



DTO-BioFlow

Integration of biodiversity monitoring
data into the Digital Twin Ocean



dto-bioflow.eu

**EXPLORE MORE
USE CASES**



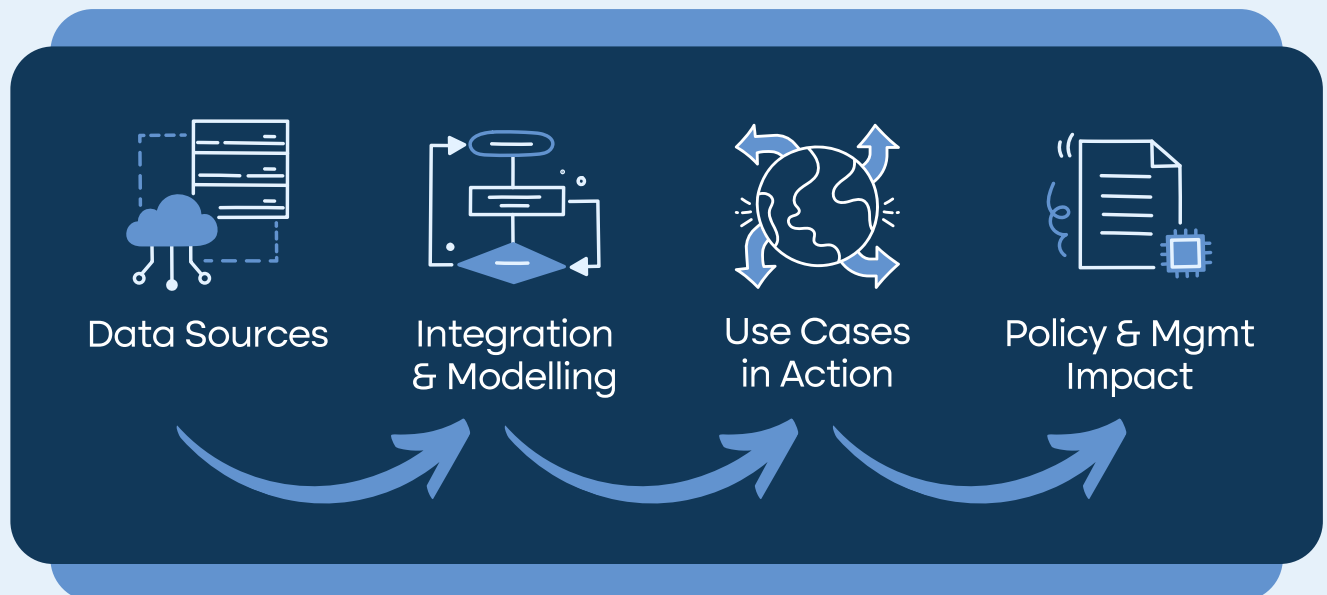
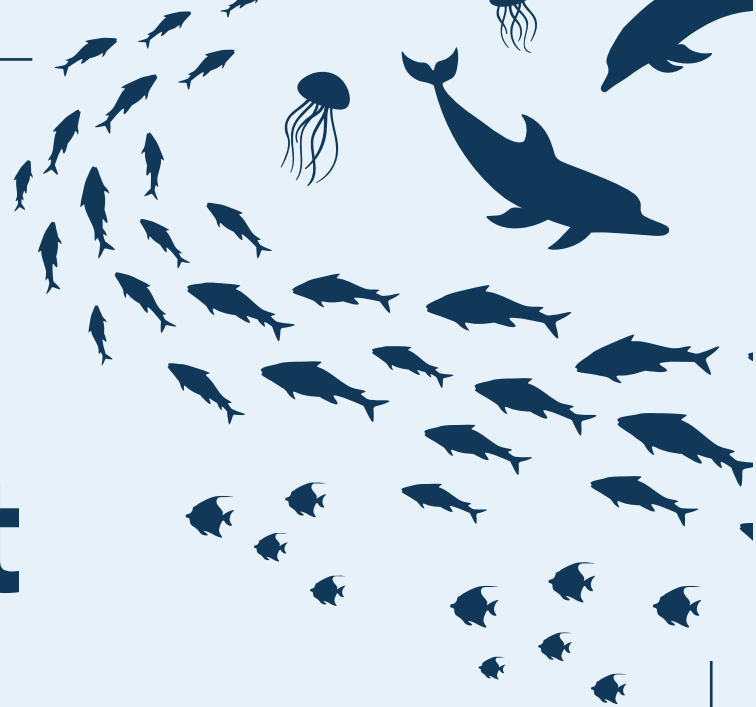
From Data to Decisions: DTO-BioFlow Use Cases

DUC 6 - Tracking Plankton Biomass
to Strengthen Ocean Governance



Funded by
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From Insight to Impact



The Demonstrator Use Cases (DUCs) are at the heart of the DTO-BioFlow initiative, translating complex scientific capabilities into tangible digital solutions for marine biodiversity monitoring and management.

Designed to showcase the power of an **end-to-end digital approach**, these use cases connect cutting-edge biodiversity observations with AI-enhanced models, analytical tools, and the infrastructure of the Digital Twin of the Ocean (DTO).

Each DUC serves as a living example of how real-world marine challenges can be addressed through integrated digital workflows. They all address a pressing challenge for ocean sustainability and propose an integrated, evidence-based solution.



DUC 6 focuses on the lower-trophic level biomass monitoring for ocean governance.

Zooplankton such as *Calanus* species form a vital link in marine food webs and act as key indicators of ocean health. This use case builds a continuous **monitoring system to track plankton biomass** at high resolution using acoustic and optical sensors, supporting data-informed governance decisions like fishing quotas and marine traffic management.

Challenge

Traditional methods for monitoring plankton biomass are limited in scope and frequency.

Sparse patchy distributions and environmental variability mean plankton are poorly represented in governance datasets, hindering timely decision-making.



Solution

This DUC deploys acoustic echosounders and optical cameras on autonomous platforms to capture real-time plankton biomass.

Data-driven sensor fusion and particle tracking models provide continuous updates on biomass distribution, supporting responsive ocean governance and ecosystem understanding

Data and monitoring networks used

Ocean observations, Satellite imagery, oceanographic data, Optical sensors (SilCam).



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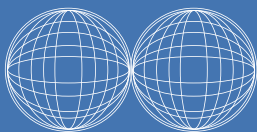
OpenDrift

Expected Outputs

Interactive maps

Decision dashboards for regulators

Ongoing publicly accessible data streams



Digital Twin Capabilities Demonstrated

- **Event detection:** Real-time tracking of plankton blooms and mass events
- **Governance support:** Dashboards linking biomass trends to decision-making contexts
- **Gap identification:** Pinpoints spatial and temporal data shortages in plankton monitoring

Useful for

- Fishing regulators
- Port and maritime authorities
- Ocean governance bodies

Learn more on development and read the publications

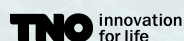




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