



Let's talk about Marine Biodiversity

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Inspire Area – European Digital Ocean Pavilion

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Abstract

BGC-Argo & biodiversity

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Ocean biodiversity, from phytoplankton to higher trophic levels, underpins key ecosystem services such as carbon cycling and climate regulation. Monitoring this biodiversity across spatial and temporal scales is increasingly urgent in the face of accelerating environmental change. The BGC-Argo program, through a global array of autonomous profiling floats, offers a transformative tool to observe ocean biogeochemistry and biological variability from the surface to the mesopelagic zone.

At the base of the food web, phytoplankton diversity and productivity benefit from the synergy between BGC-Argo bio-optical sensors (e.g., chlorophyll-a, backscattering, hyperspectral radiometry) and satellite ocean color observations. This integration enables the development of 3D and 4D products that capture both surface dynamics and vertical structure, improving our understanding of phytoplankton community composition, bloom phenology, and their role in carbon export.

While upper trophic levels remain challenging to monitor, emerging technologies—such as AI-enhanced imaging systems and acoustic sensors tested on BGC-Argo floats—offer promising avenues for functional group identification. Together, these advances pave the way for more holistic biodiversity assessments.

The enhanced BGC-Argo system strengthens the scientific basis for ecosystem-based management, supporting biodiversity conservation, marine spatial planning, and the evaluation of nature-based solutions such as marine carbon dioxide removal (mCDR).

