



GOMO BGC Argo in the North Atlantic



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US Argo @MBARI, UW, SIO, PMEL, AOML
the EXPORTS team
WHOI float group team

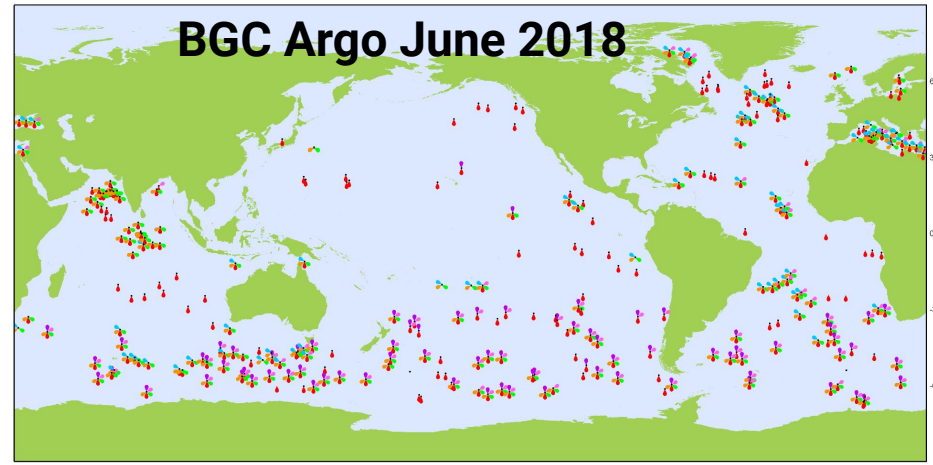


GOMO-funds build capacity @WHOI to support OneArgo goal of a sustained, global backbone observing system

WHOI: 32 Seabird BGC Navis floats since 2020 (mostly GO-BGC)

Work closely with US Argo (MBARI, UW, SIO, PMEL, AOML) and international partners

*OneArgo = Core + Deep + BGC components





Why should Congress fund your work?

Sound policy for the future must be informed by quality observations today

At what rate will the ocean continue to take up anthropogenic carbon?

How will ecosystems respond to a changing ocean?

What is the efficacy of potential climate solutions such as marine carbon dioxide removal?

We need not fly blind - BGC Argo is a realtime alert system monitoring ocean C/O₂/N cycles and ecosystem health

GOMO-funded BGC Argo @ WHOI



2 deployed at the Bermuda Atlantic Time Series (BATS)

2 deployed at Porcupine Abyssal Plain (EXPORTS)

1 in production for 2023 deployment

**1203 funded by NASA OBB, operated w/ GOMO funds*

BATS

EXPORTS



Seabird Navis BGC

CTD

Chlorophyll

Backscatter

CDOM

Dissolved Oxygen

pH

Nitrate



We are not only deploying floats....

(1) Improving quality across BGC Argo by correcting dynamic error in oxygen sensors

(2) GOMO assets contribute to the NASA-funded EXPORTS biological carbon pump process study

(3) GOMO observations used in DEIA and community outreach

What is new? What is challenging? What is important?

Oxygen sensor response time

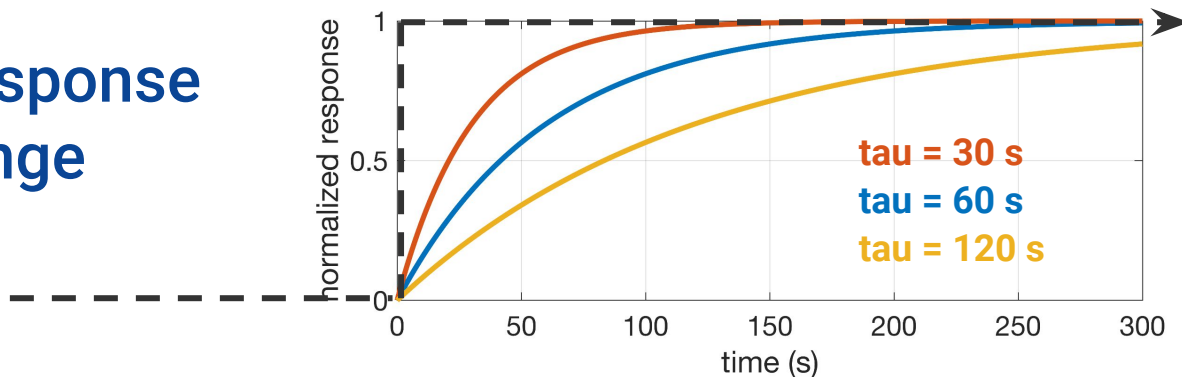


Ellen Park, Ph.D. student in Nicholson Lab is lead
Collabs: M. Dever, RBR, C. Richards, DFO and D. Atamanchuk, Dalhousie
NOAA GOMO supported project - Ellen supported by NSF funding

