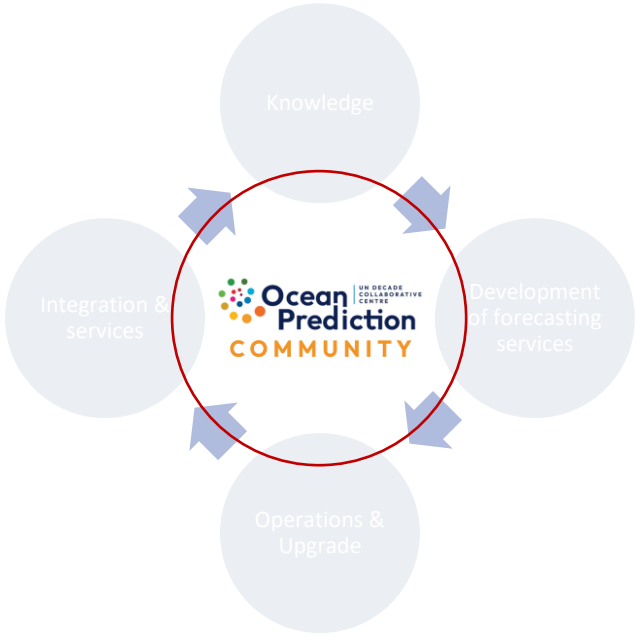
hereon

The ocean forecasting we need

- OceanPrediction DCC is promoting collaboration towards the ocean forecasting we need.
- A virtuous loop implemented by our community
- OceanPrediction DCC is building the assets to make it possible



