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Palacz AP et al. (2024). Towards a Marine Organic Carbon Atlas. 2024 Arctic Science Summit Week, Edinburgh, UK; 21.03.2024. 10.5281/zenodo.10908471

Towards a Marine Organic Carbon Atlas

A case study for the Arctic Ocean

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1. IOPAN, Poland, 2. Mercator Ocean, France, 3. DTU-Aqua, Denmark, 4. Uppsala University, Sweden, 5. IOCCP, Poland, 6. Aix Marseille Univ, France, 7. QUML, UK, 8. NOC, UK, 9. CSIC, Spain, 10. NIVA, Norway, 11. UiT, Norway, 12. NERSC, Norway

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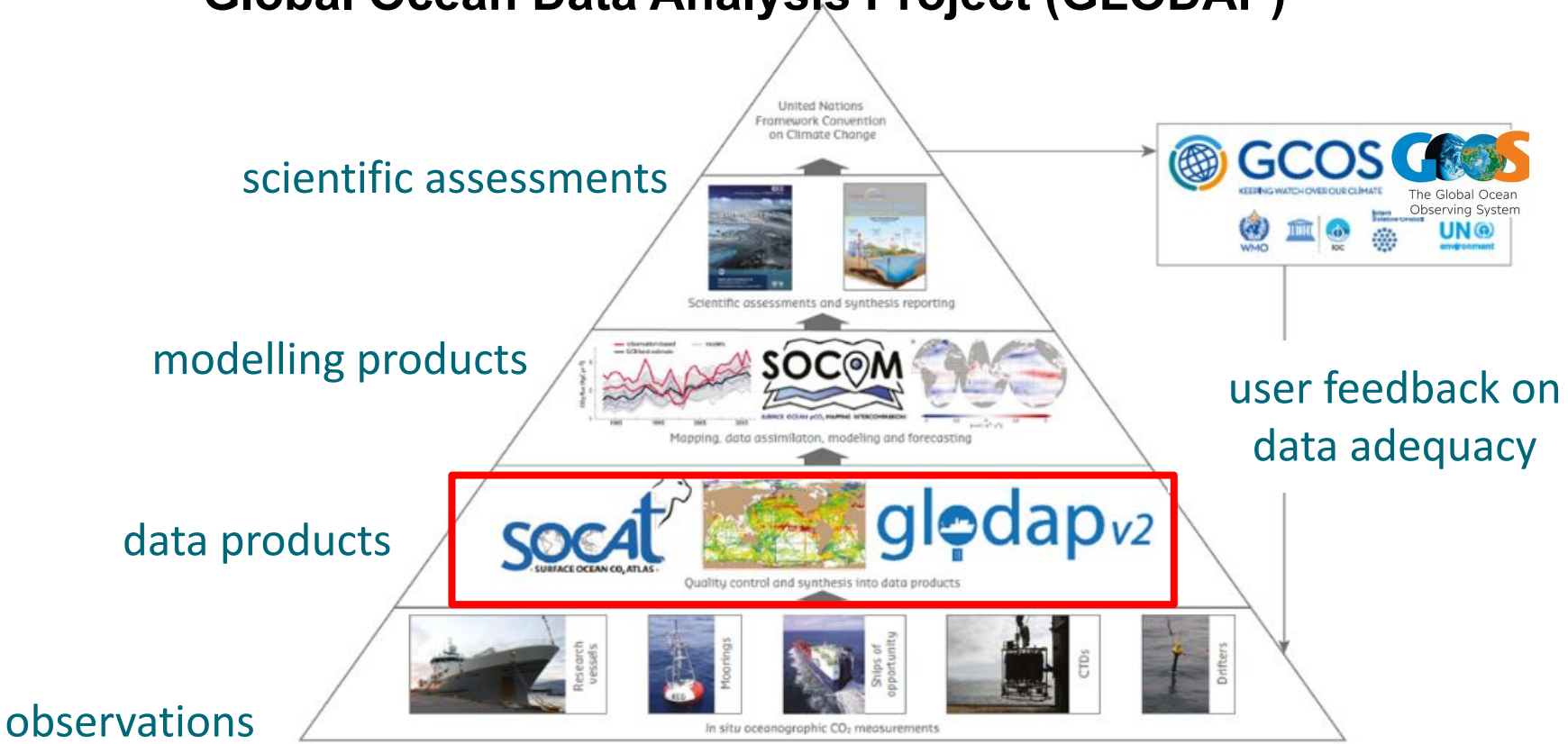
Pan-Arctic DBO meeting
ASSW 2024, Edinburgh
21 March 2024