Dynamic error is a leading source of bias in the Argo Oxygen dataset

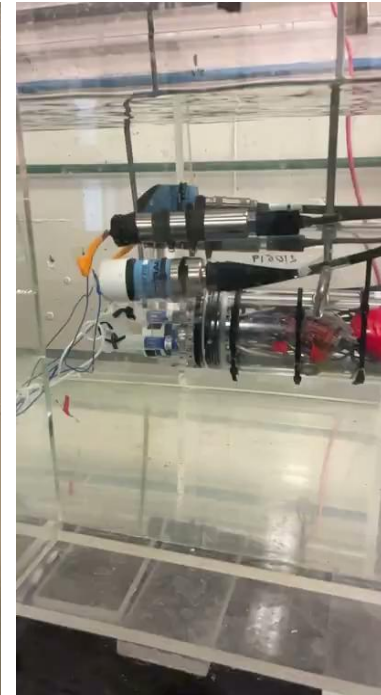
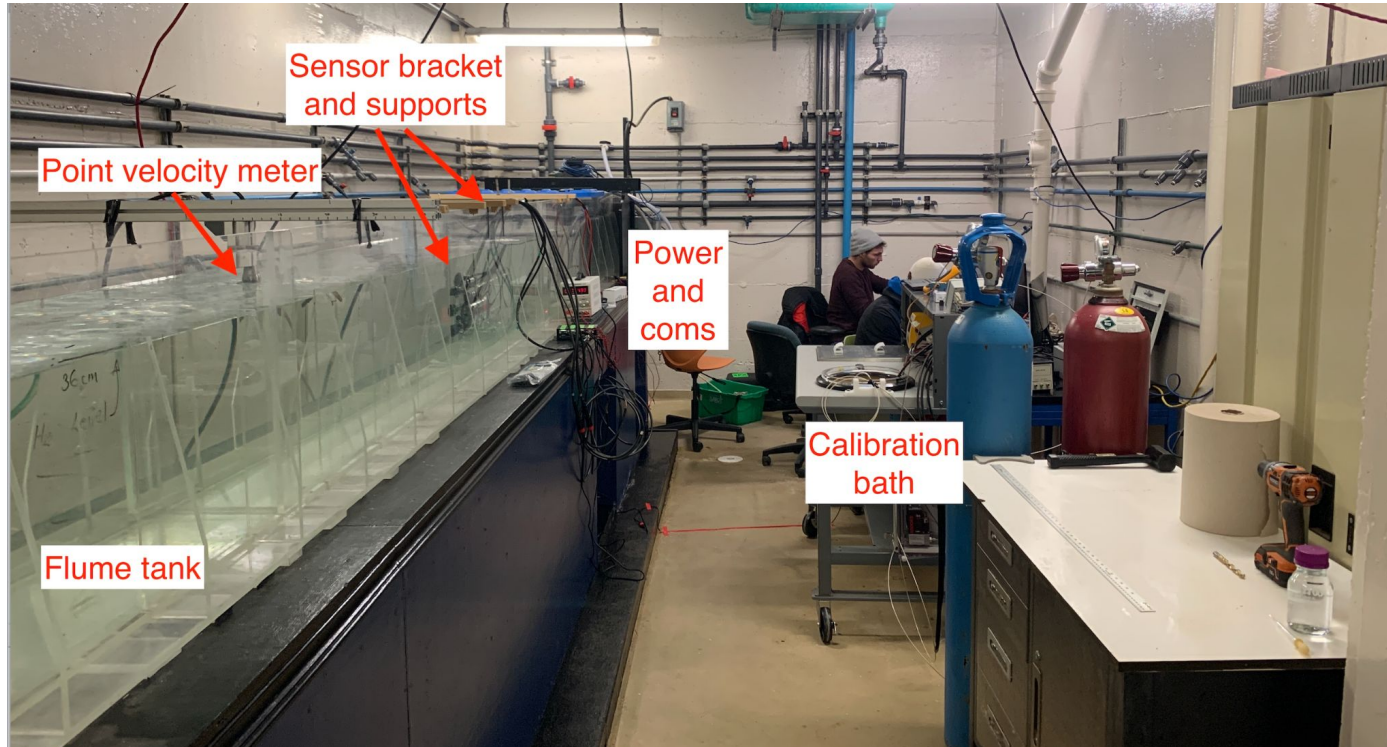
Consistency needed across sensor models

1st order response
to step change



What is new? What is challenging? What is important?

Oxygen sensor response time



What is new? What is challenging? What is important?