Building a community with our Regional Teams

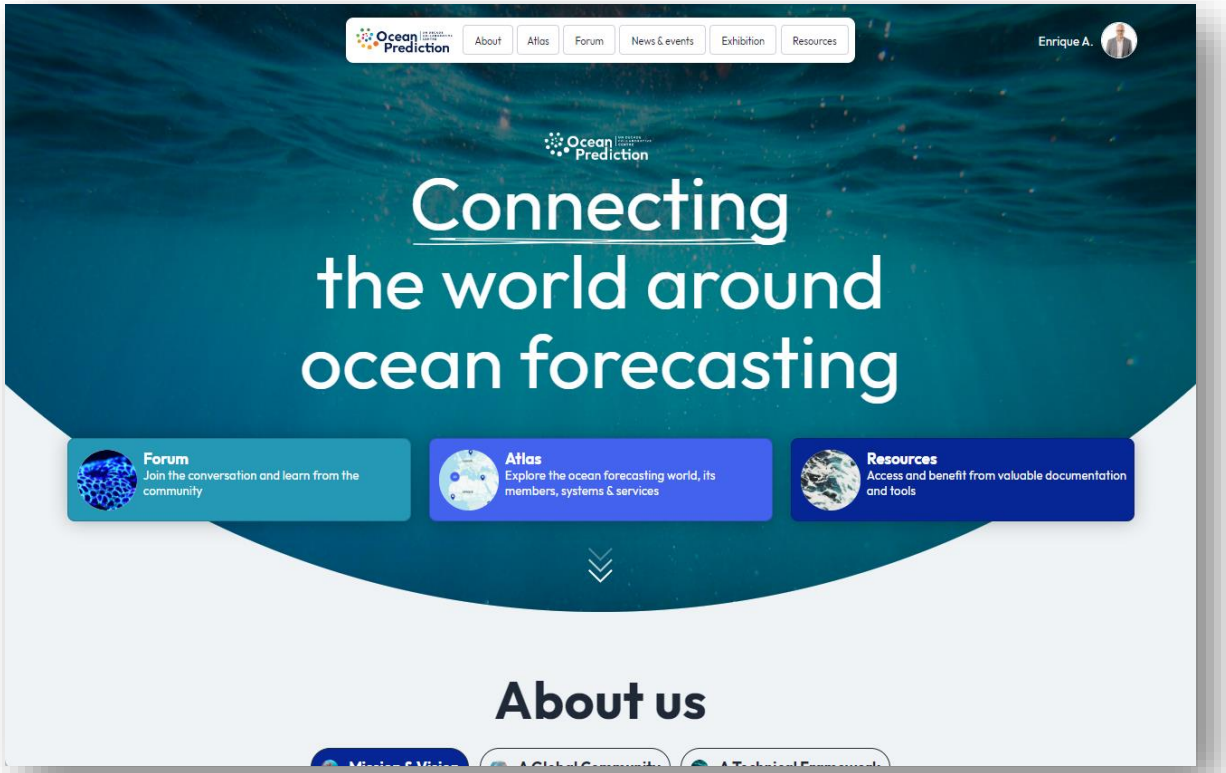


The web

The Forum

The Atlas

https://www.unoceanprediction.org



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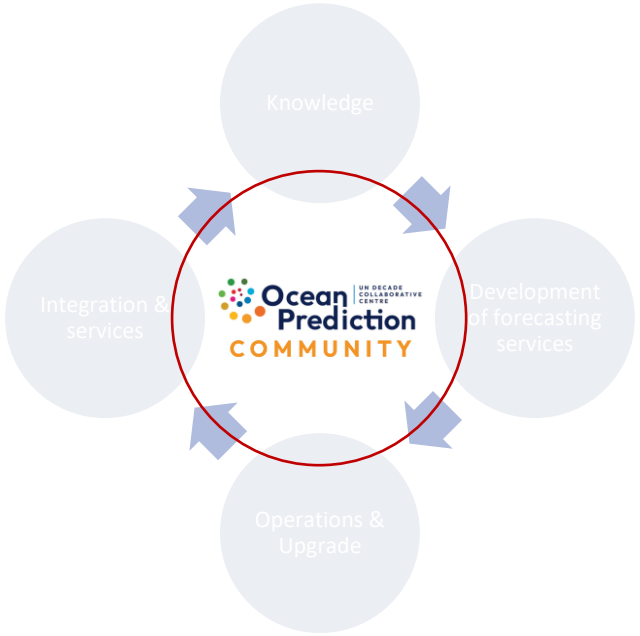
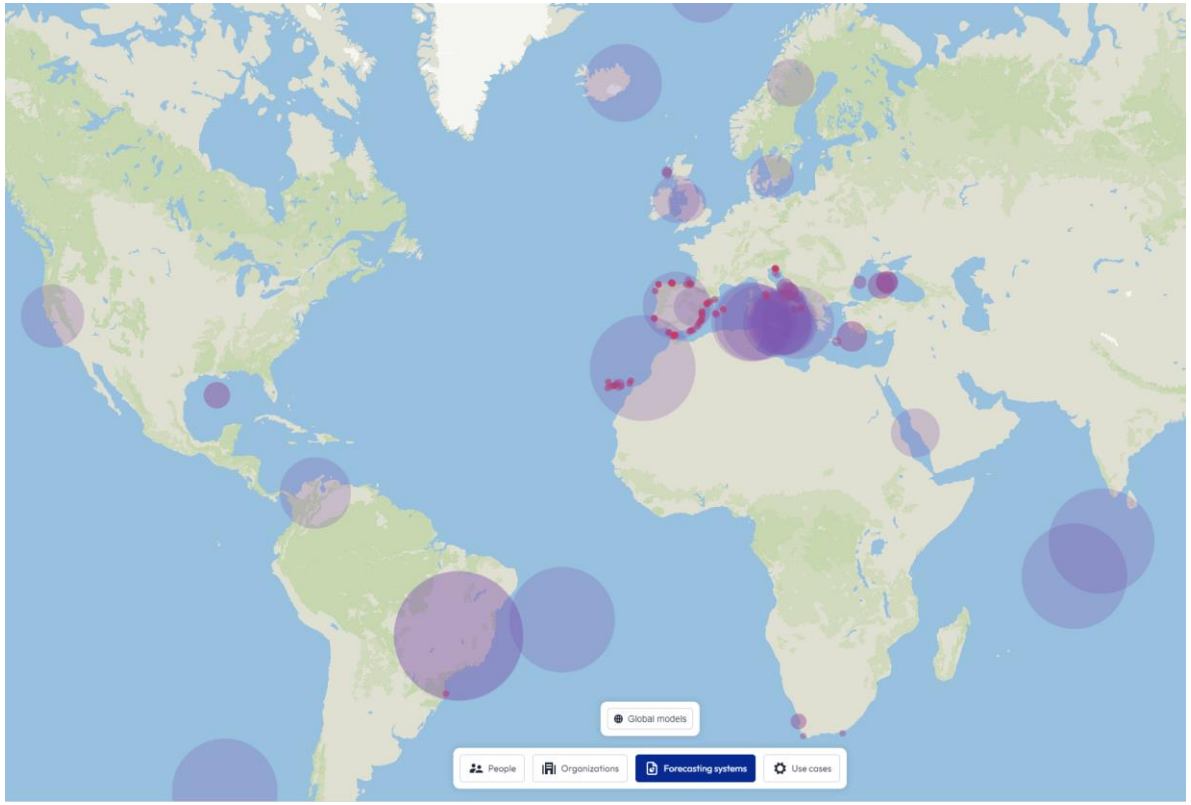


