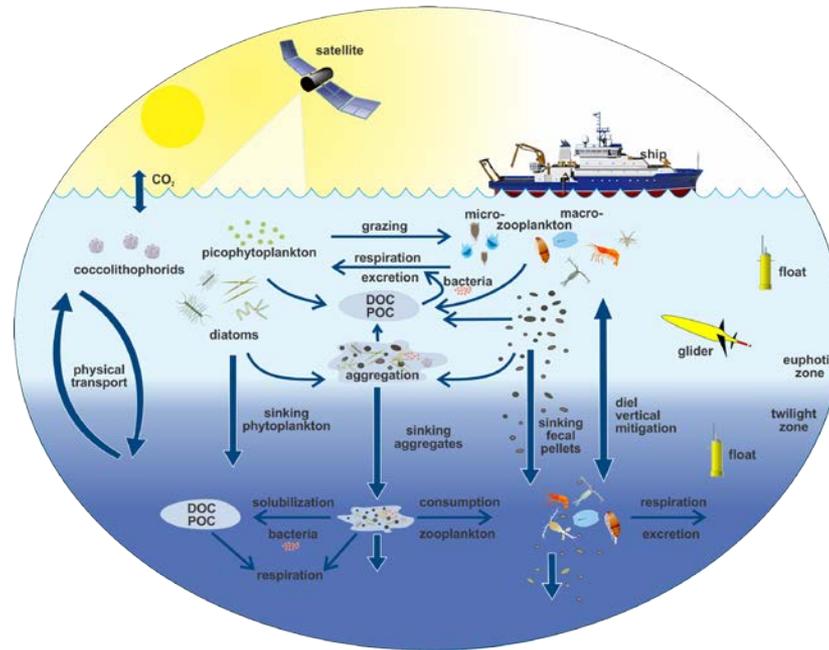


EXPORTS

Export Processes in the Ocean from Remote Sensing



Dave Siegel (UCSB) & Ken Buesseler (WHOI)

EXPORTS Writing Team: Mike Behrenfeld (OSU), Claudia Benitez-Nelson (USoCar), Emmanuel Boss (UMaine), Mark Brzezinski (UCSB), Adrian Burd (UGA), Craig Carlson (UCSB), Eric D'Asaro (UW), Scott Doney (WHOI), Mary Jane Perry (UMaine), Rachel Stanley (WHOI), Deb Steinberg (VIMS)

