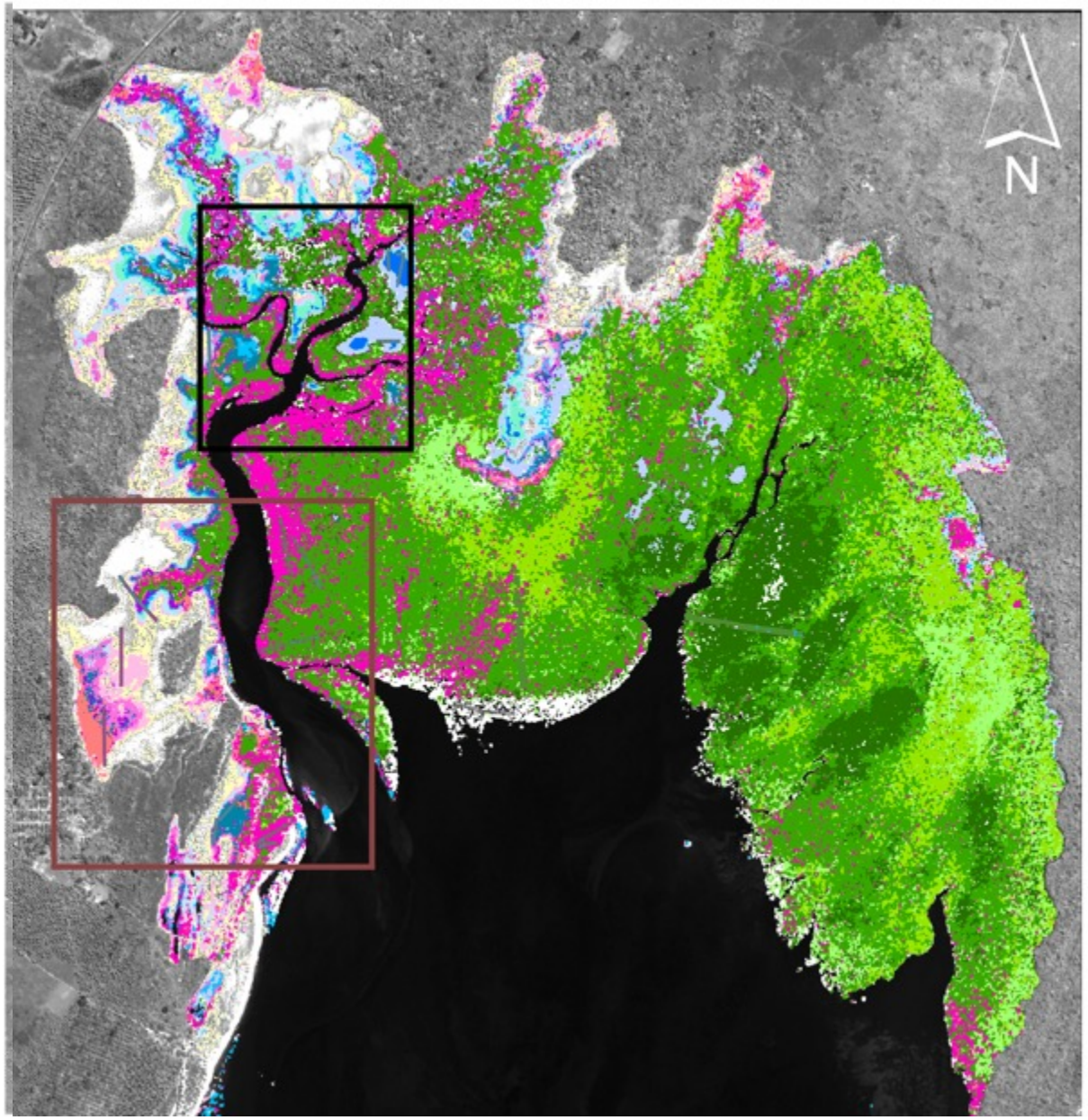
2021: A SCIENCE ODYSSEY

by Griet Neukermans

A 15-year journey across oceans & seas
and the return home

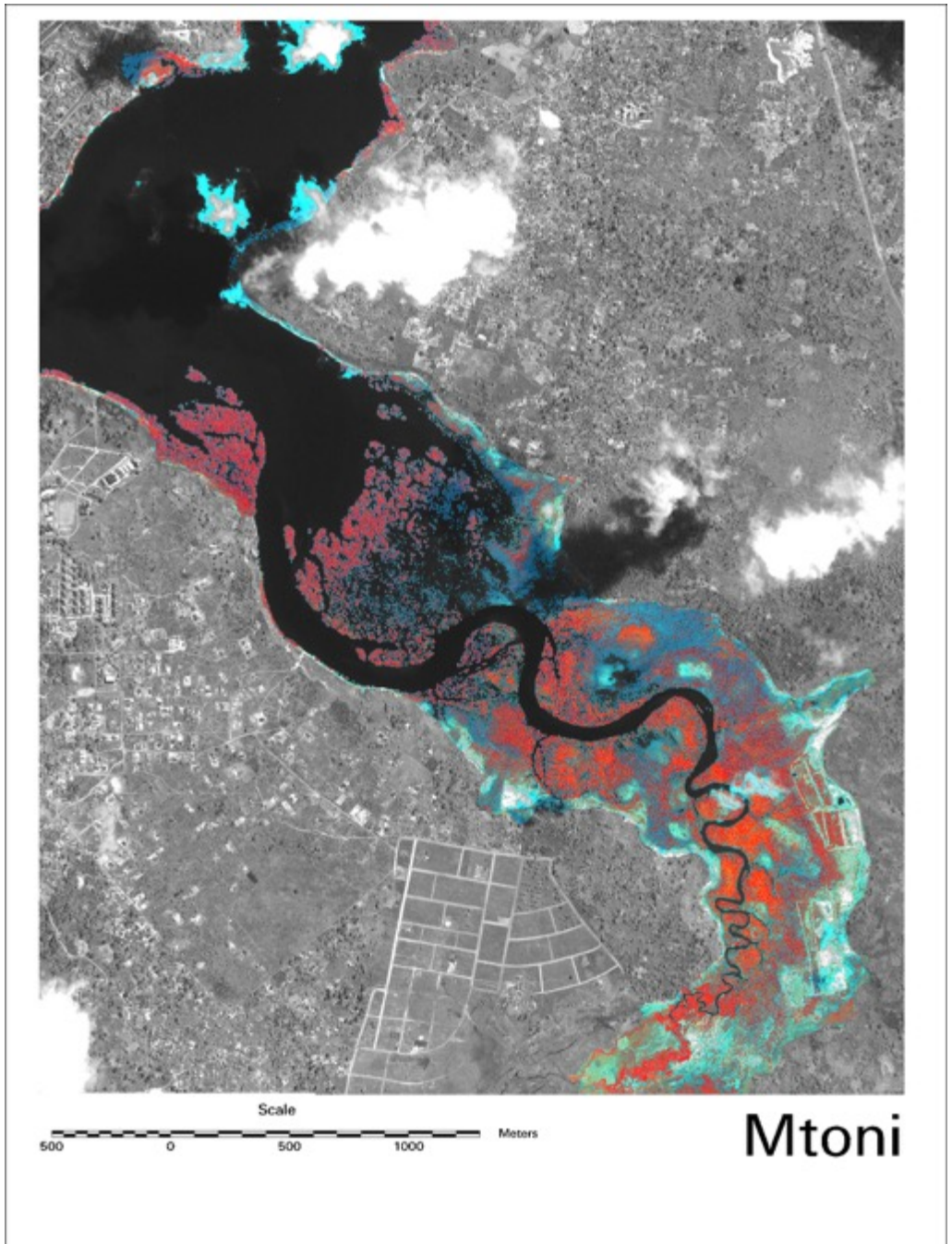
Master thesis Oceans and Lakes (VUB, Belgium) ← Master degree in applied mathematics (VUB)