The web

The Forum

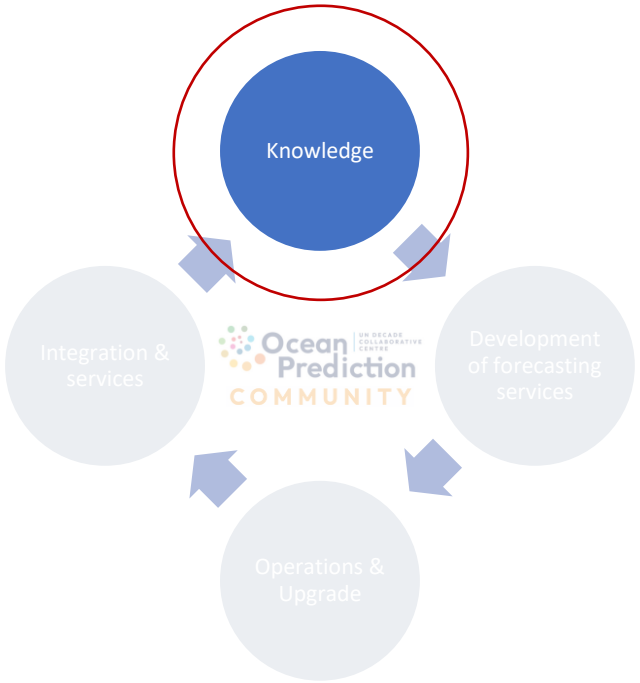
The Atlas

https://www.unoceanprediction.org/en/atlas/models

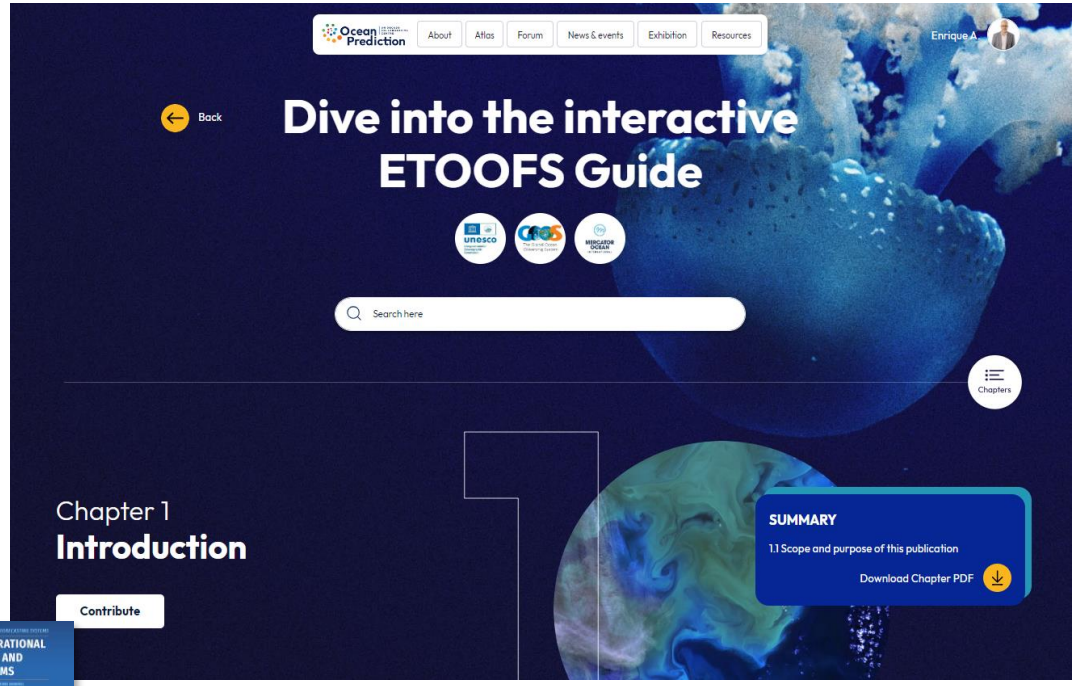


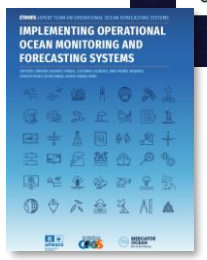
130 Systems already on the Atlas!

Building our shared knowledge



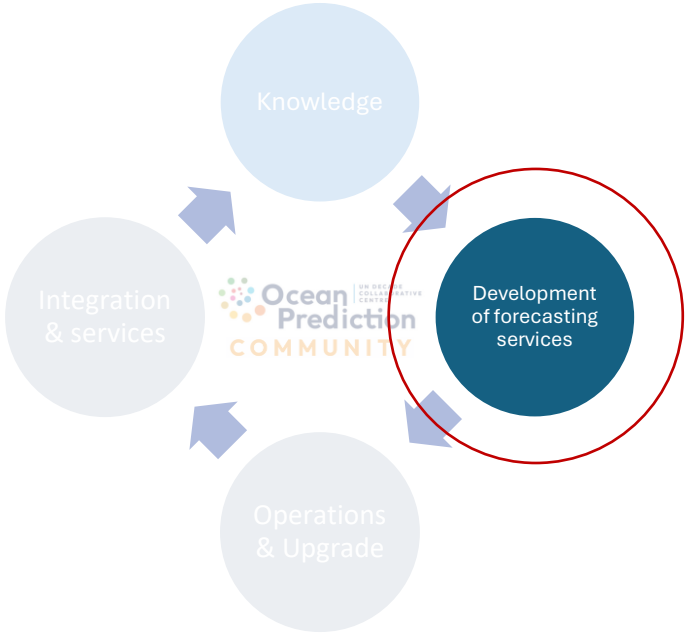
https://www.unoceanprediction.org/en/resources/etoofs-guide