<http://exports.oceancolor.ucsb.edu>

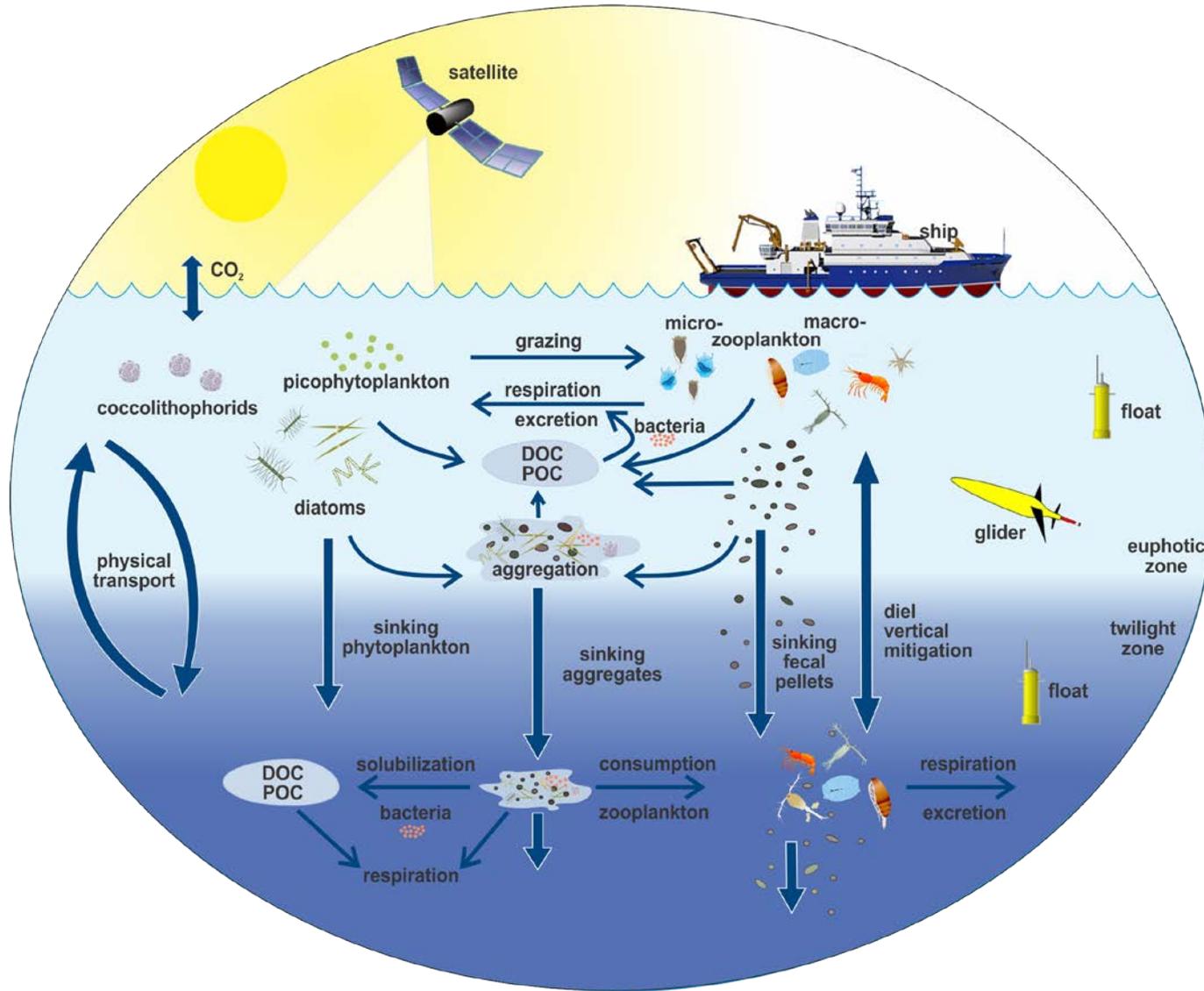
What is EXPORTS?

A community-vetted science plan for a NASA field campaign

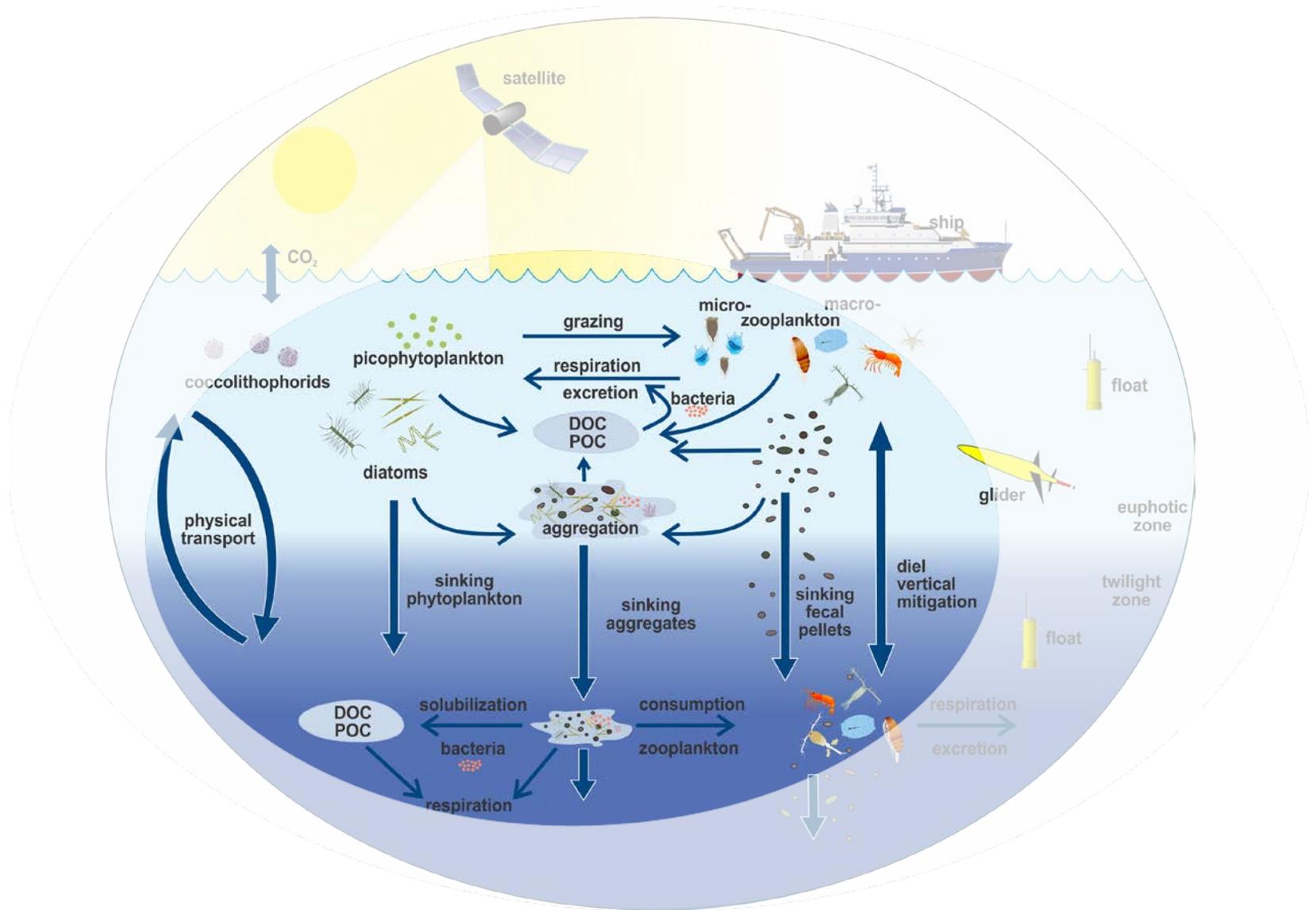
Predict the **state** of the biological carbon pump from satellite and other observations