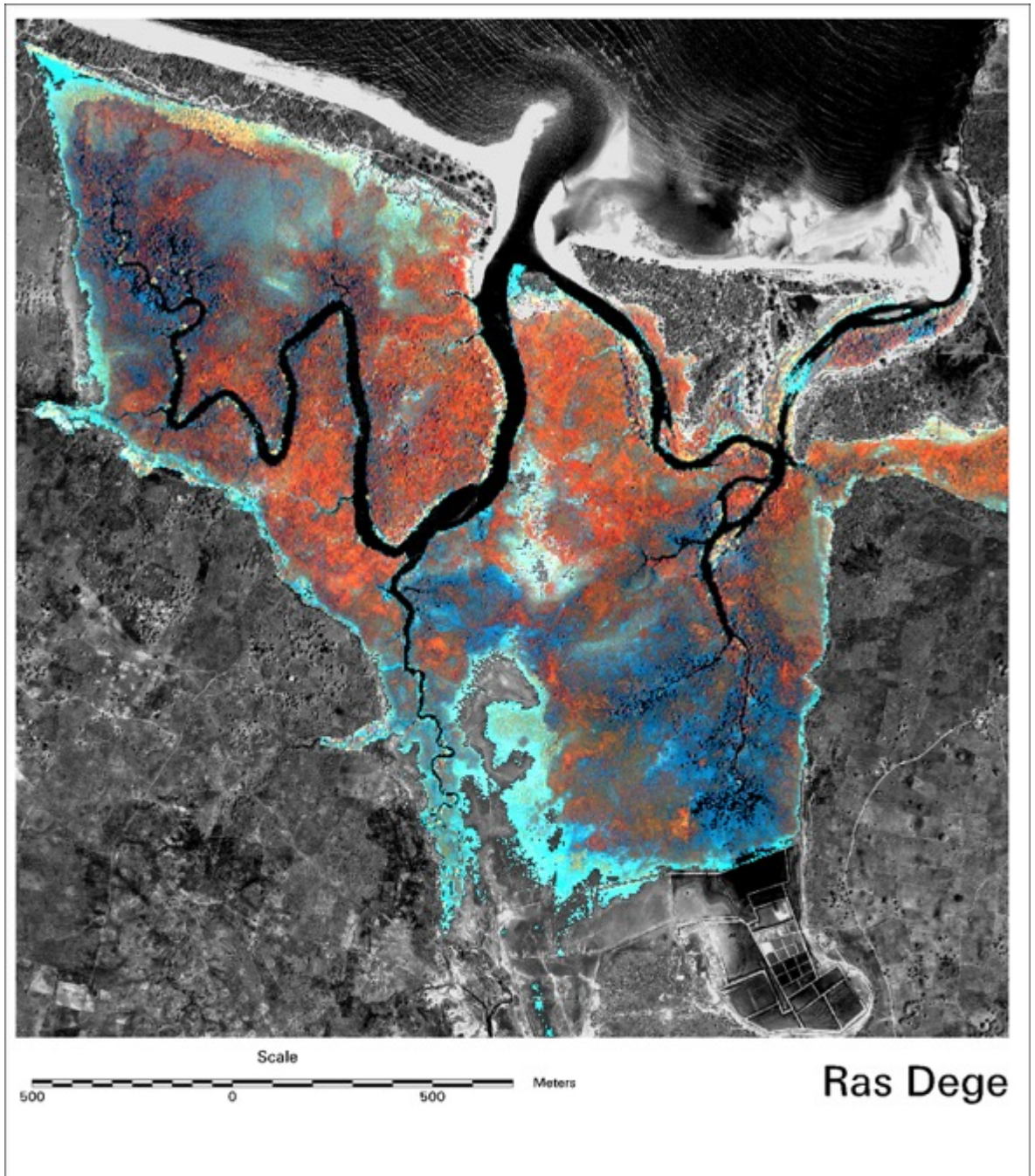


Gazi Bay

Neukermans et al. (2009)

PhD 1. Mangrove vegetation dynamics in East Africa (VUB, Belgium)

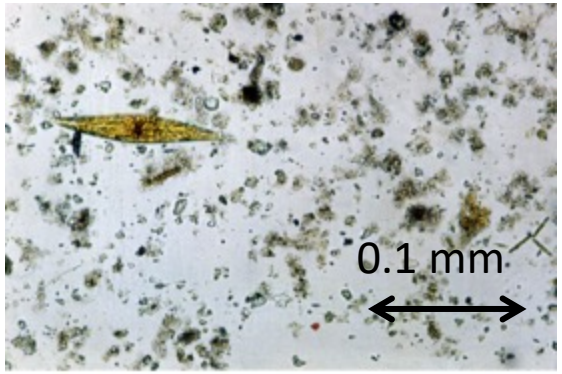




PhD 2. Optical properties and remote sensing of suspended particles in coastal waters

Ocean colour remote sensing and marine optics

Suspended particles



Submicron to mm sizes

Phytoplankton cells, detritus, sediments, aggregates

museum
Operational Directorate Natural Environment
OD Nature | OD Natuur | DO Nature

ulco UNIVERSITÉ DU LITTORAL CÔTE D'OPALE

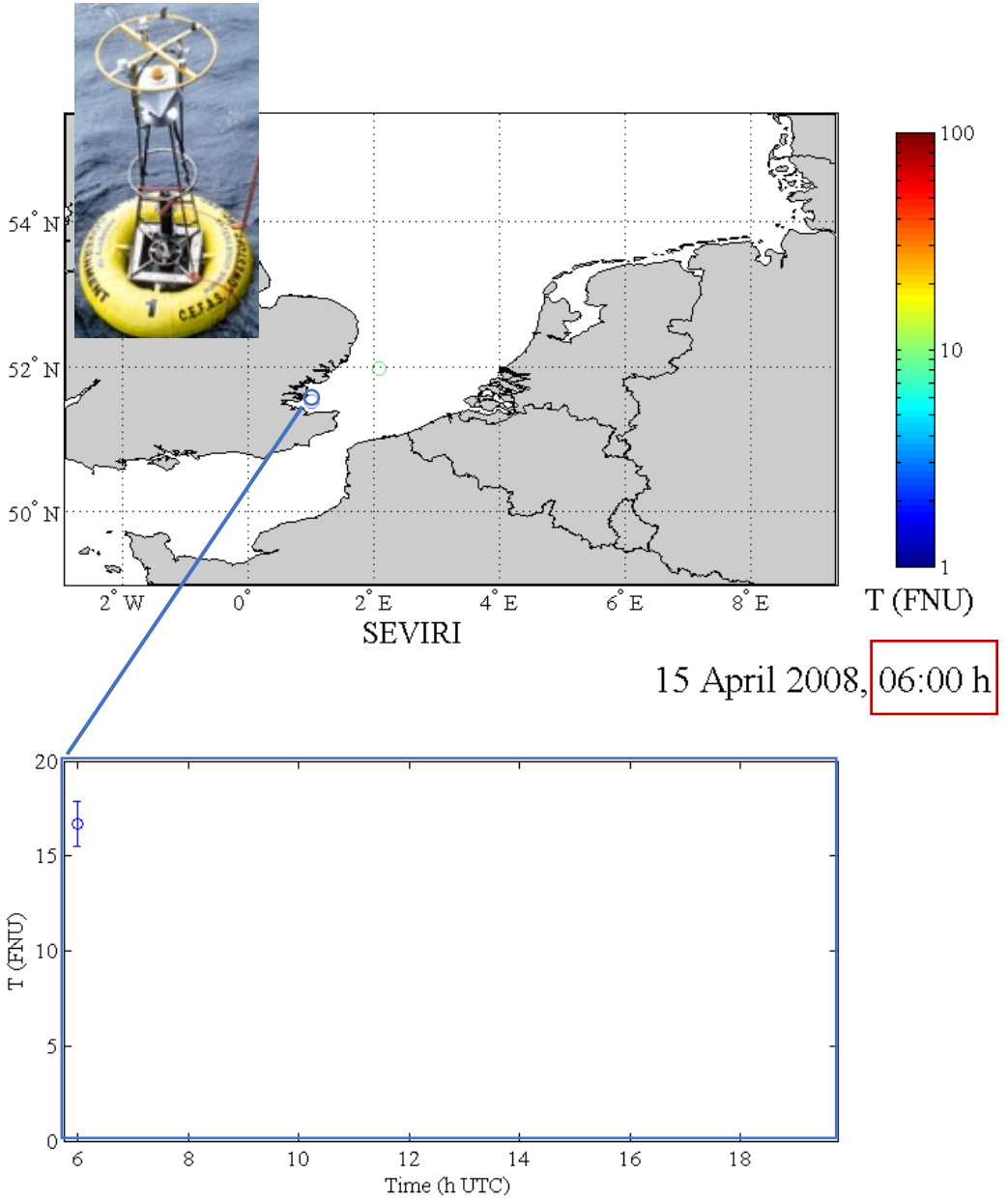
Can we retrieve marine reflectance from an optical weather satellite in Geostationary orbit?