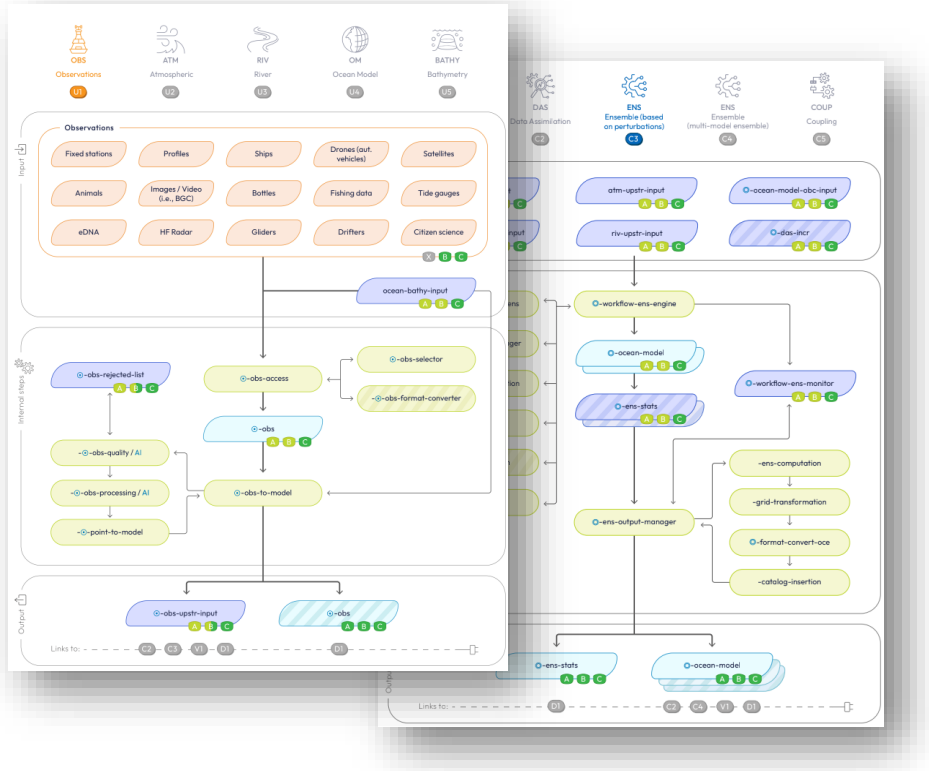




- A community compilation of our shared knowledge
- Now available on wiki format

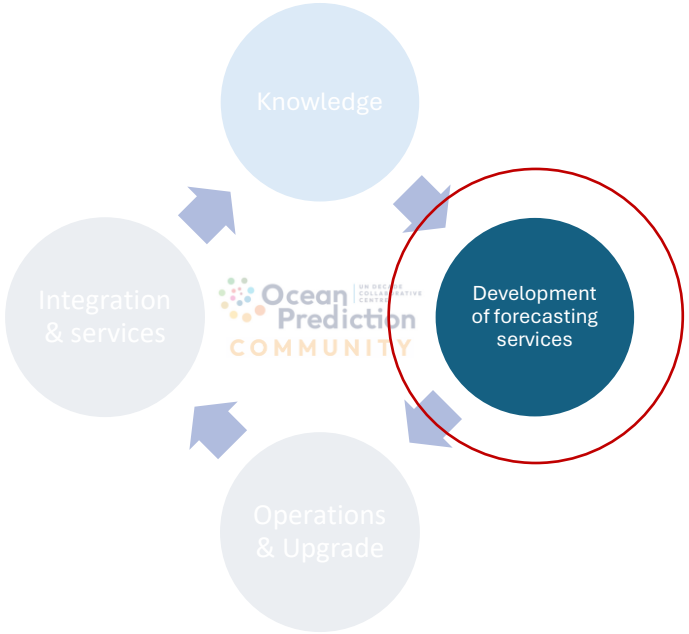
Building robust Ocean forecasting services

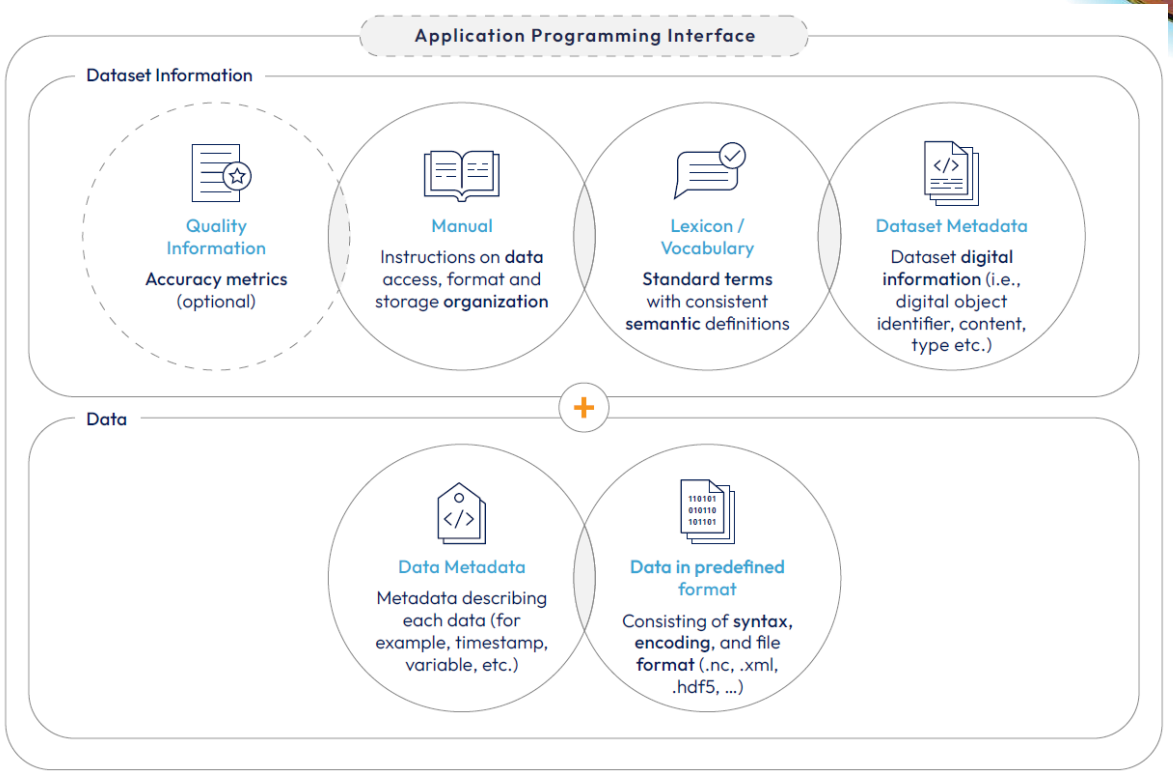




- A community product to be delivered soon by OceanPrediction DCC
- A practical Guide on how to “wire” a Forecasting System
- A definition of the tools and data standards to be developed during the Decade