Oxygen sensor response time

Aanderaa 4831
WTO701 foil



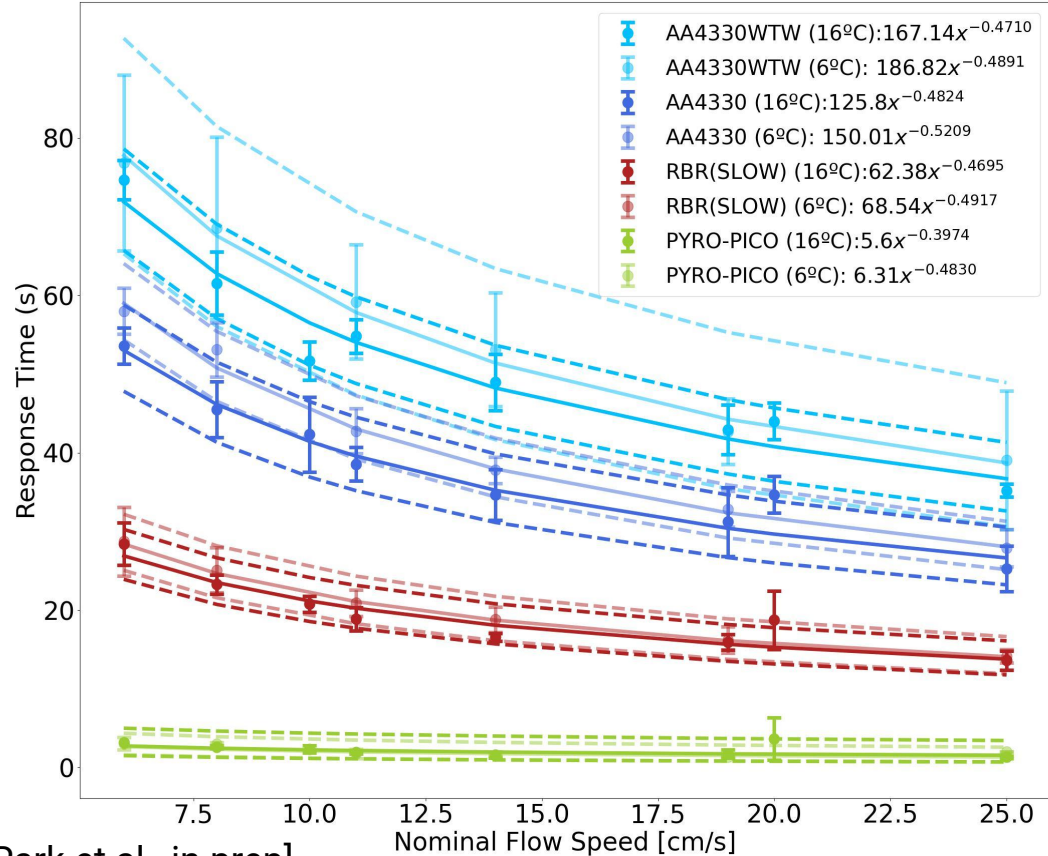
Aanderaa 4831
Pst3 foil



RBRcoda ODO
slow foil



PyroScience
Pico O₂



[Park et al., in prep]

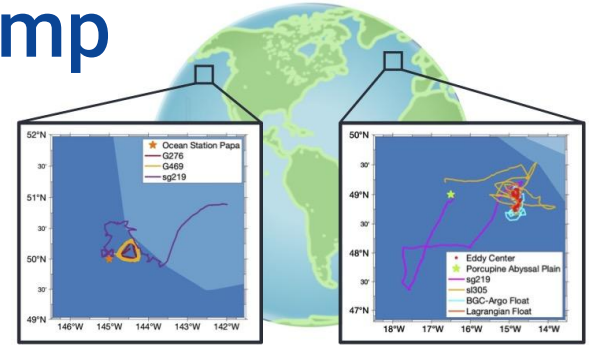


What is new? What is challenging? What is important?