EXPORTS plan in public comments
Projected start date: 2017 (if approved)

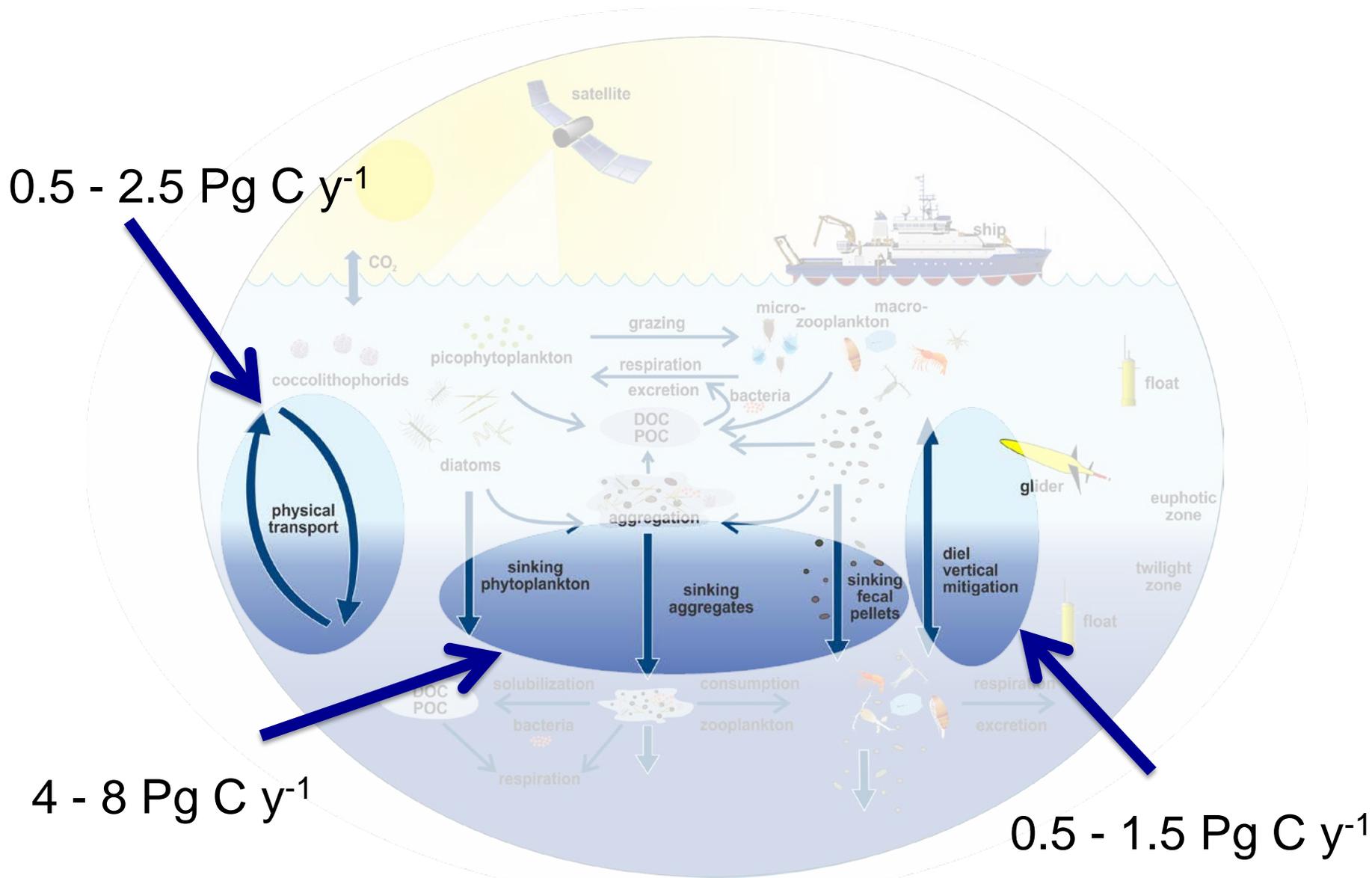
Why EXPORTS?