Inspired by the success of the Surface Ocean CO_2 Atlas (SOCAT) & the Global Ocean Data Analysis Project (GLODAP)



Key questions for the next decade of ocean carbon research

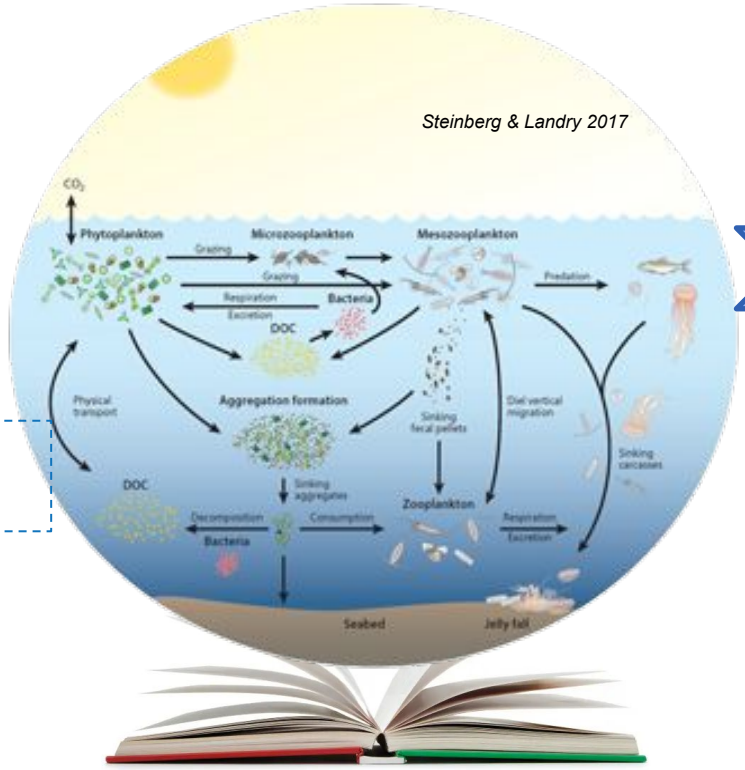
- Will the ocean uptake of anthropogenic CO_2 continue as primarily an abiotic process?
- **What is the (changing) role of biology in the ocean carbon cycle?**
- What are the exchanges of carbon between the land-ocean-ice continuum and how are they evolving over time?
- How are humans altering the ocean carbon cycle and resulting feedbacks?

http://www.ioccp.org/images/D2backgroundDoc/IOCR_WG_Report_2021.pdf

Vision for a Marine Organic Carbon Atlas (MOCA)

Role of (changing) biology in the ocean carbon cycle understood & modelled

- C uptake
- C export
- **C recycling**
- **C burial**



(ORGANIC) CARBON OBSERVATIONS

BIOGEOCHEMICAL MODELING

BIOLOGY & ECOSYSTEMS MODELING

Biogenic Data Products to Advance Ocean Carbon Sequestration Modelling in the Arctic