Building robust Ocean forecasting services





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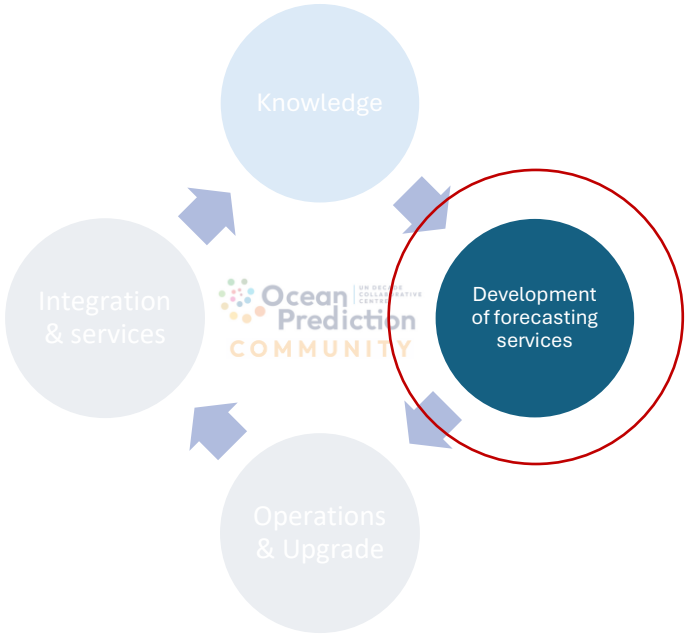
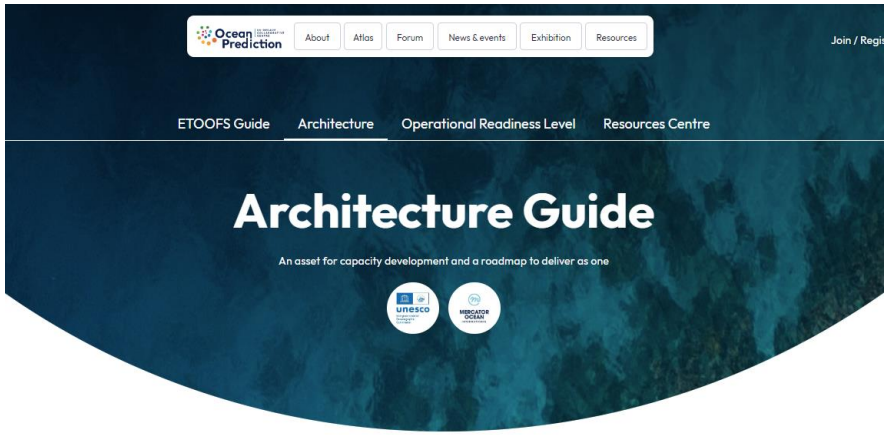
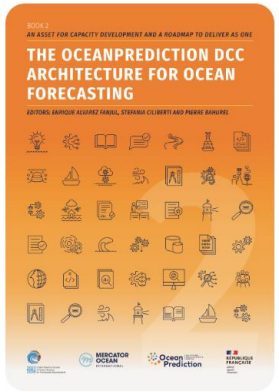






Download Guide

What is the OceanPrediction DCC architecture?

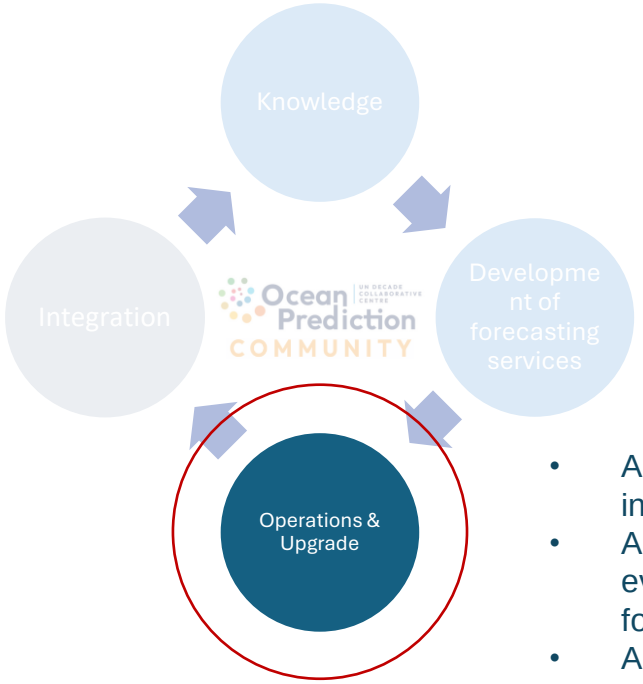
The OceanPrediction DCC architecture is a guide on how to build an Ocean forecasting system, describing the required tools and data standards, and all the required "wiring" between the different components

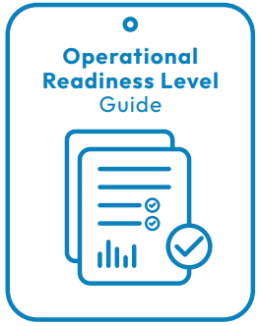
What is the rationale behind this architecture

Who will use this publication?

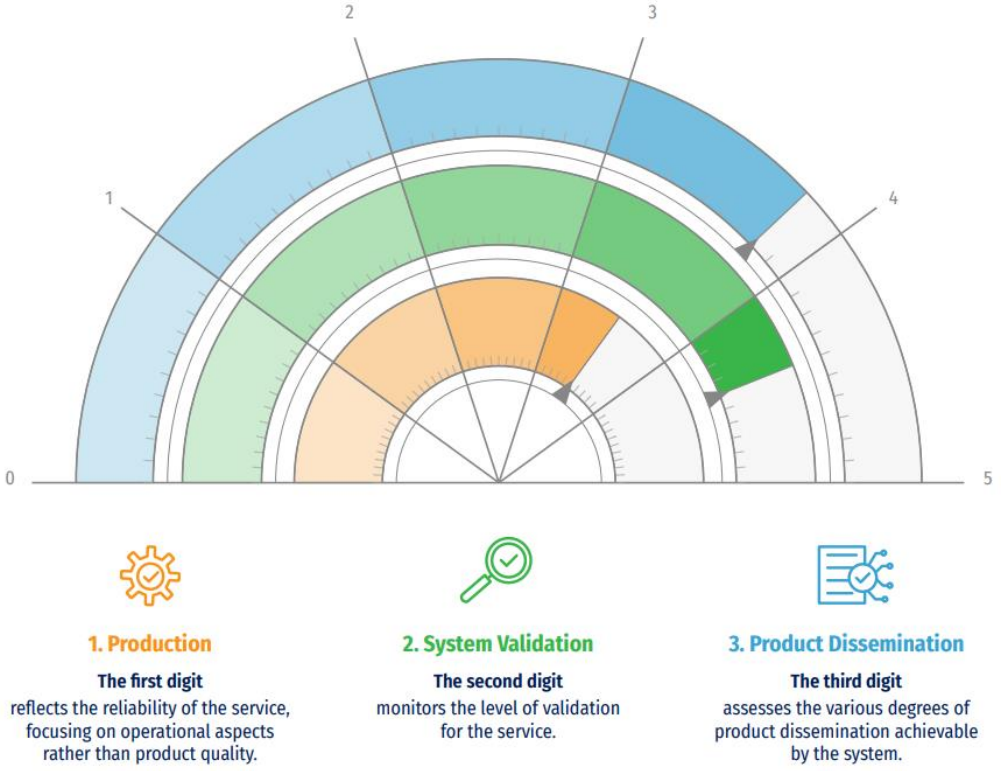
Who are the authors and editors?