Low-Earth Orbit
Ocean colour satellites
1 image per day

Geostationary Orbit
Weather satellites
1 image every 15 minutes

Proof of concept for observing the ocean from a satellite in geostationary orbit

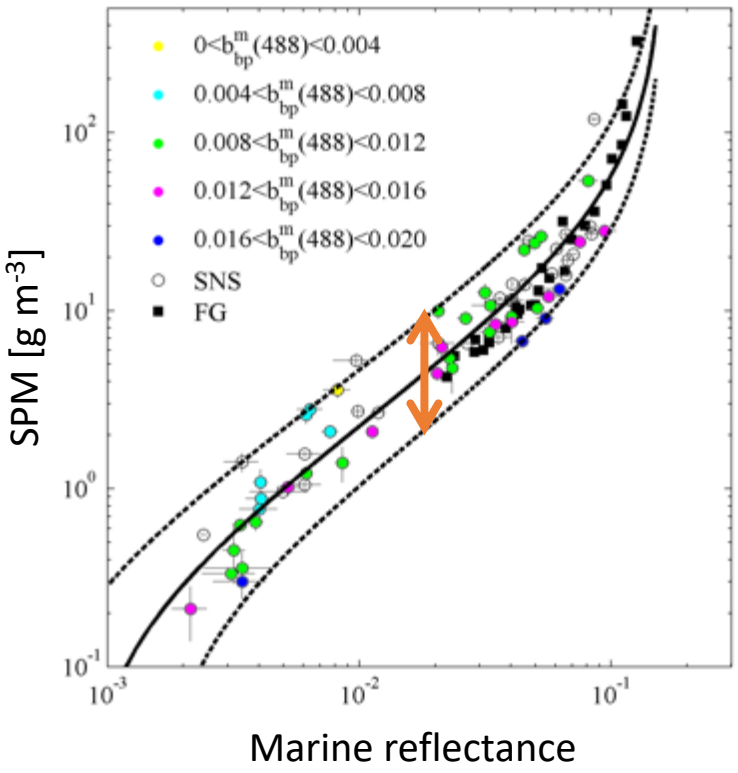
EUMETSAT plans to provide **operational water quality products** from next generation of geostationary weather satellites, to be launched in 2022.



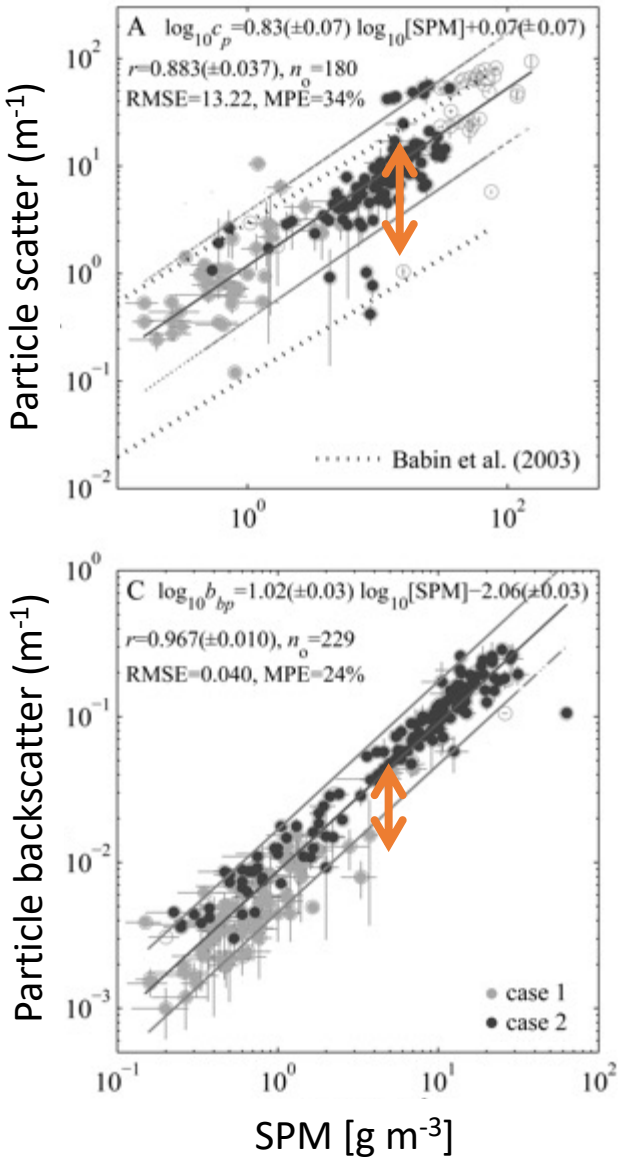
Neukermans et al. (2009, 2012a)

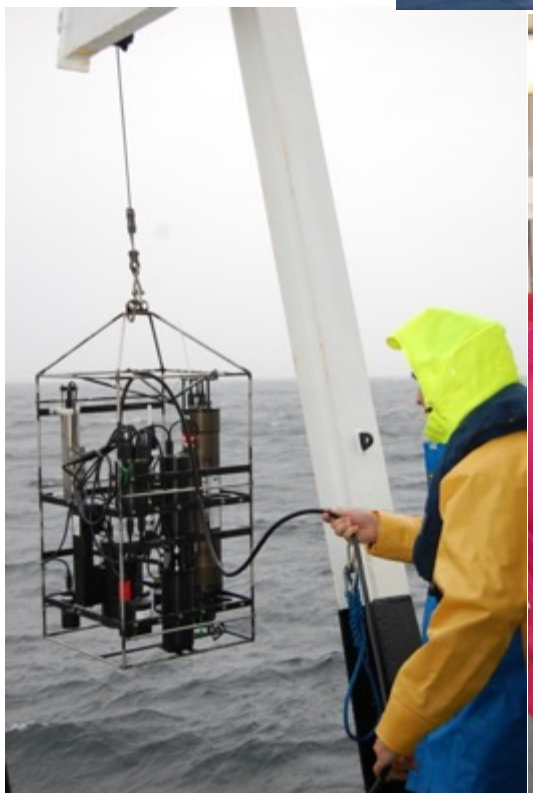
Uncertainties in retrieval of suspended particle concentration from space...