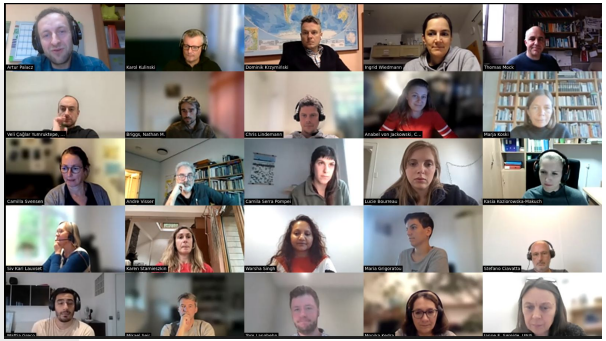
JOIN US

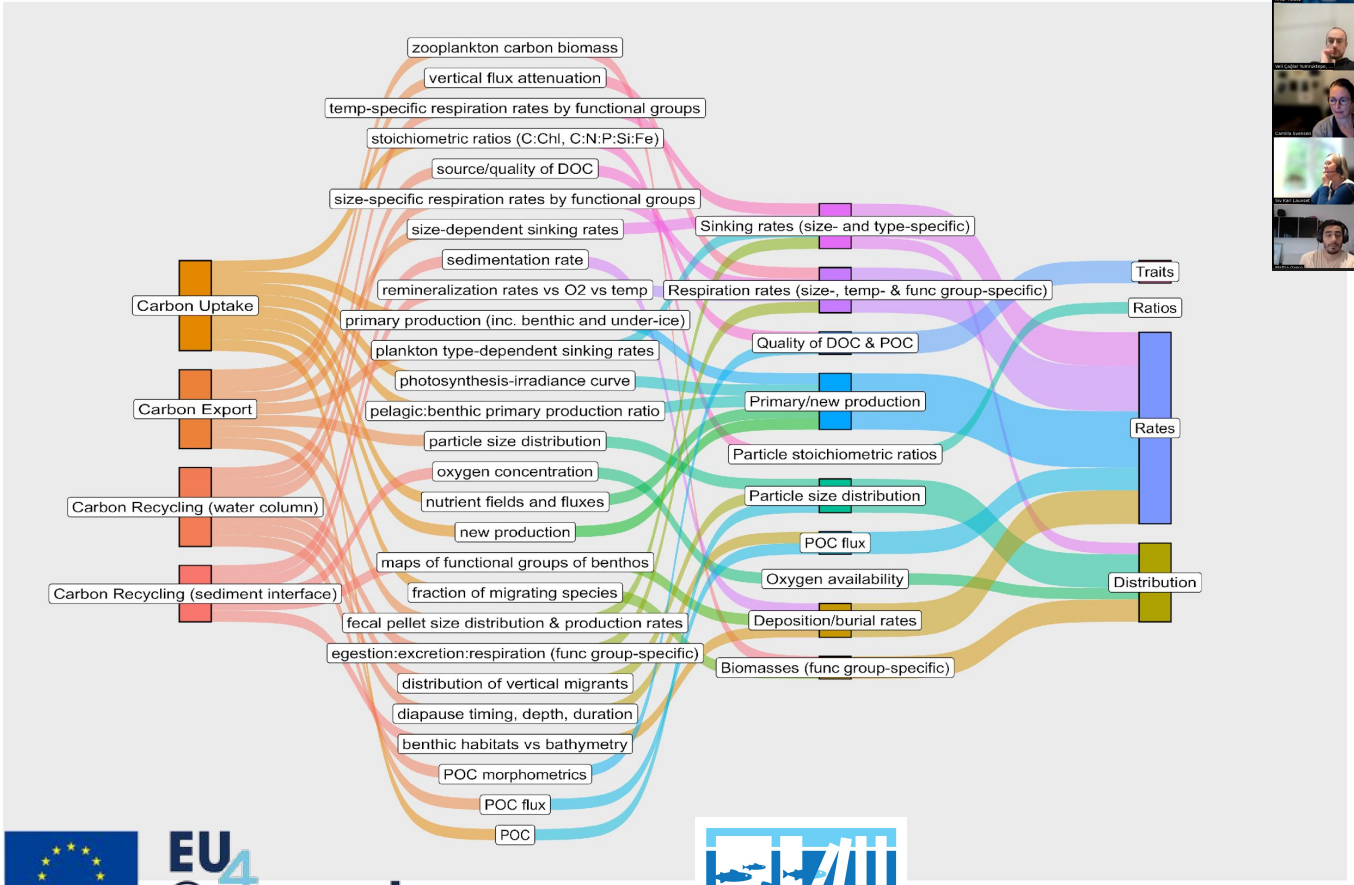
1 Survey

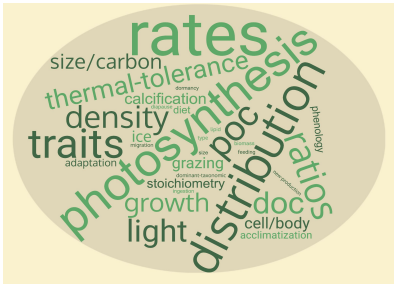
2 Community online workshop

3 Scientific Paper

“Top 10” biogenic data product needs







RATES, FLUXES & TRAITS
on top of stocks

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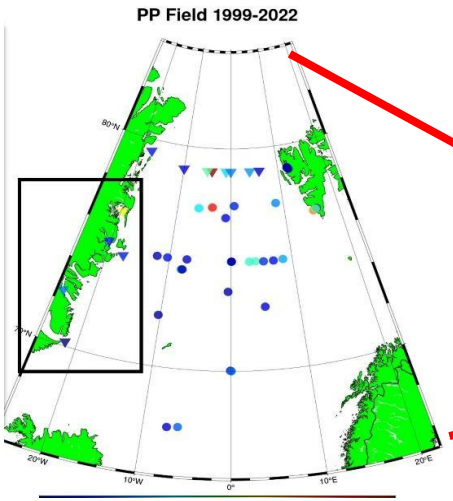
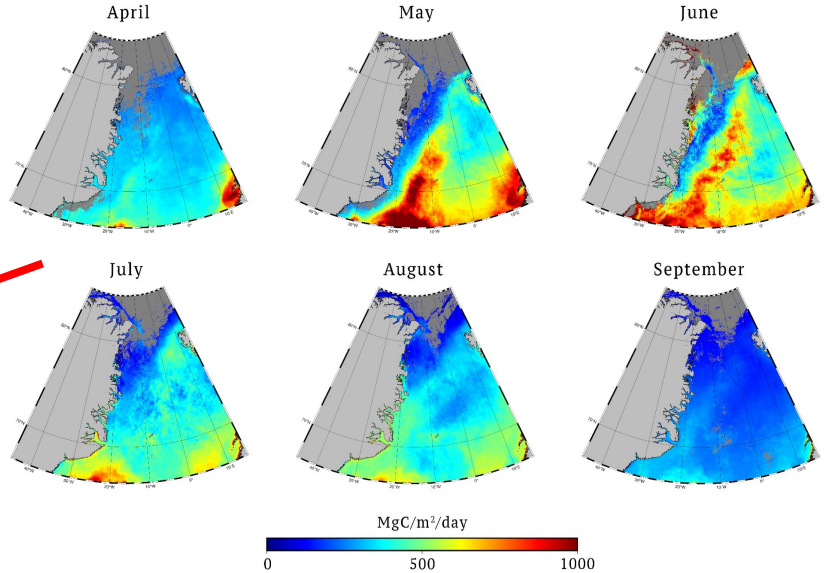
