NECCTON

Transforming European capability to predict and protect the biodiversity of marine ecosystems

The ocean's rich biodiversity sustains the livelihoods and well-being of billions of people worldwide.

From providing food security through fisheries to supporting coastal economies and tourism, healthy marine ecosystems are vital for nearly half of the global population. However, this invaluable resource faces threats from climate change and human activities, necessitating advanced monitoring and protection efforts.

Recognising the urgent need to address the biodiversity crisis in our oceans, NECCTON is developing new modelling products focused on fisheries, pollution and benthic habitats. These products will enable the Copernicus Marine Service to better inform ocean policy makers, managers, and the public.

The central hypothesis of NECCTON is that integrating new biogeochemical and biological data into cutting-edge ecosystem models will improve the relevance and effectiveness of operational centres' products.

To achieve this, NECCTON is adopting a pioneering three-pronged approach:

- Developing new ecosystem models that tightly couple the marine processes, as well as the living and non-living components of the ocean.
- Integrating ecosystem models with satellite and in-situ data using artificial intelligence and machine learning techniques.
- Developing a framework to interlink Copernicus Marine Service models with NECCTON's ecosystem components, facilitating code and knowledge sharing.
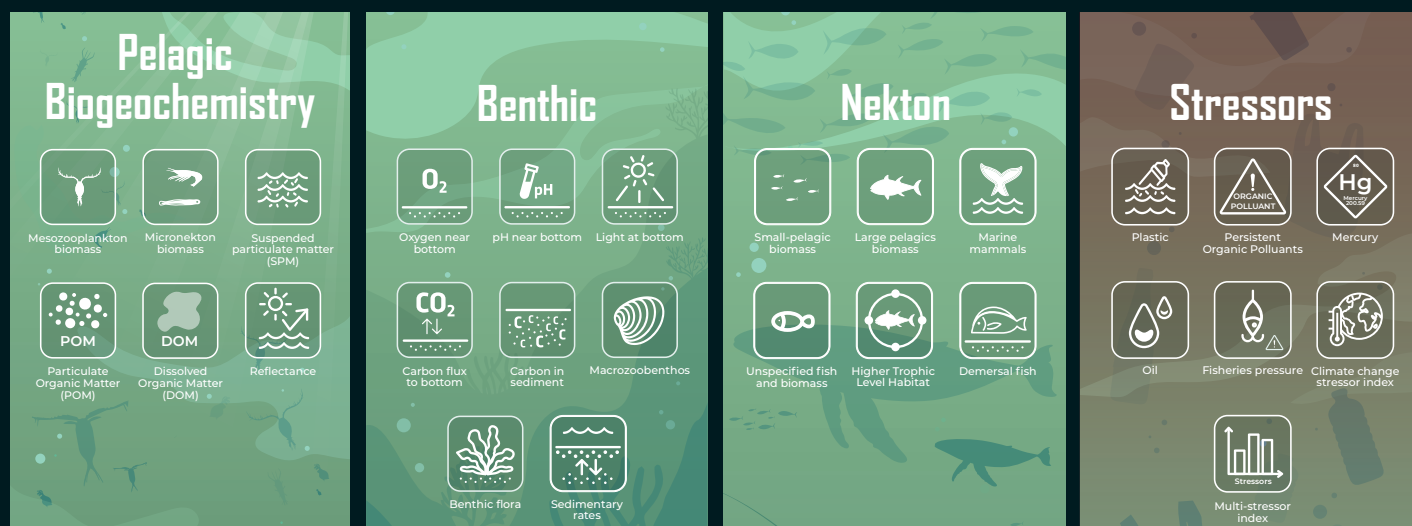
Copernicus Marine Service

This pioneering approach will advance understanding and protection of marine biodiversity and sustainable management of fisheries on a regional to global scale.

NECCTON products

At the heart of NECCTON lies the development of innovative modelling products that will revolutionise our understanding and protection of marine biodiversity and sustainable management of fisheries. These products, tailored for fisheries, pollution, and benthic habitats, represent a significant advancement in integrating multidisciplinary data and state-of-the-art modelling techniques.

Pelagic Biogeochemistry

- Mesozooplankton biomass
- Micronekton biomass
- Suspended particulate matter (SPM)
- Particulate Organic Matter (POM)
- Dissolved Organic Matter (DOM)
- Reflectance

Benthic

- Oxygen near bottom
- pH near bottom
- Light at bottom
- Carbon flux to bottom
- Carbon in sediment
- Macrozoobenthos
- Benthic flora
- Sedimentary rates

Nekton

- Small-pelagic biomass
- Large pelagics biomass
- Marine mammals
- Unspecified fish and biomass
- Higher Trophic Level Habitat
- Demersal fish

Stressors

- Plastic
- Persistent Organic Pollutants
- Mercury
- Oil
- Fisheries pressure
- Climate change stressor index
- Multi-stressor index

Explore the NECCTON product catalogue at www.neccton.eu/products

Case studies

NECCTON is conducting a diverse array of case studies to test, validate, and demonstrate the capabilities and readiness level of its modelling products. These real-world applications cover a wide range of topics, from understanding the impacts of human activities to developing strategies for ecosystem conservation and sustainable resource management.

The case studies showcase the power of NECCTON's modelling approach, integrating environmental and biological data to provide comprehensive insights into complex marine systems.

Highlights from NECCTON's case studies include:

- Mapping biodiversity hotspots for improved fisheries management
- Investigating the role of Marine Protected Areas in conserving biodiversity
- Modelling and forecasting pollution transport to protect aquaculture farms

Through these diverse case studies, NECCTON will demonstrate the practical applications of its cutting-edge models and products, with possible future use in digital twins of the ocean, and empowering stakeholders with the knowledge and tools needed to make informed decisions for the sustainable management of our oceans.

UN Ocean Decade

NECCTON has received endorsement from the UN Ocean Decade Initiative as a contributing project under the Marine Life 2030 programme.

As part of Marine Life 2030, NECCTON will create and share products, tools and standards. This interdisciplinary approach will contribute tackling the Challenges 2 (Protect and restore ecosystems and biodiversity), 3 (Sustainably feed the global population) and 5 (Unlock ocean-based solutions to climate change) of the UN Ocean Decade.

NECCTON collaborates with the Decade Collaborative Center for Ocean Prediction to define standards for marine ecosystem models and products, helping to make this information and expertise available for worldwide use.

2021 2030 United Nations Decade of Ocean Science for Sustainable Development

NECCTON partners

NECCTON brings together a multidisciplinary consortium of leading research institutions, universities, and enterprise partners from across Europe, coordinated by Mercator Ocean International, drawing on their collective expertise to tackle the challenges facing marine biodiversity conservation.