GOMO BGC Argo in the North Atlantic

PIs David Nicholson, Susan Wijffels WHOI
Contributions from Ellen Park, Shawnee Traylor, Anabella Amato, WHOI
Matt Dever, RBR, Dasha Atamanchuk, Dalhousie, Clark Richards, DFO
US Argo @MBARI, UW, SIO, PMEL, AOML
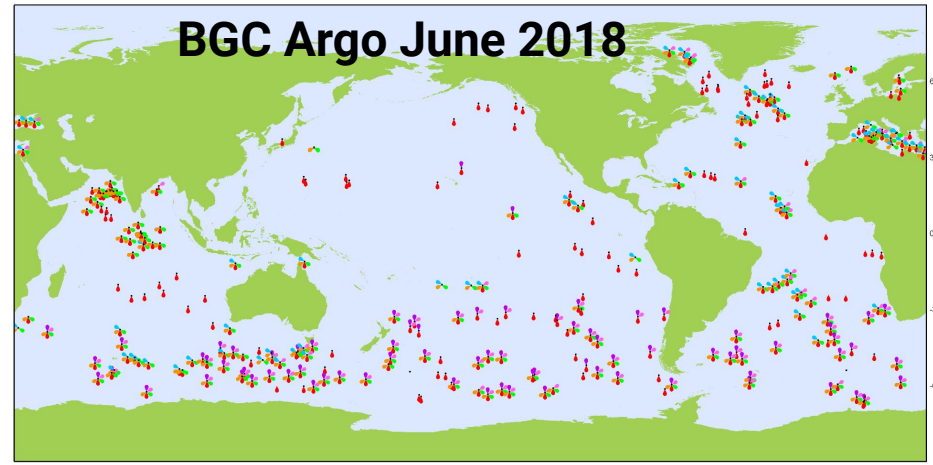the EXPORTS team
WHOI float group team

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

BGC Argo June 2018

BGC Argo June 2023