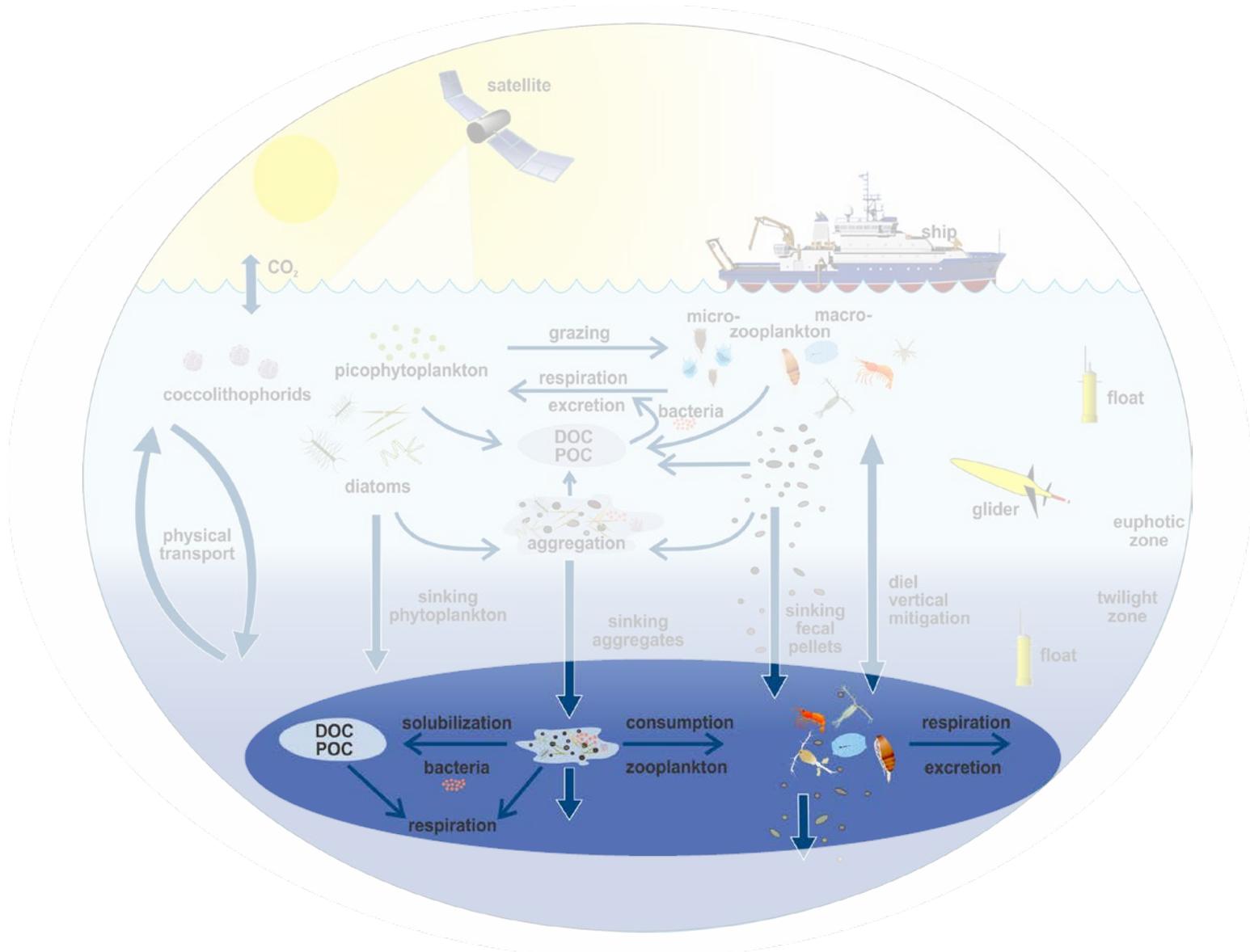
Why? Need to understand, quantify & predict how ecosystem processes transfer organic matter to depth