are mostly caused by variability in the nature of the particles



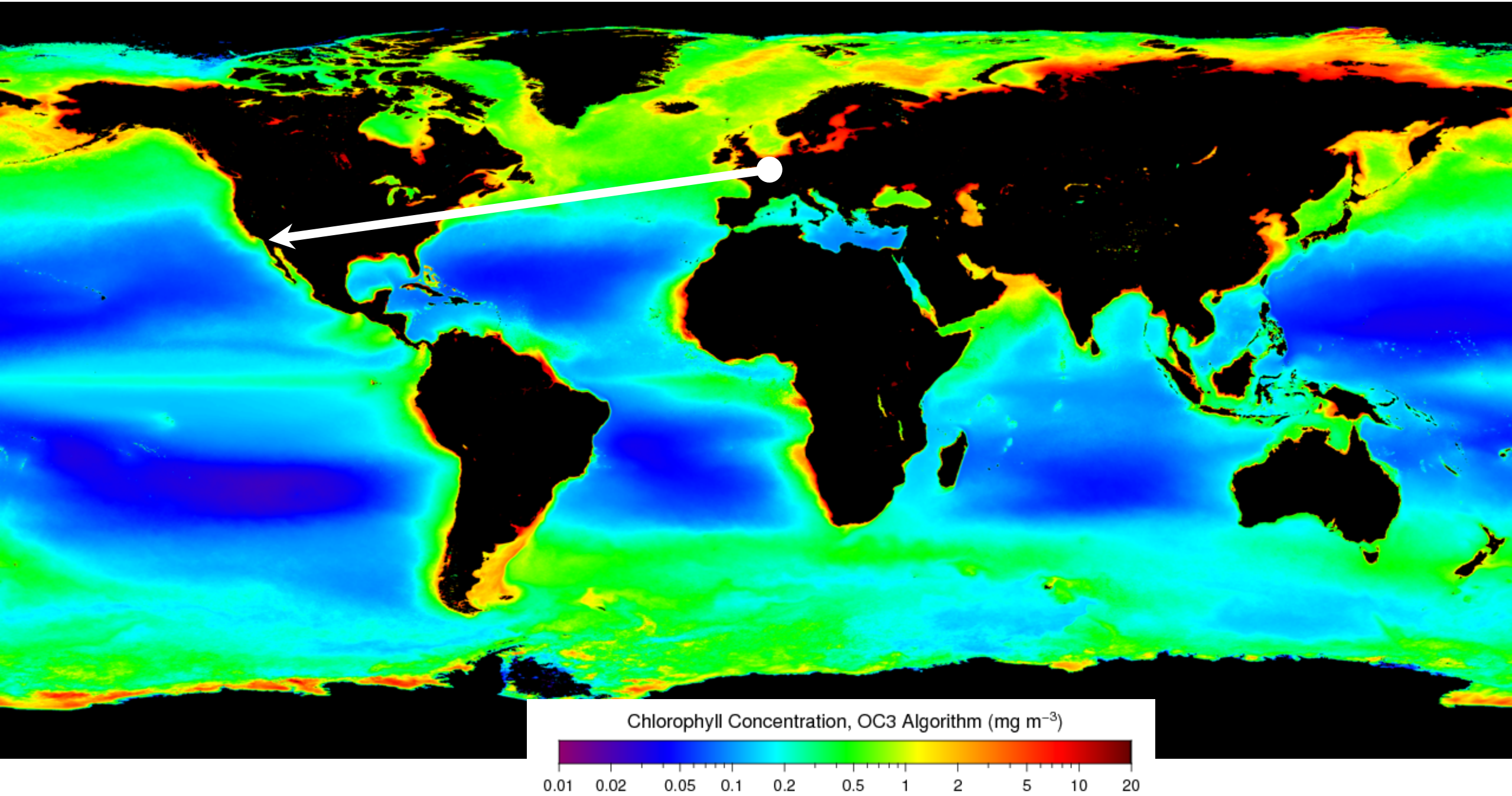
(Neukermans, 2012)



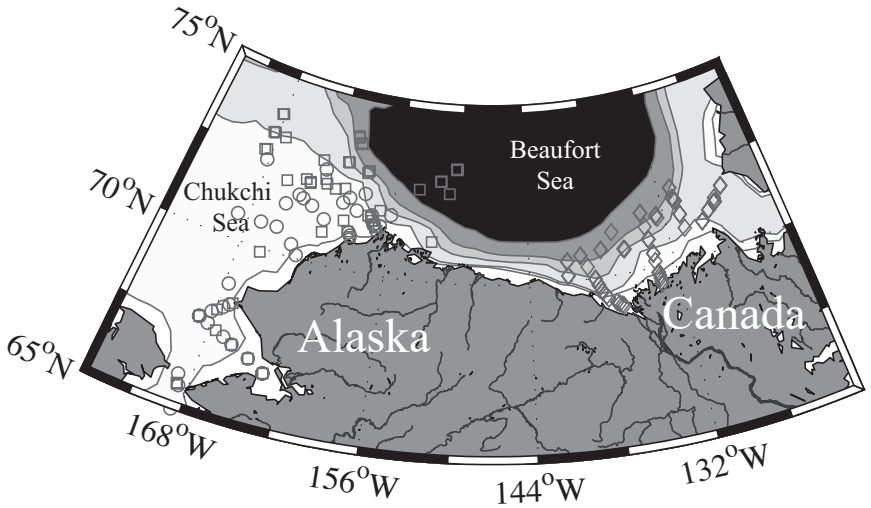


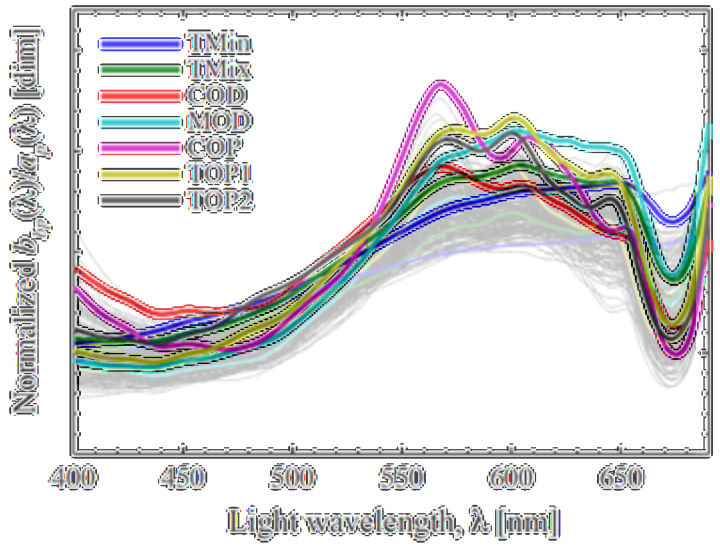
Neukermans et al. (2012b)

Off to Scripps Institution of Oceanography for Postdoc 1



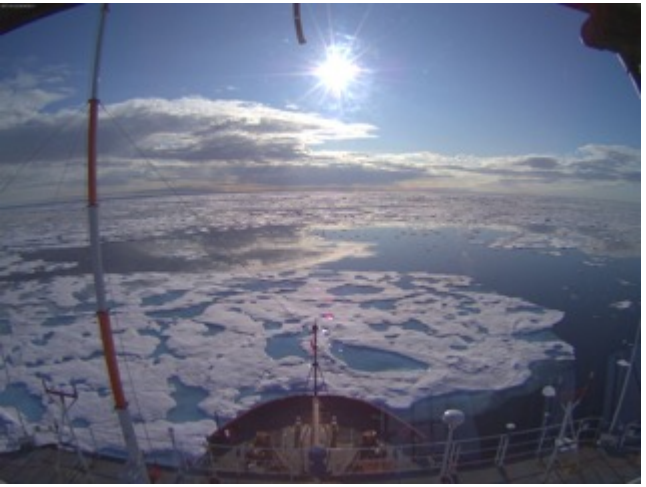
Postdoc 1. Develop optical approaches to monitor the changing Arctic Ocean ecosystem

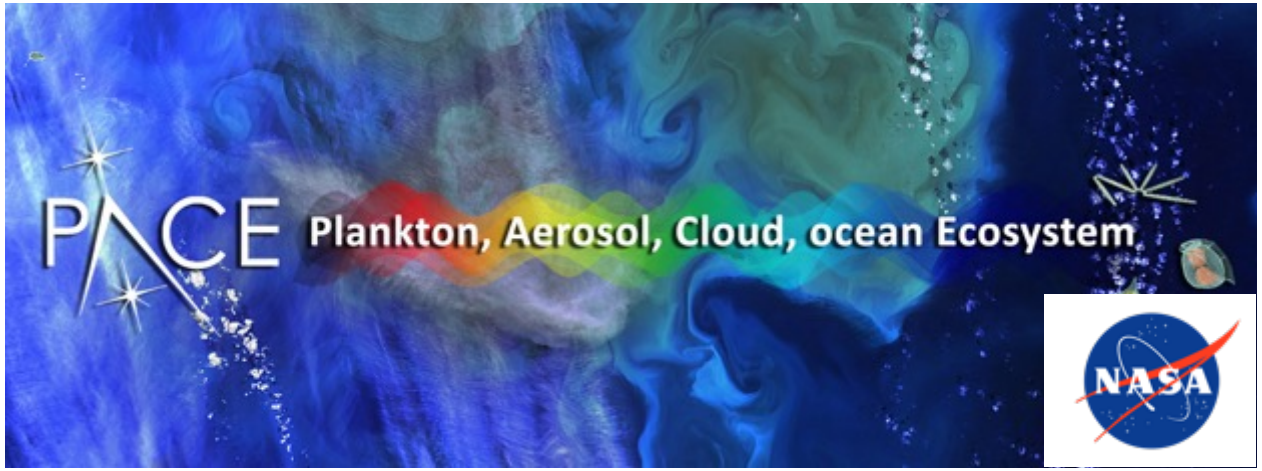




Neukermans et al. (2014, 2016)