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/O$_2$/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

EXPORTS

1203

1201

BATS

1200

139

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

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**
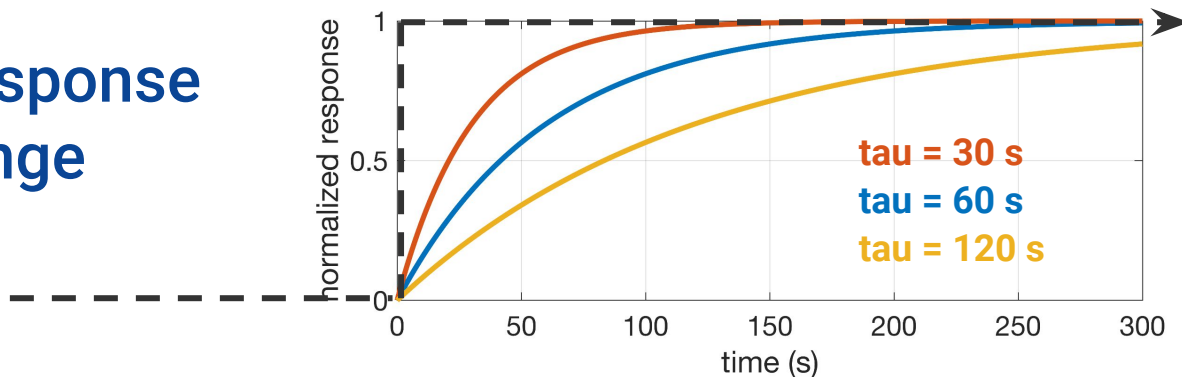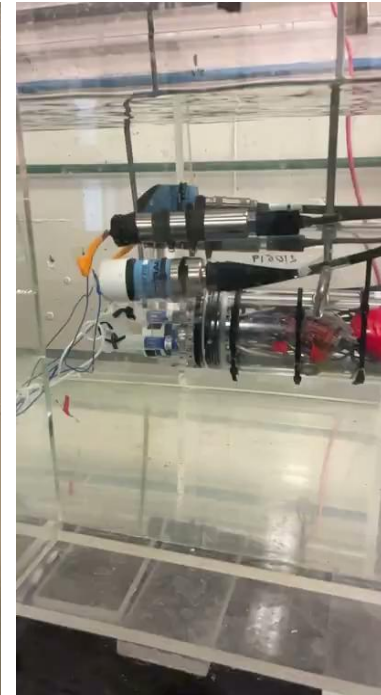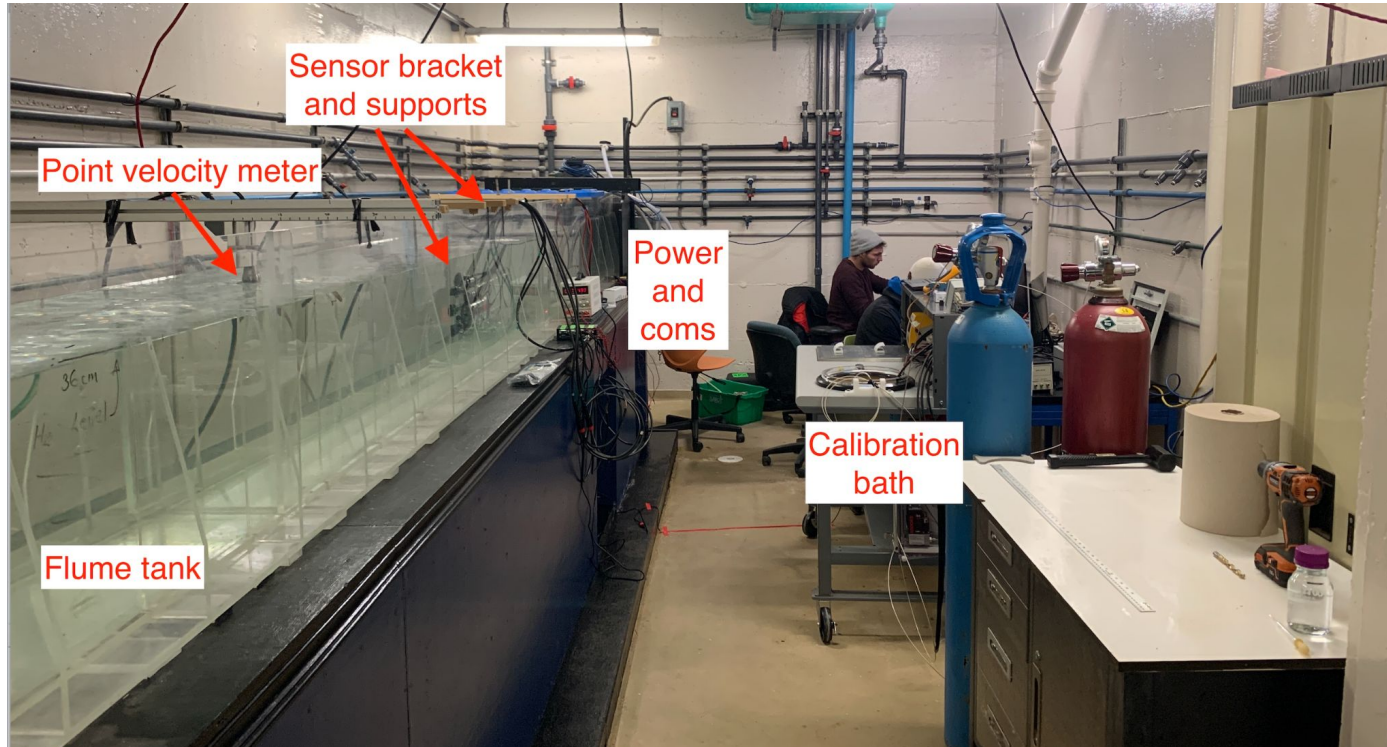
Oxygen sensor response time