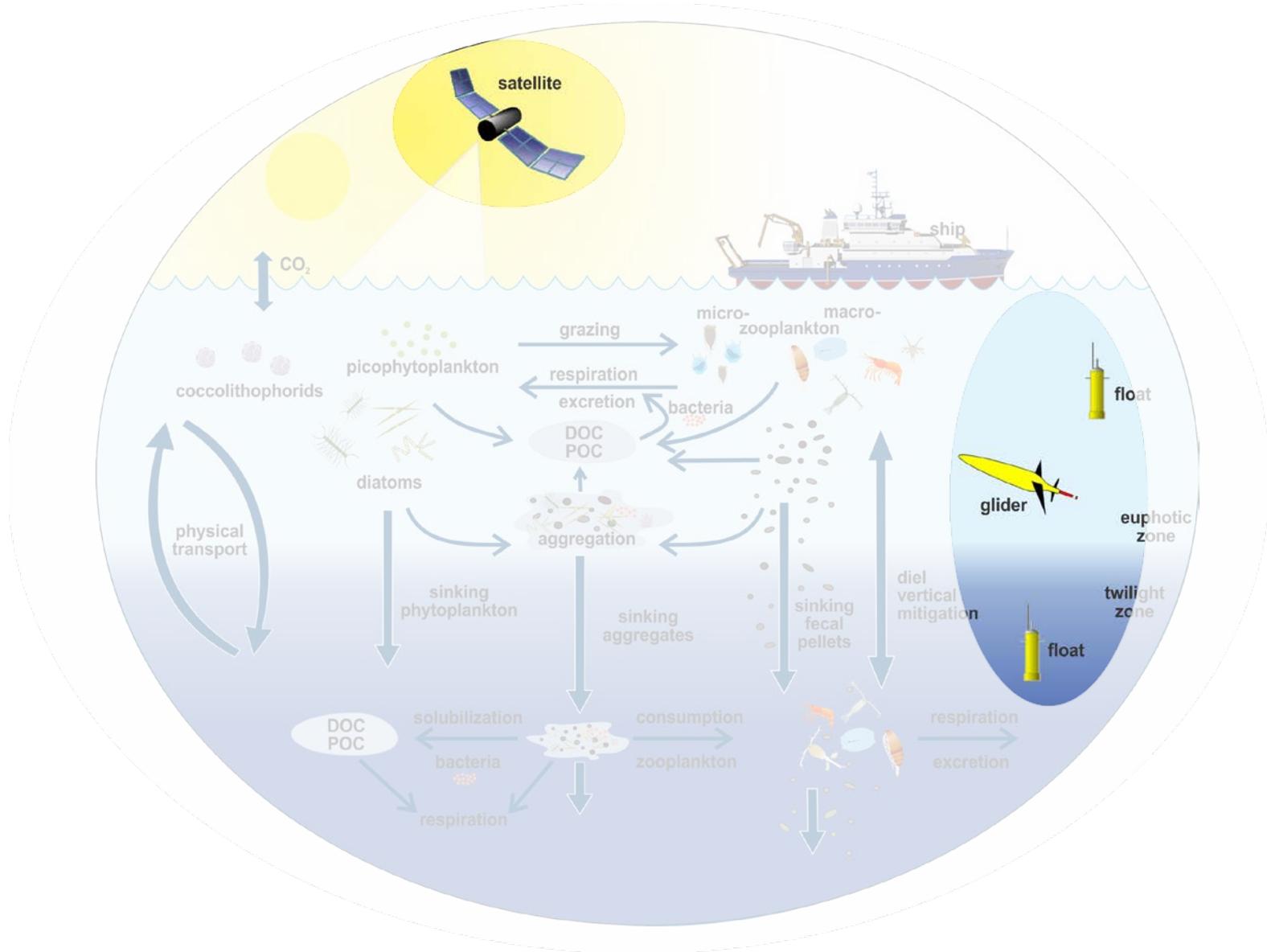
Why? Improve global estimates of carbon export from the euphotic zone (4 to >12 Pg C y⁻¹)