Link between spectral shape of scattering and absorption by particles and marine ecosystem state (e.g. phytoplankton size and bloom state)



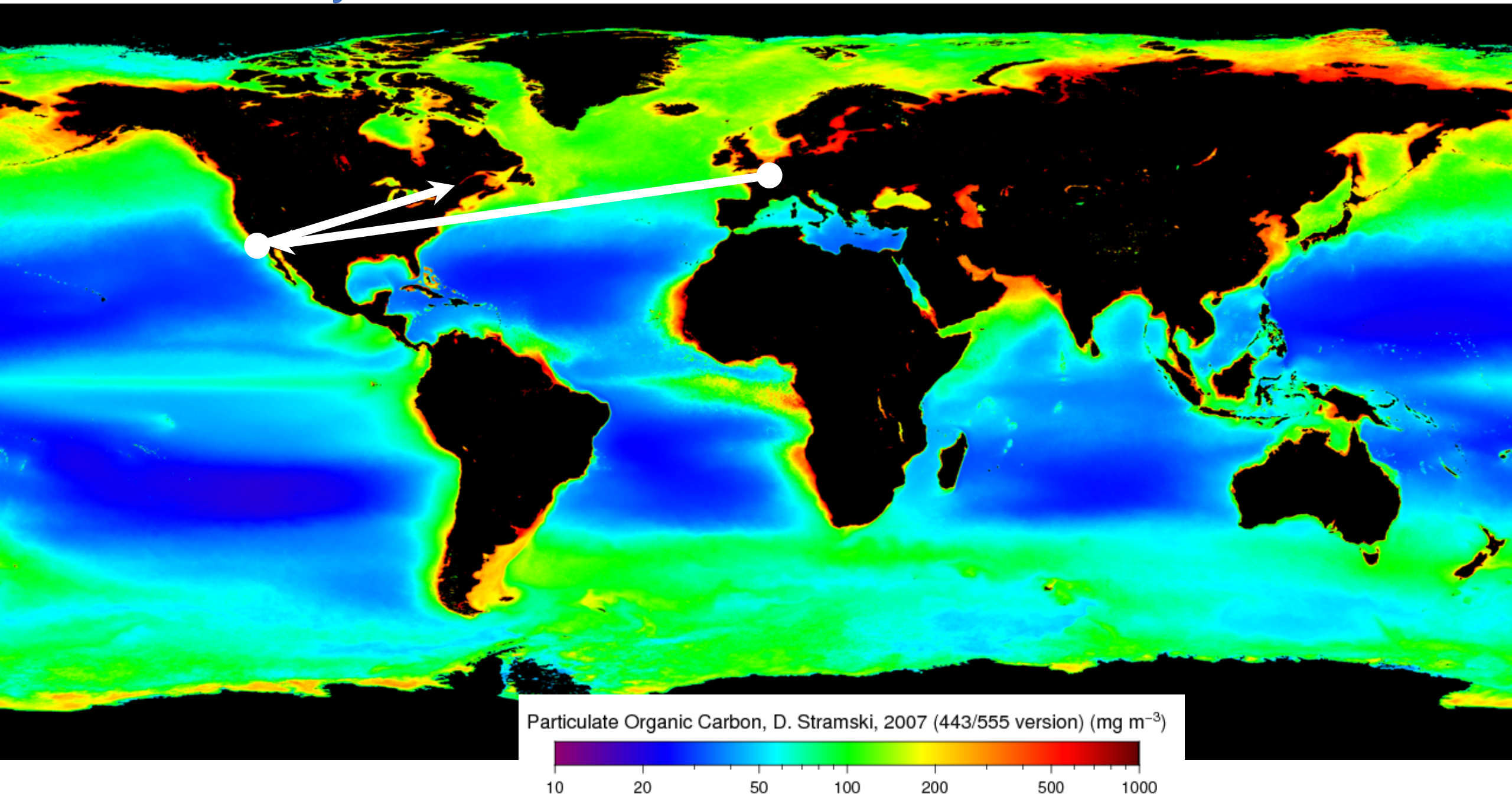


NASA PACE mission

First hyperspectral ocean colour satellite

Launch: 03/2023

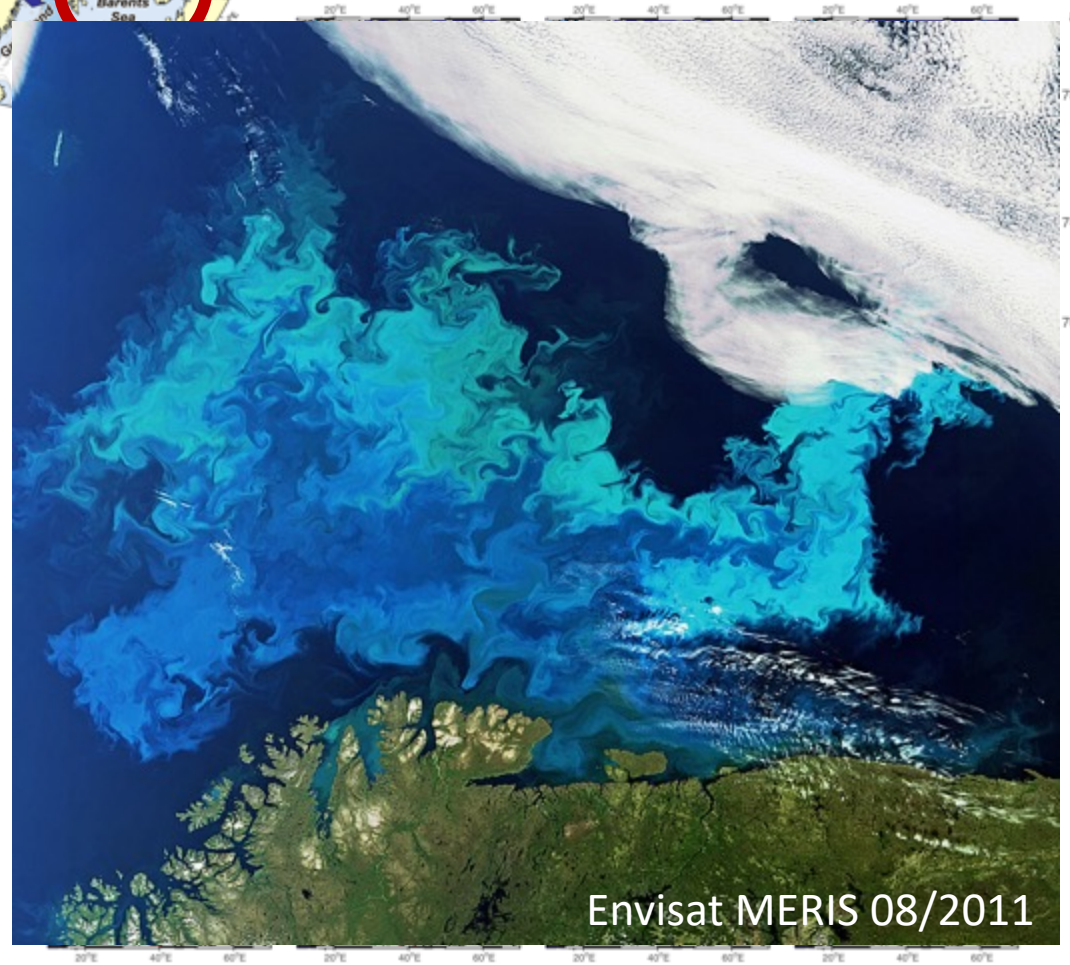
Off to Laval University (Québec, Canada) for Postdoc 2