Oxygen sensor response time

Aanderaa 4831 WTO701 foil

Aanderaa 4831 Pst3 foil

RBRcoda ODO slow foil

PyroScience Pico O$_2$
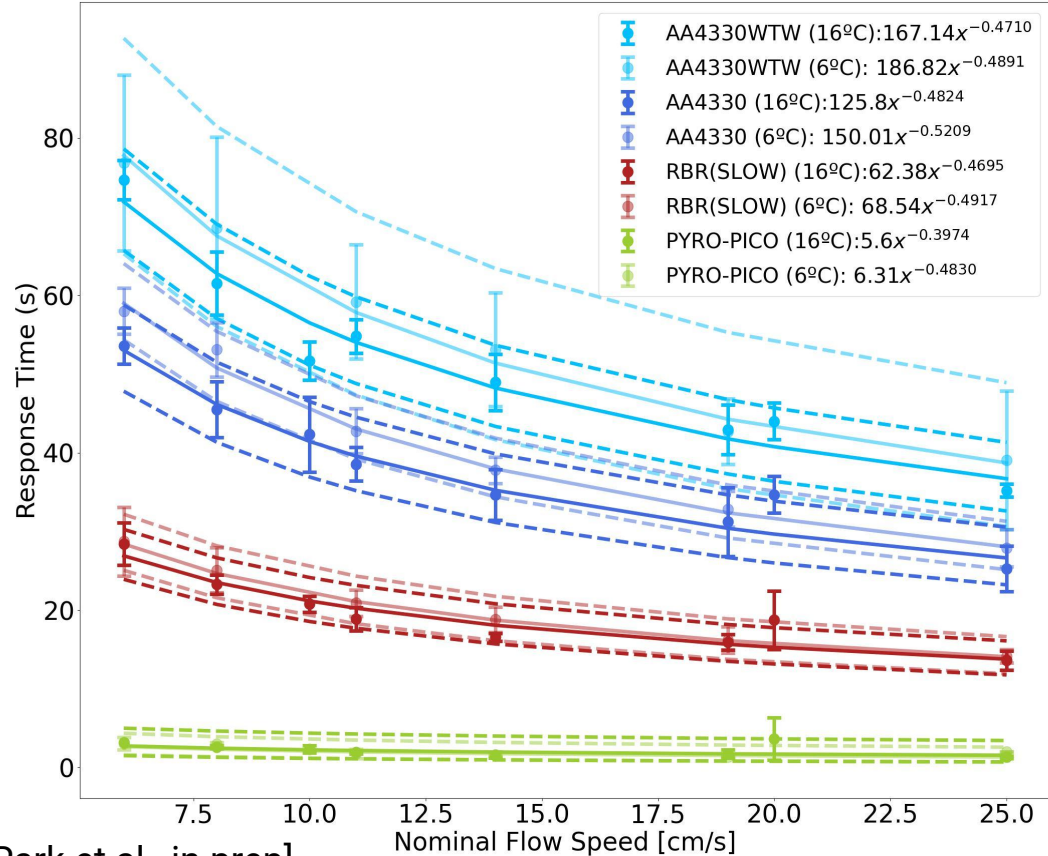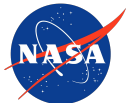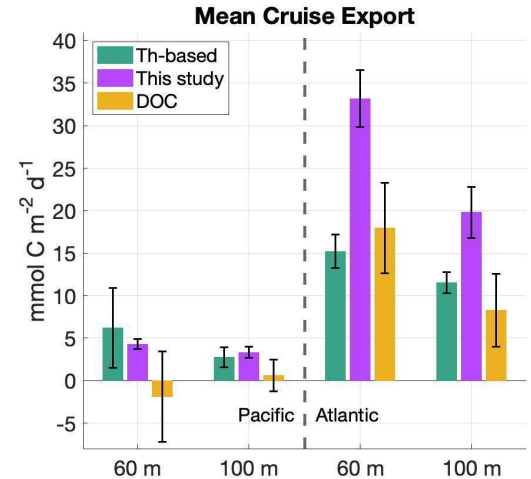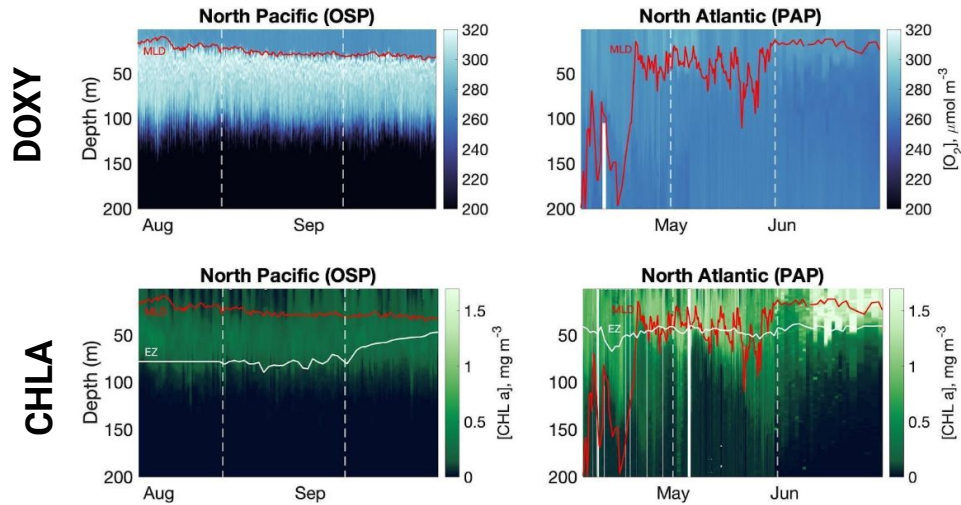
[Park et al., in prep]

EXPORTS Biological Carbon Pump

Shawnee Traylor, Ph.D. student in Nicholson Lab is lead. Collabs: Many from EXPORTS
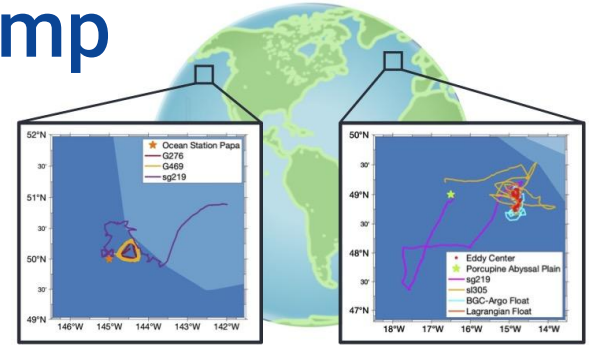
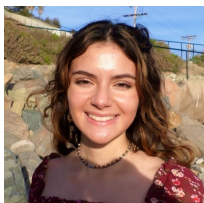Glider and float data combined to quantify carbon export

North Pacific (OSP) / North Atlantic (PAP) — DOXY and CHLA depth profiles

Mean Cruise 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

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

GO-BGC

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,…)