Why? Need to quantify the attenuation of export below euphotic zone (the twilight zone)



Why Now? Advances in remote sensing (& PACE!!) & autonomous tools make it time!



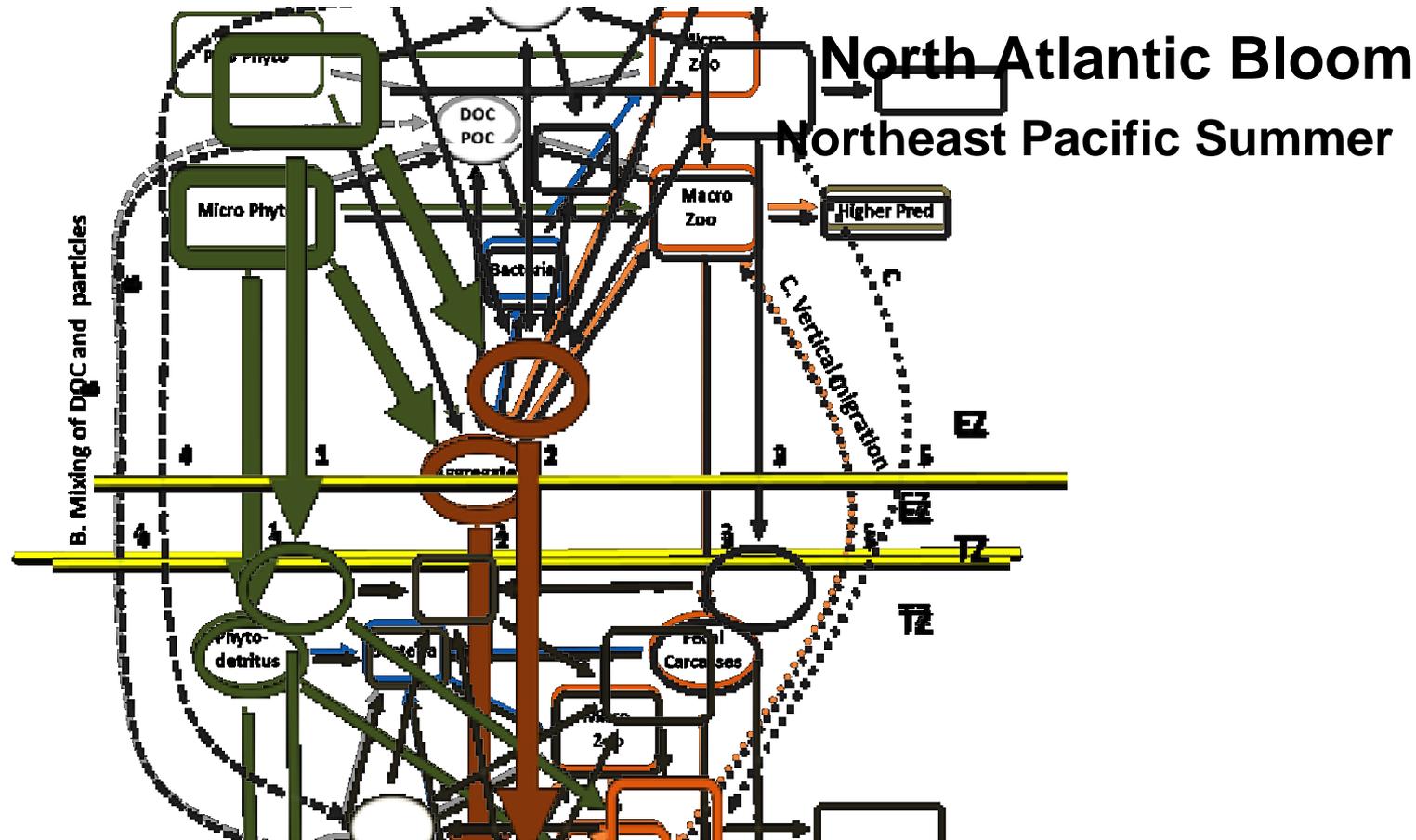
EXPORTS: Three Science Questions

How do upper ocean ecosystem characteristics determine the vertical transfer of organic matter from the well-lit surface ocean?