EU4 OceanObs
INTERNATIONAL OCEAN GOVERNANCE
EU COMPONENT TO GLOBAL OCEAN OBSERVATIONS

ECOTIP

Primary and production, size/functional type distributions

based on data mining and satellite model development…





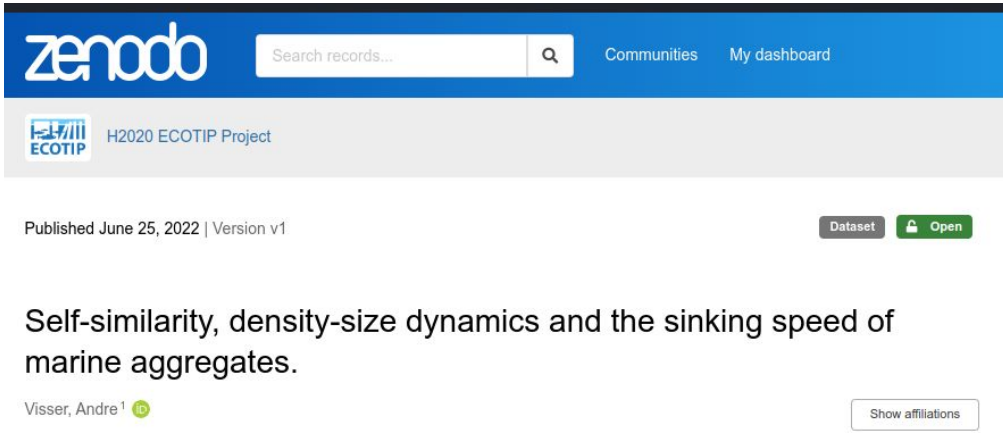
- 20 years of in situ primary production data
- 20 years of HPLC phyto pigment data
  --> >80 satellite match-ups!