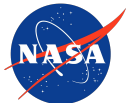
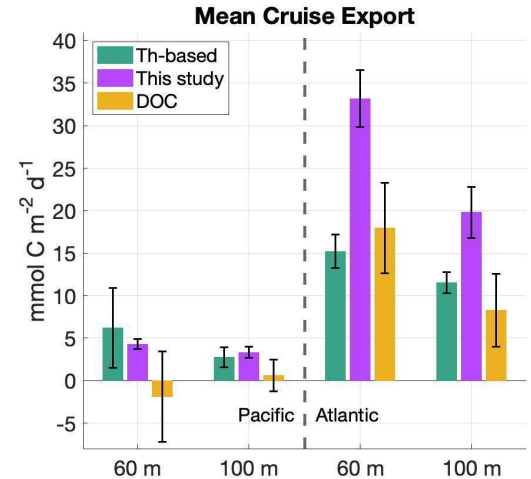
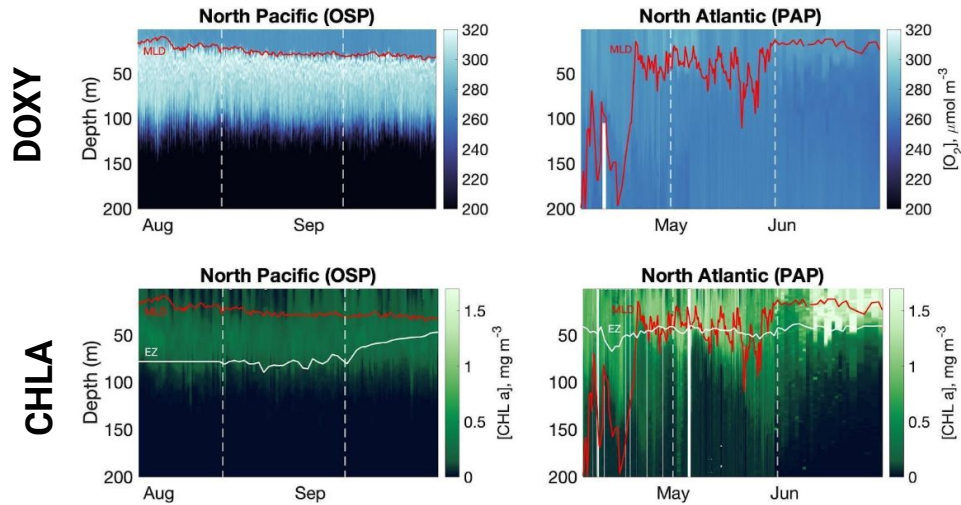
EXPORTS Biological Carbon Pump



Shawnee Traylor, Ph.D. student in Nicholson Lab is lead. Collabs: Many from EXPORTS



Glider and float data combined to quantify carbon export

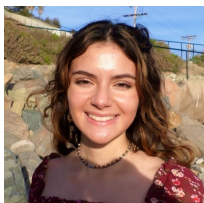


Science funded by NASA - leveraging GOMO-funded BGC Argo float

[Traylor et al., in prep]



DEIA and community outreach



Bella Amato, 2022 WHOI NSF Summer Student Fellow - project used GOMO BATS float data



Nicholson organizer for float data workshop
GO-BGC/BGC-Argo

Float Data Workshop

UMass Boston
August 21-23, 2023



Net Community Production in the Subtropical North Atlantic: Modeling and Observations

01. Introduction
Our understanding of climate change and how we plan to mitigate our impact on it relies on our knowledge of the global carbon budget. This is a complex system that is influenced by both natural and human factors. The carbon cycle is a complex system that is influenced by both natural and human factors. The carbon cycle is a complex system that is influenced by both natural and human factors.

02. Objectives
• Characterize and compare the seasonal NCP rates in the Subtropical North Atlantic (STNA) and the Western North Atlantic (WNA) using data from the GOMO BATS float network.
• Calculate seasonal NCP rates using data from the GOMO BATS float network.
• Analyze the seasonal NCP rates using data from the GOMO BATS float network.

03. Methodology
03.1. Model Setup
• The model used to generate the NCP time series was the MITgcm coupled ocean-atmosphere-ice model.
• The observational data used was collected from the GOMO BATS float network.
• The model was run for a 100-year period from 1950 to 2050.
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04. Current Results
• The plots of the seasonal NCP rates exhibit NCP rates to be the highest in the STNA, with an average magnitude of 1.5 gC m⁻² d⁻¹.
• The lowest rates are observed during June, with an average magnitude of approximately 0.5 gC m⁻² d⁻¹.

06. Next Steps
• The model output derived from the GOMO BATS float network will be used to compare the seasonal NCP rates to the observational data.
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Net Source Oxygen Calculations
$$Net\ Source\ Oxygen\ Calculations = \sum_{i=1}^n (C_{i+1} - C_i) + \sum_{i=1}^n (P_i - R_i)$$



GO-BGC Adopt-a-Float led by MBARI connects WHOI floats with classrooms



Some Challenges & Ideas

Argo = power in numbers

of floats deployed

of BGC Argo data users

of partner agencies/funders/collaborators

of deep domain experts in float groups

of budding scientists engaged/trained



Some Challenges & Ideas

Incredible progress and growth for BGC Argo over last few years...but sustained funding for OneArgo plan has not been secured

Our challenge is to: sustain these gains, maintain our expert workforce and continue to expand use of BGC Argo observations by broad range of stakeholders

Collaborate with adjacent communities (glider obs, remote sensing, modelers,...)