What controls the efficiency of vertical transfer of organic matter below the well-lit surface ocean?

How can the knowledge gained be used to reduce uncertainties in contemporary & future estimates of the biological pump?

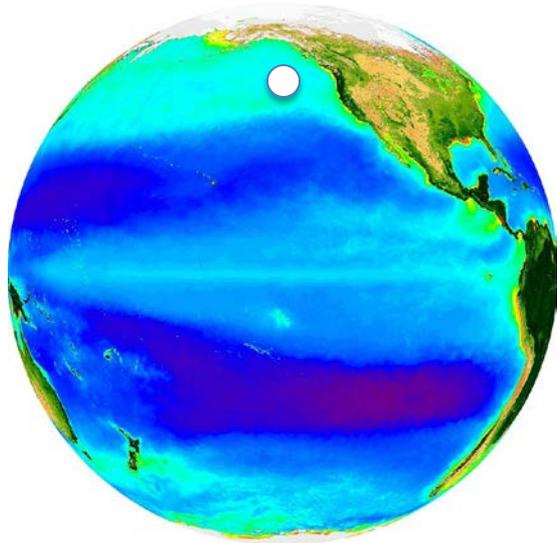
EXPORTS: Focus on Pathways



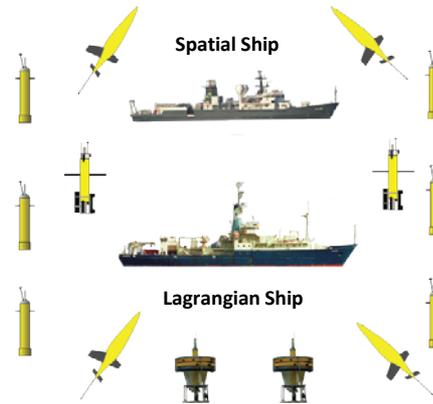
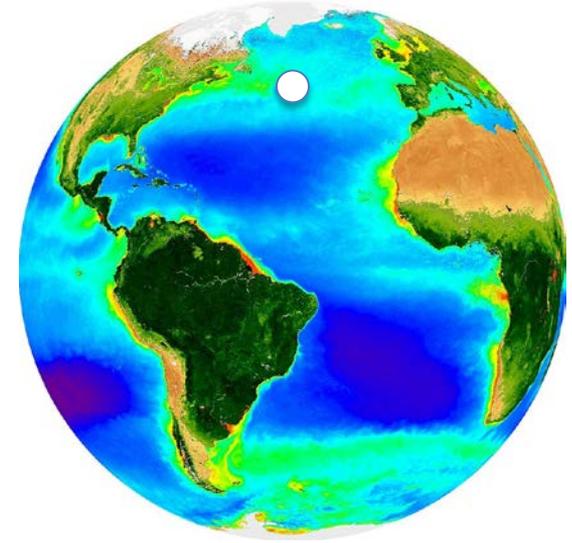
Goal: Predict the state of the biological pump given surface ecosystem characteristics

EXPORTS: Experimental Plan

Station P



North Atlantic



Cruise 1: April/May 30/45d
Cruise 2: Aug, 30d
Leverage: OOI node, LineP

Bloom: April/May 45 d
Non-bloom: Aug, 30d
Leverage: Internationals

Will collect up to 8 states of the biological pump
Supplement by data mining existing results

EXPORTS: Experimental Plan

Water-following

follow instrumented mixed layer float(s?)