Dragańska-Deja et al. (submitted), Stoń-Egiert et al. (in prep.)

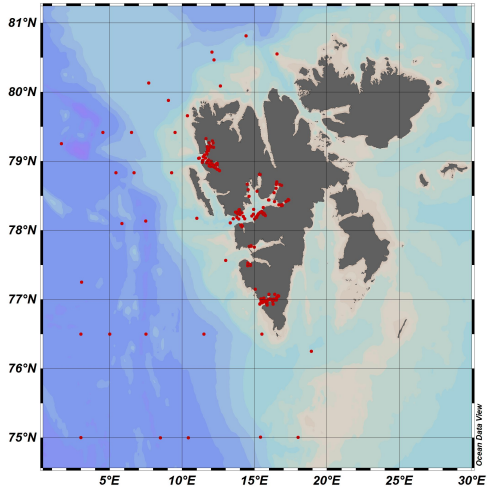
Satellite PP model for the Greenland Sea

Cherkasheva et al. (in review), doi.org/10.5194/egusphere-2023-2495, 2023.

…. but equally important products on DOM, POC, plankton biomass as well as sinking rates, respiration and consumption rates, burial rates



Visser, A. (2022). doi.org/10.5281/zenodo.6731389



> 1,200 DOC samples, 300 stations

Koziorowska-Makuch et al. (in prep.)

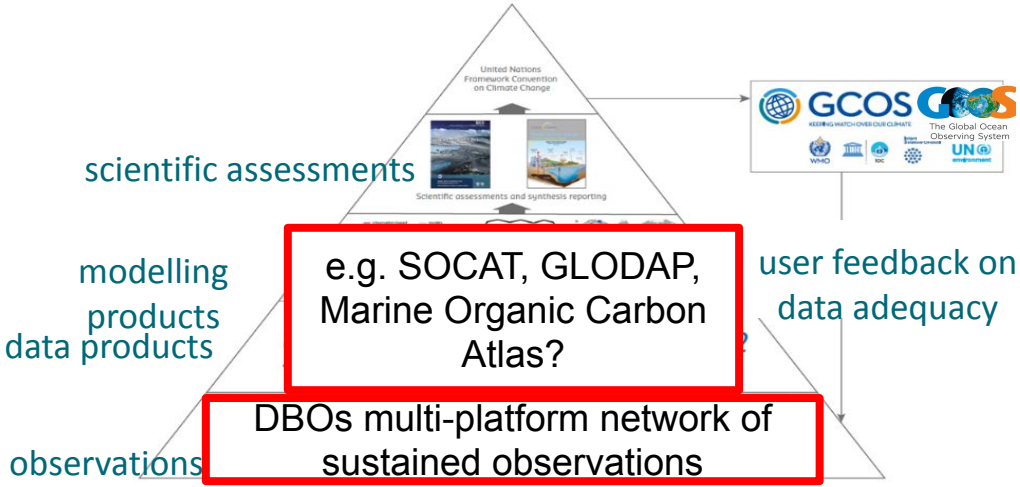
Why MOCA & DBOs?

Need to maximize the value and impact of each observation

Long-term data synthesis product development relies on steady flow of quality data.

DBOs provide unprecedented coordination of multi-platform BGC and BioEco observations

Better integration of biodiversity and climate observations and modelling



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