Operating and improving Ocean forecasting services

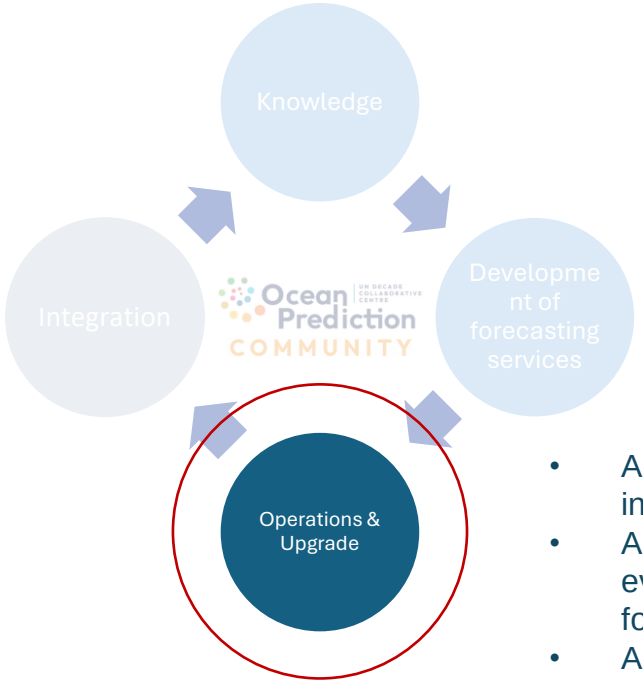




- A mechanism to introduce Best Practices
- A way to promote the evolution of Ocean forecasting
- A mechanism to endorse services to join common frameworks



Operating and improving Ocean forecasting services



Operational Readiness Level Guide

- A mechanism to introduce Best Practices
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1. PRODUCTION

Base Level 0: **Pre-operational production**

PC-0-1	Sufficient and reliable computational resources are secured for the operation of the system.
PC-0-2	The system is launched automatically by a processing chain that verifies the existence of all the required forcings and other upstream data, runs the model or AI, and archives the output.
	A basic log file is created on each forecasting cycle informing on the start and correct (or incorrect) ending of

1/6 points to the

2. VALIDATION

Base Level 0: **Non-operational validation**

VC-0-1	An offline system validation covering a period long enough to assess the quality of the solution concerning the main phenomena to be forecasted is done during the service's setup and/or pre-operational phase.

1/3 points e.

3. PRODUCT DISSEMINATION

Base Level 0: **Off-line access**

DC-0-1	Data produced by the system is stored and available to the developers for offline purposes, such as pre-operational evaluation.
DC-0-2	Historical and last forecast data can be provided to third parties under conditions (distribution rights, crediting instructions, ...) established by the data producer.
DC-0-3	Data is stored in a well-described data format, so the users can use the data easily.

Each fulfilled criteria adds 1/3 points to the level score.

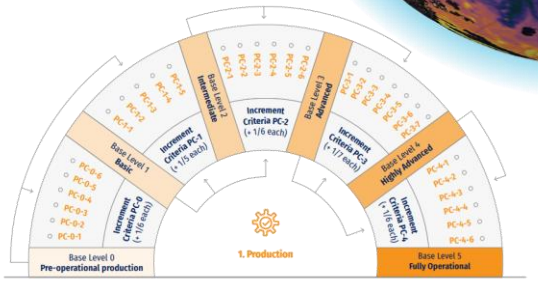
Base Level 1: **Basic**

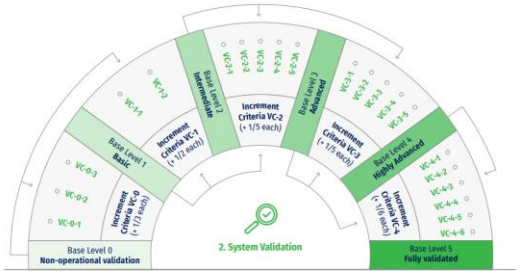
DC-1-1	The latest forecast product is distributed to users and developers in graphical format (for example via plots of time series or 2D fields in a web page).
DC-1-2	Numerical data is distributed to external users under request and using internationally agreed data standard formats (that will be considered in the future OceanPrediction DCC recommendations).
DC-1-3	A help desk operating in working hours (8 hours - 5 days per week) is available to support users.

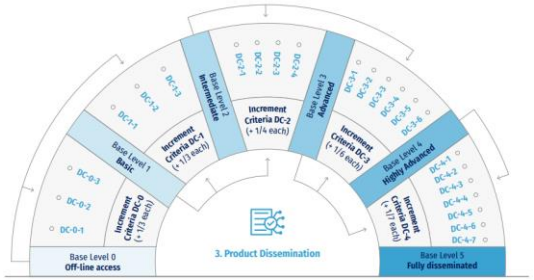
Each fulfilled criteria adds 1/3 points to the level score.