Follow Particles

from production to trap
Measure C cycling fluxes from 0 to 500 m (over 10 d)

Lagrangian Ship

Measure rates & transformations

Spatial Ship

Submeso- & meso-scale surveys (5-200 km)
Deploy short-term assets

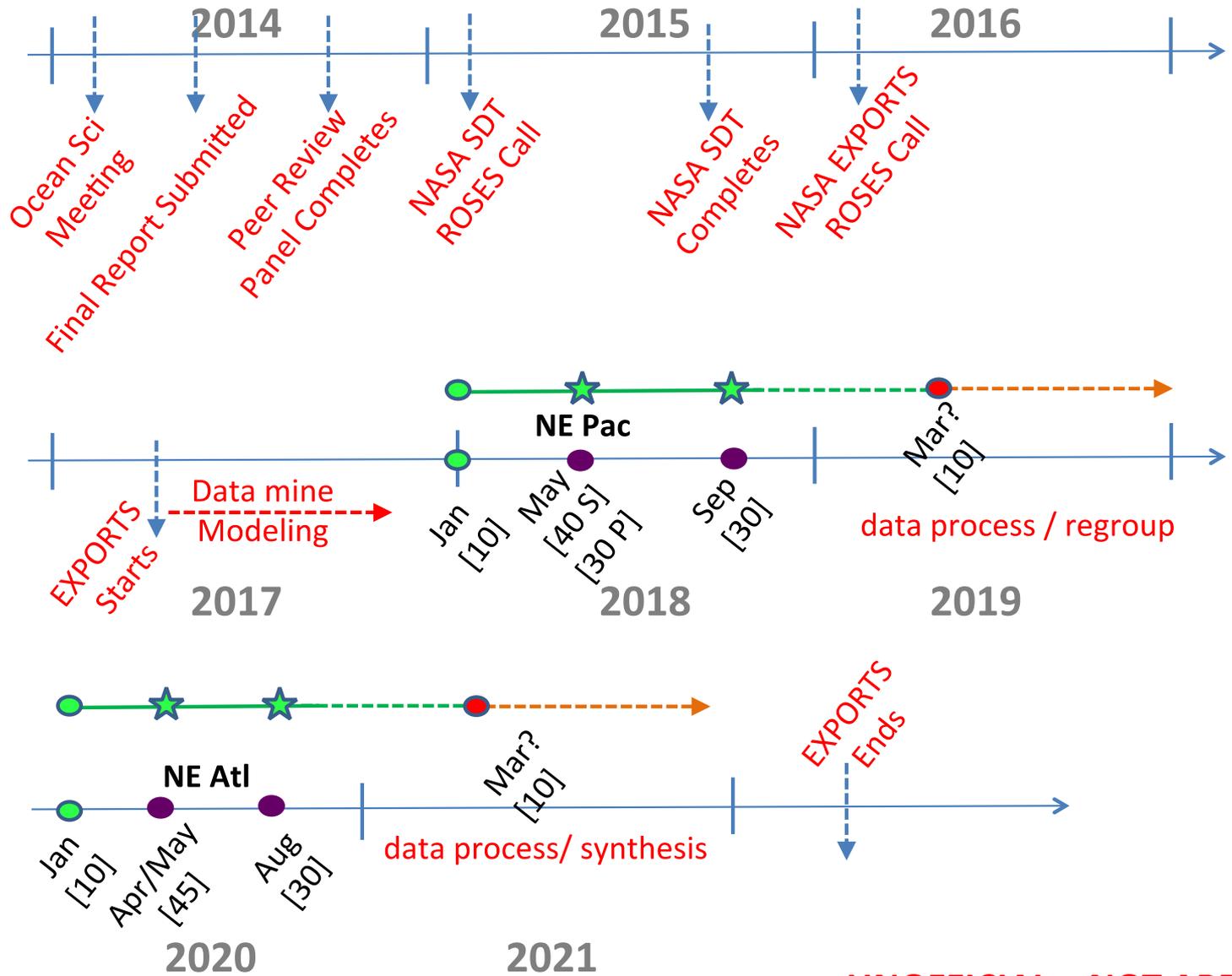
Long Term Presence

Profiling floats (& Satellites)
BioARGO, PSD & export proxy
Annual BGC budgeting
O₂, NO₃, DOC, DIC, etc.

Optimize Spatial Sampling

Gliders surveying (5-100 km)
Bio-optical proxies
Satellite sampling
Ocean color & supporting

EXPORTS: *Notional* Timeline



UNOFFICIAL – NOT APPROVED!!!

EXPORTS: Next Steps

The EXPORTS Science plan is in public comment period until Aug 21 - <http://cce.nasa.gov/cce/ocean.htm>

NASA will consider comments in a peer review panel to decide whether EXPORTS will be conducted

If selected: A Science Definition Team will be competed (late-2014) to write the Implementation Plan with the EXPORTS field campaign starting 2017

Important: Every role in EXPORTS will be competed!!