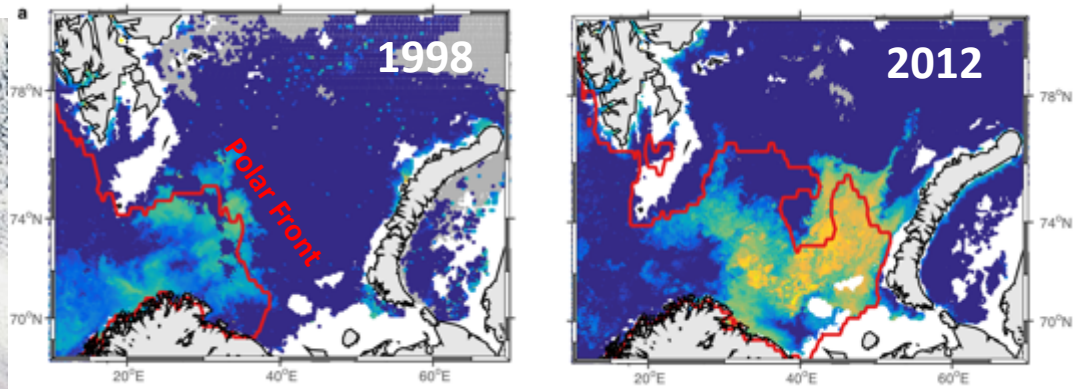


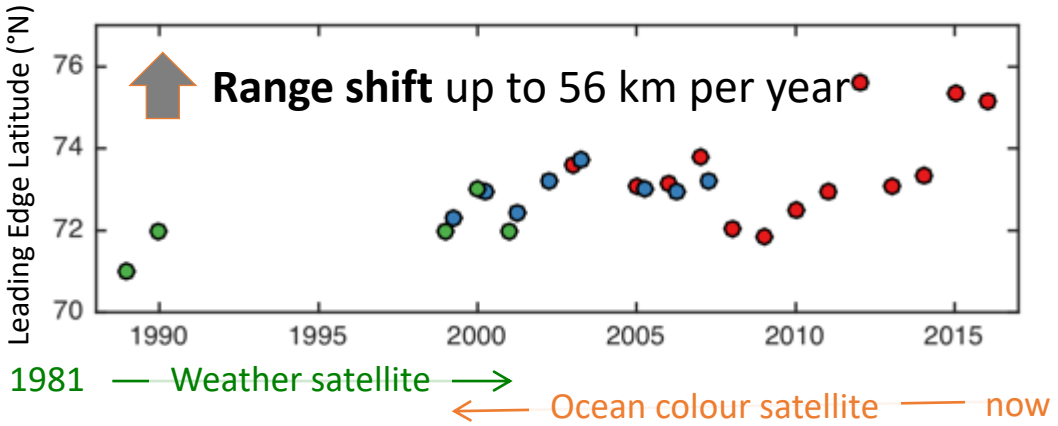
Postdoc 2. Impact of climate change on the Barents Sea ecosystem using remote sensing

Blooms of warm water phytoplankton species are rapidly expanding poleward

Bourses postdoctorales Banting Postdoctoral Fellowships



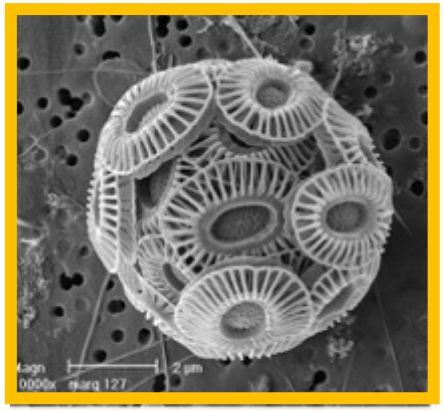




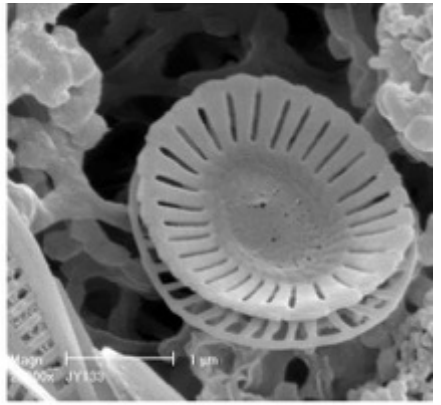
Neukermans *et al.* (*2018*)

Postdoc 2. Why do the blooms of calcifying phytoplankton color the water milky turquoise?