Base Level 2: **Intermediate**

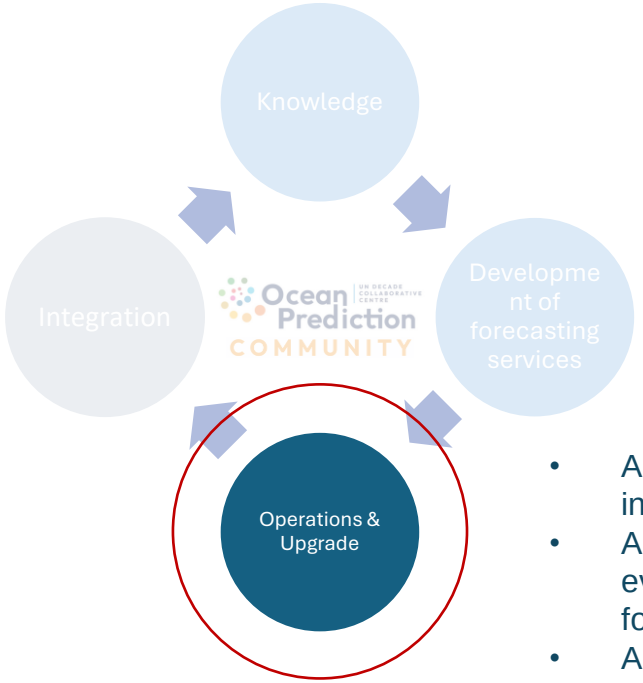
	Data from the last cycle (in numerical format following an internationally agreed Data Standard) can be ac-

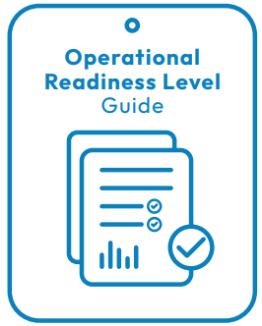






Operating and improving Ocean forecasting services





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Promoting best practices in ocean forecasting through an Operational Readiness Level

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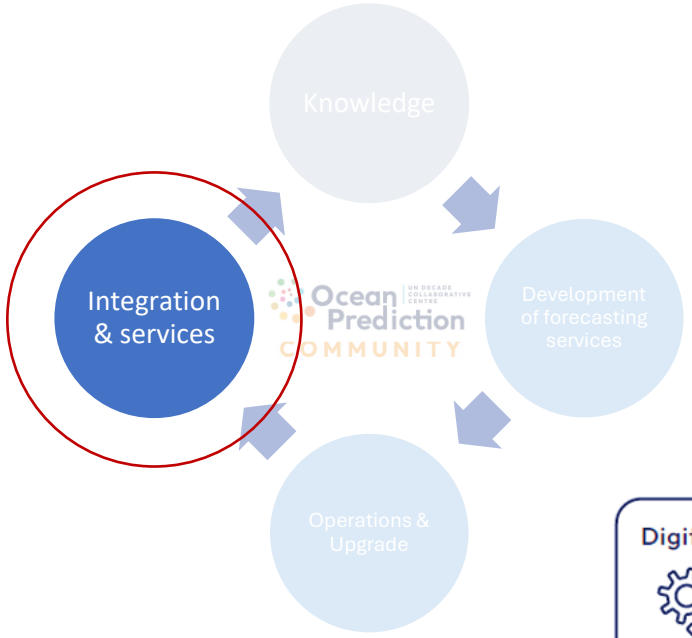
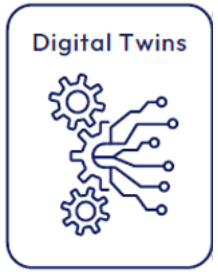
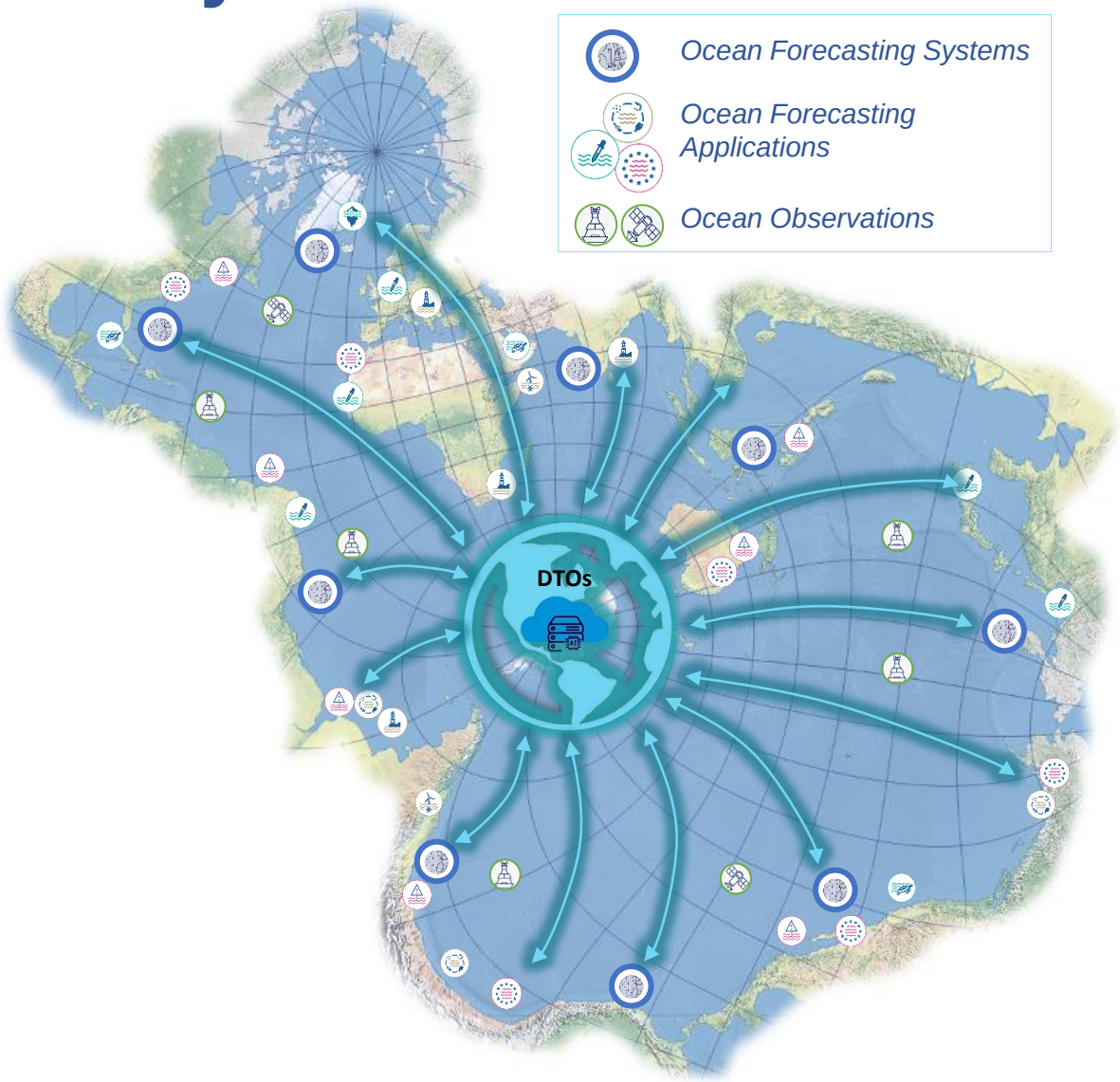
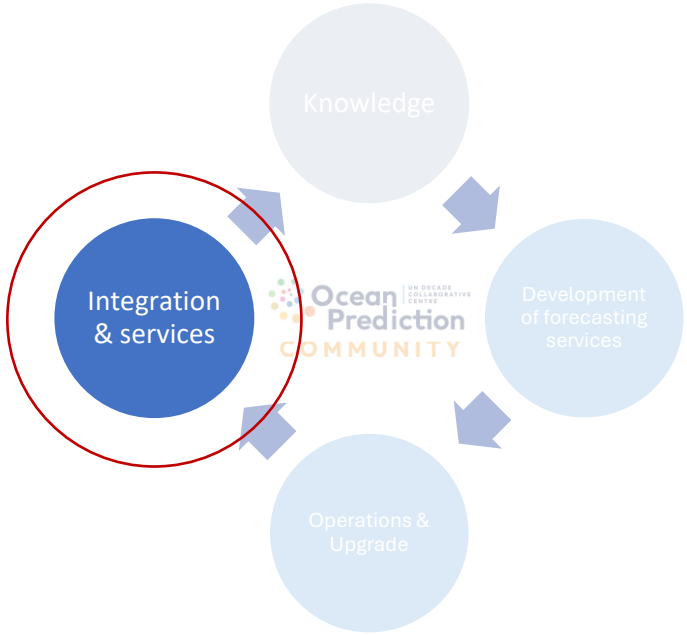
One ocean, one digital ecosystem

