

WG170: Physiology and Rates in Microbial Oceanography (PRIMO)

This working group's goals are to:

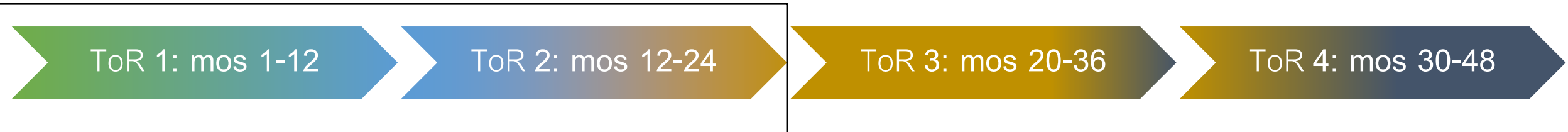
- 1) Identify what physiological processes we should be paying attention to. Many physiological approaches were developed before the 'omics revolution. Are we still measuring the best currencies? **Can we leverage the wealth of information from 'omic measurements to measure rates more effectively?**
- 2) Develop a framework and toolset for discovering proxies of physiological processes that can **bridge 'omics and models**, leveraging expertise from physiologists, 'omics researchers, and modelers.

The overarching aim of the WG is to identify and set the stage for the development of a core suite of measurements that are harmonized, low-cost, easy to use, and high throughput to **promote co-measurement of 'omics, rates, and biogeochemistry.**



<https://www.primoscorwg.org>

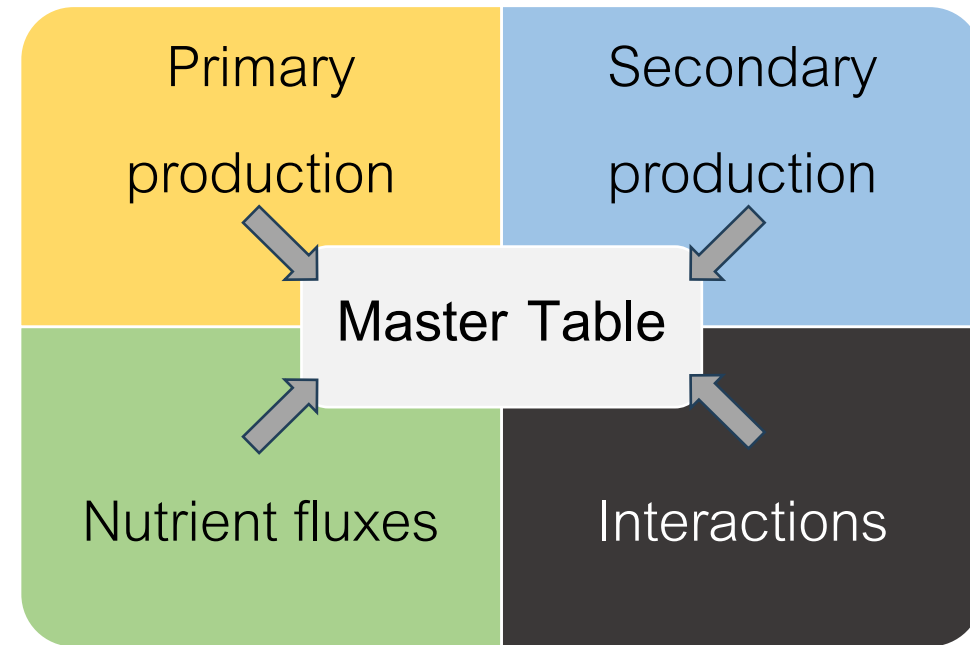
PRIMO Timeline



ToR 1 and 2 Progress

1. Review current physiological metrics
2. Identify the key knowledge gaps as revealed by 'omics that are candidates for the co-design of new assays
3. Rank assays according to their likely success for development, biogeochemical importance, and modeling ease
4. Collaborate with modelers: Identify priority new/improved physiological metrics

Working group split into 4 subthemes



Reviewing

- Currency (e.g., Carbon)
- Resolution (spatial, temporal)
- Assumptions / uncertainties
- What are the gaps?

Ranking

- Importance for biogeochemistry
- Modeling ease
- Suitability for co-measurement (Through-put, cost, scalability)

Collaborating

- Expertise from other disciplines
- Publish online database
- Input from modelers
- Perspective paper
 - Key gaps in models and propose new physiological approaches to fill them



IN PROGRESS



PRIMO Inventory of Oceanographic Physiological Assays

Our goal is to develop a community and framework for co-designing novel physiological metrics that may act as 'currency converters' to link 'omics datasets and biogeochemical models of the marine ecosystem.

To this end, this literature review covers well-established physiological metrics routinely used in biological oceanography, as well as novel metrics being developed to determine physiological rates at both the cellular and community level. The table includes information about the methods (currencies, units, assumptions, uncertainties) that impact their potential readiness to be used in biogeochemical models. We also provide key references to facilitate discovery.

We have divided the inventory into four sections: Primary Production, Secondary Production, Nutrient Fluxes, and Interactions. Feel free to focus your feedback on your field of expertise.

Please use the Feedback Form below to identify where information is incomplete or could be improved. Your input is greatly appreciated!

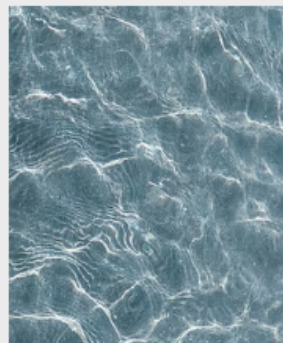
Thank you to the expert reviewers who provided invaluable feedback on this inventory.



[Feedback Form](#)



[Primary Production](#)



[Secondary Productivity](#)



[Nutrient Fluxes](#)



[Interactions](#)



Capacity building:

Mentorship Program

<https://www.primoscorwg.org/mentorship-program>

- 15 mentees, PhD students and PDFs
- Pairs early career researchers with working group and network members
- Mentees participate in all working group activities
 - Mentees participated substantively in preparation of our Inventory of physiological assays
- Mentee group meetings, occurring roughly monthly, cohort building
- Mentee-mentor meetings, typically monthly
 - career trajectory mentorship, feedback on research plans and proposals, collaborations
- **Highlight:** Our mentees, supported by the PRIMO leadership team, led the proposal and acceptance of a special session at [Ocean Sciences Meeting 2026](#) OB023 'Quantifying and Linking Omics, Physiology & Models in Marine Microbiology'.