Georges Fournier

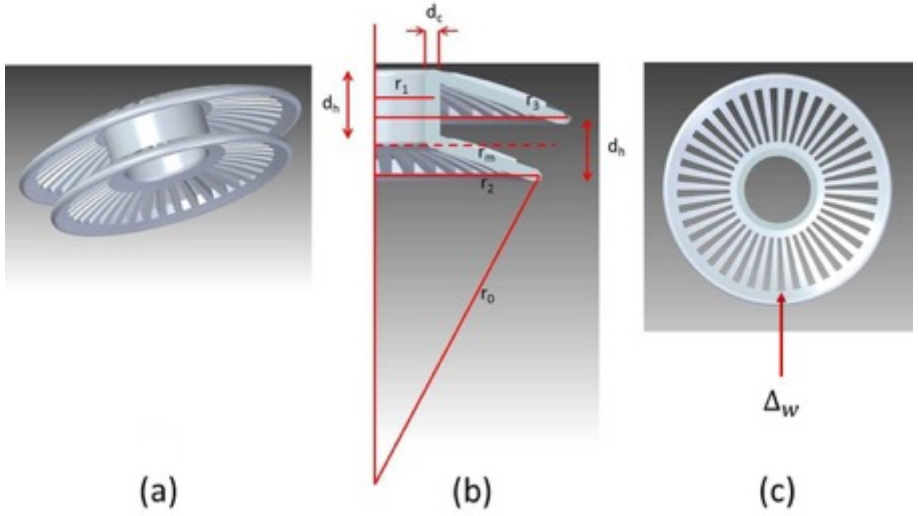


coccosphere

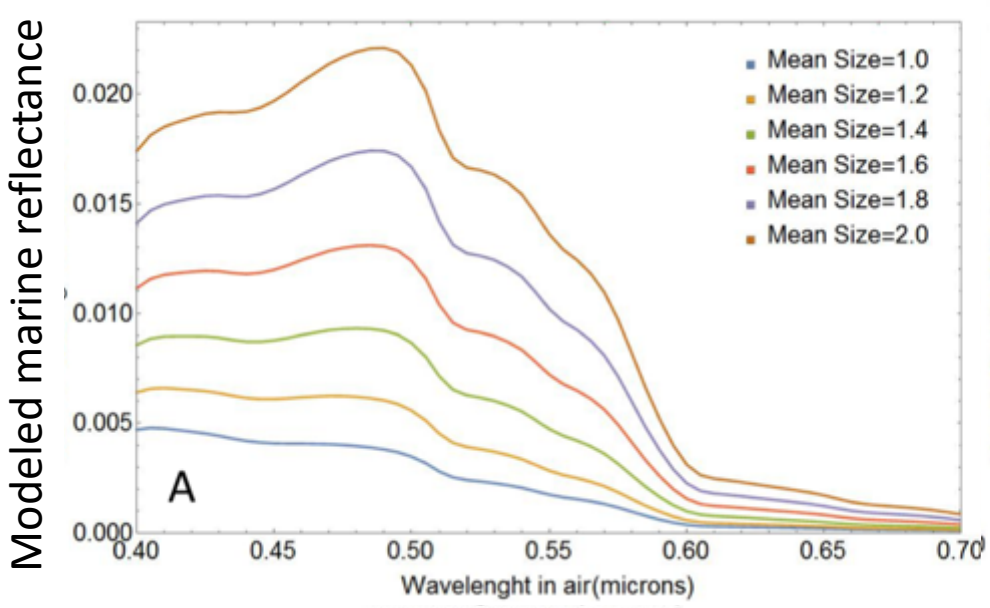


coccolith

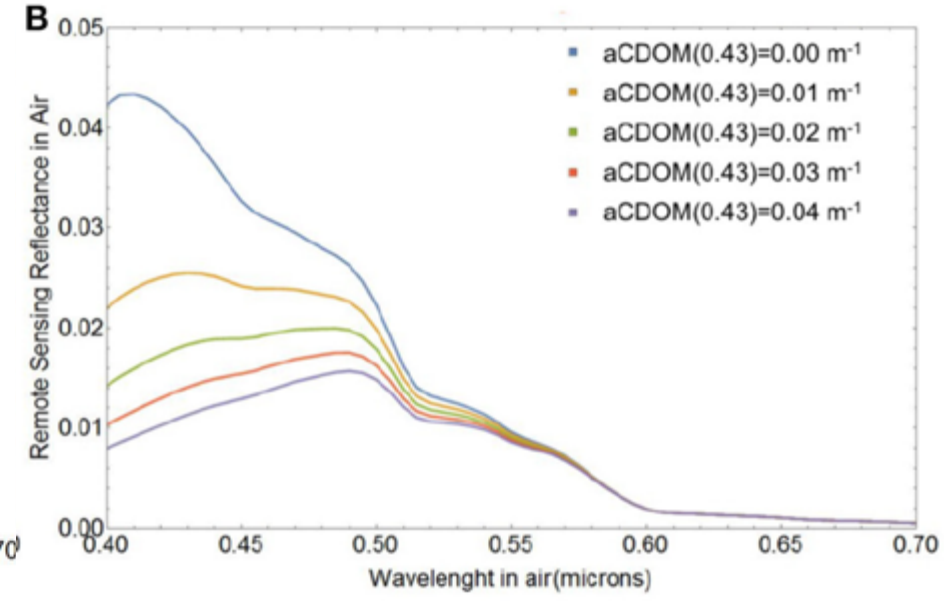
SEM of *E. huxleyi* (J. Young)



Model of *E. huxleyi* coccolith



Fournier and Neukermans (2017)

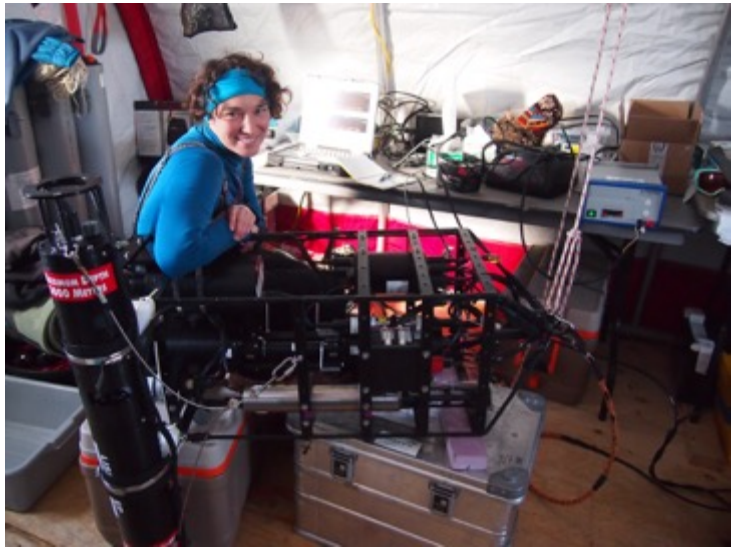


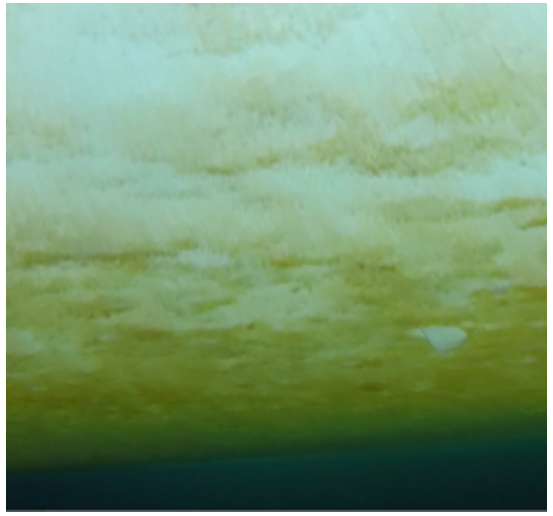
Neukermans and Fournier (2018)

Postdoc 2. Opportunity to join an Arctic field expedition

Marcel Babin

TAKUVIK





BioGeoChemical-Argo float network for ocean biogeochemistry observations

SORBONNE UNIVERSITÉ

https://nke-instrumentation.com/

https://biogeochemical-argo.org/

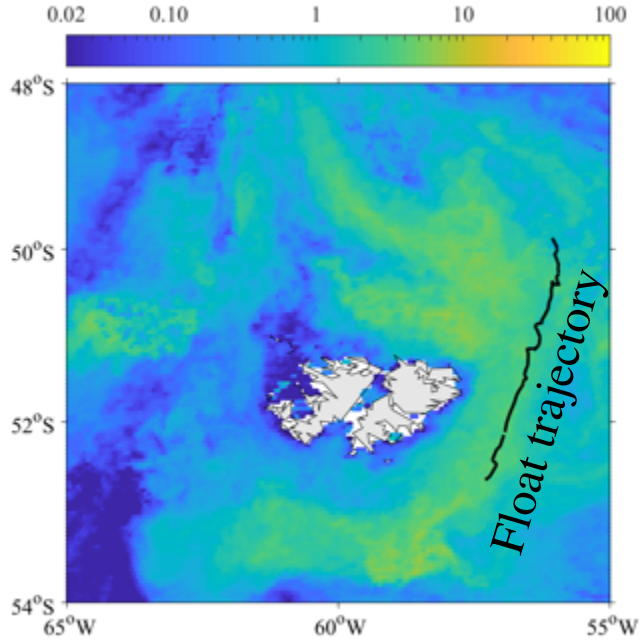
Global network of robotic ocean platforms