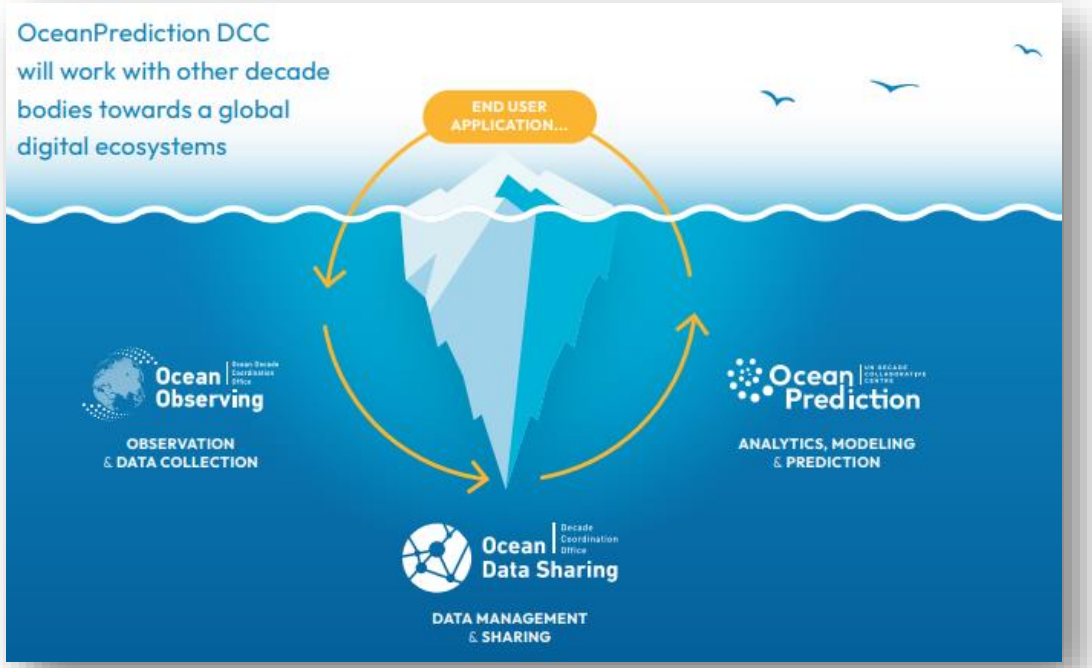






One ocean, one digital ecosystem





- Ocean Prediction Capacity of the Future – ForeSea
- DITTO – Digital Twins of the Ocean
- Ocean best practices
- GOOS | CoastPredict with The Global Ocean Observing System
- UN environment programme GEMS OCEAN
- ⋮

Conclusions

- OceanPrediction DCC will work in close collaboration with Decade partners to promote Ocean Forecasting and its applications during the Decade
- A community organized around the Regional Teams
- The first results of this effort are visible:
  - Architecture
  - ORL
  - Atlas
  - Forum
  - … more to come
- We are working with Ocean Observing DCO, Data Sharing DCO, Foresea, DITTO, CoastPredict, Best Practices, and other Decade Actions, towards a digital ecosystem for the Decade.

Join us at:

https://www.unoceanprediction.org/en

SYMPOSIUM OP'24

In partnership with unesco Intergovernmental Oceanographic Commission

2021 2030 United Nations Decade of Ocean Science for Sustainable Development

European Commission

Copernicus Marine Service

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