Profile the upper 1000m of the ocean at high temporal resolution

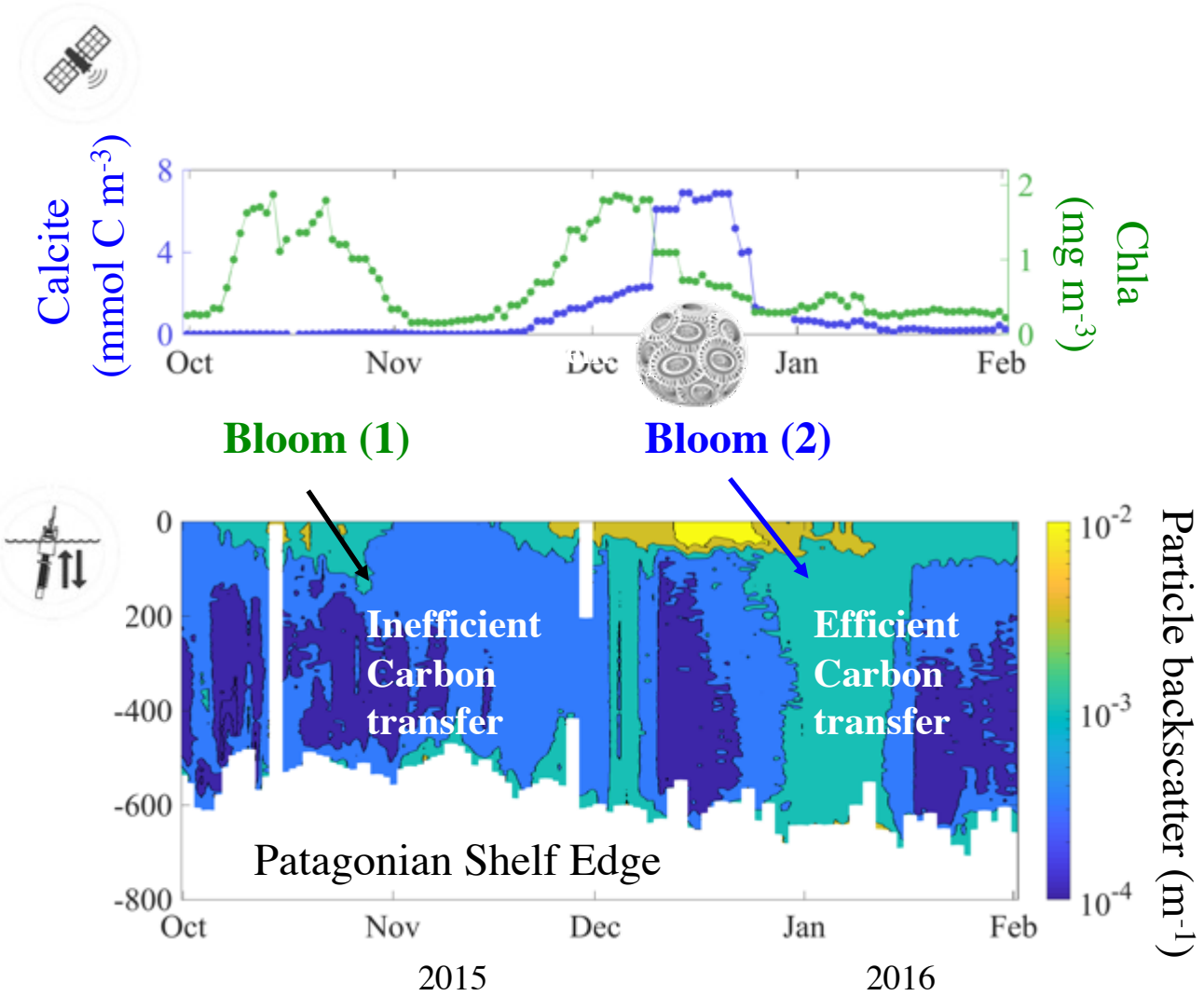
Record ocean biogeochemical parameters (many from optical instruments):

Temperature
Salinity
Suspended particles (197)
Downwelling irradiance (54)
pH (150)
Nitrate (149)
Chlorophyll a (198)
Oxygen (359)

Postdoc 3. Impact of calcifying phytoplankton blooms on carbon transfer using BioGeoChemical-Argo floats



Neukermans et al. (in prep.)



Marie Skłodowska-Curie Actions

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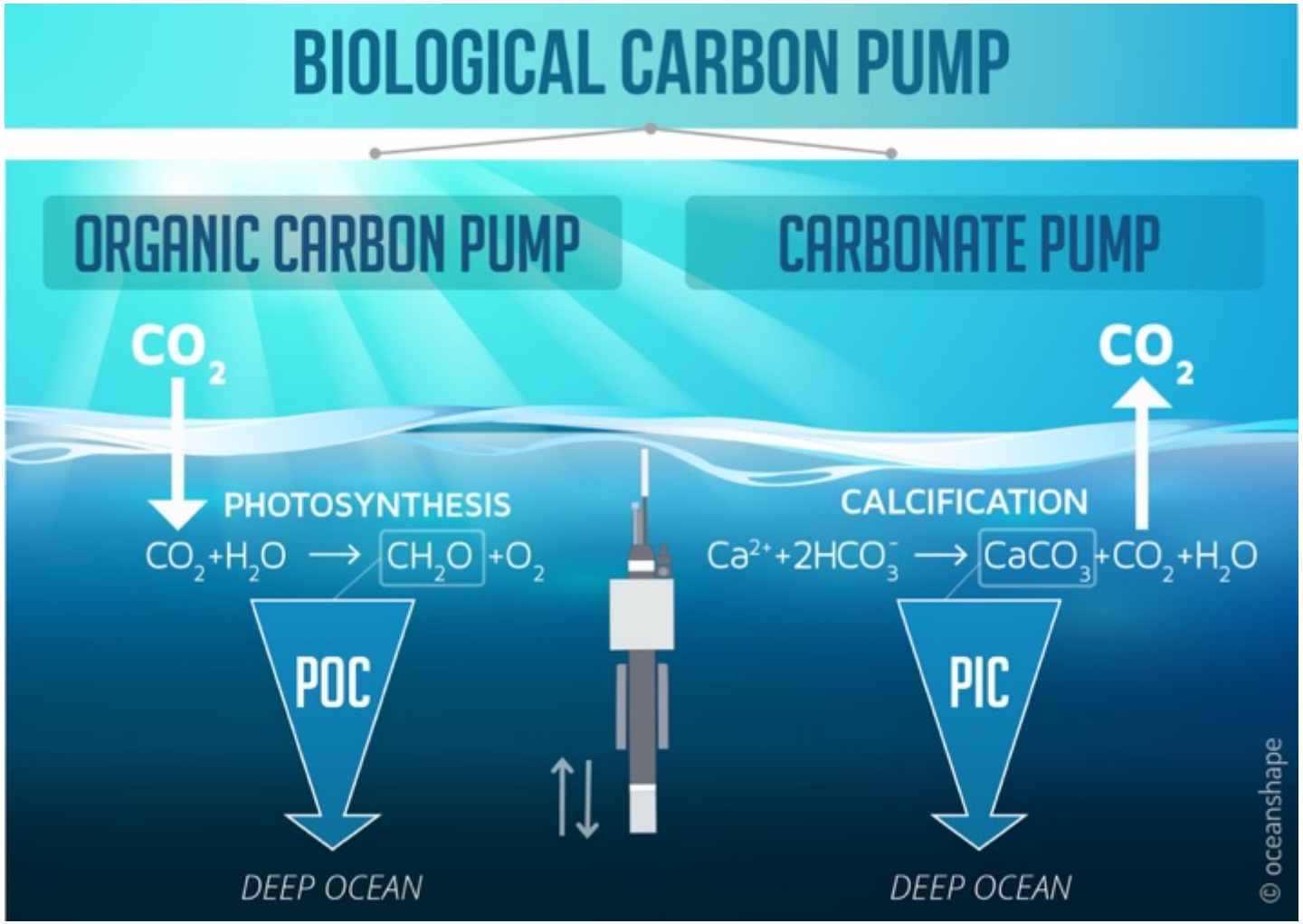
ERC grant CarbOcean: studying the inorganic and organic carbon components of the biological carbon pump using robotic profilers, remote sensing, and modeling

Georges Fournier (Canada)

Hervé Claustre

Jean-Pierre Gattuso



European Research Council
Established by the European Commission

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FACULTY OF SCIENCES

MarSens MARINE OPTICS & REMOTE SENSING

VLIZ

GRIET NEUKERMANS

Associate Professor, UGent

Head of MarSens Research Group

Associate Researcher, VLIZ

Remote and in situ optical sensing of particles in the ocean

calcifying phytoplankton

2008 — 2012 — 2014 — 2017 — 2019 — 2020

PhD

ULCO

RBINS

Detection of particle size and composition

Coastal water quality

Postdoc 1

Scripps

Detection of marine ecosystem state

Postdoc 2

ULaval

Banting Fellow

Response to climate change: range shifts

Postdoc 3

Sorbonne

Marie Curie Fellow

Light scattering

Role in sinking carbon

Prof.

UGent

VLIZ

erc

European Research Council

Established by the European Commission

https://grietneukermans.weebly.com/ https://konijnwortelsbenen.wordpress.com/

CAREER TIPS FOR YOUNG MARINE SCIENTISTS

Things may not always go the way you planned… but they'll always end up the way they should.

We all have our own unique career path to walk, and that doesn't need to be straight.

Find purpose and value in your work and be passionate about it.

Build GRIT (=perseverance and passion for long-term goals)**: Have courage. Don't be afraid to fail; it is part of the process. Get back on your horse. Strive for excellence, not perfection. Do the best you can. Get out of your comfort zone. Be conscientious. Be meticulous.**

Follow your intuition.