ANTARCTIC 2023-2024

AUTONOMOUS MEASUREMENT OF PRIMARY PRODUCTIVITY, PHOTOPHYSIOLOGY AND CLIMATE-ACTIVE GASES IN SOUTHERN OCEAN WATERS

LEAD INSTITUTION, PI

PI: Philippe Tortell, Department of Earth, Ocean and Atmospheric Sciences, University of British Columbia, Canada, CA

ABSTRACT

Abstract/aim of the project

We propose to install automated ocean sensors on board Le Commandant Charcot during its 2023 – 2024 Antarctic field season, with the goal of measuring key biogeochemical variables along the West Antarctic Peninsula (WAP) during the spring - summer transition. Building on our successful field season on the Charcot during summer, 2022, we will deploy an extended suite of dissolved gas and optical sensors for broad spectrum measurements of primary productivity, phytoplankton biomass and taxonomic composition and sea-air fluxes of climate-active trace gases. Our primary scientific objectives are to: 1) understand the spatial and temporal patterns of primary productivity, phytoplankton biomass and assemblage composition along the WAP, and examine the underlying factors driving this variability, and 2) identify 'hot-spots' of the climate-active gases methane (CH4) and dimethyl-sulfide (DMS) in relation to underlying oceanographic variables. By conducting repeat measurements along the WAP, we will gain insight into the hydrographic factors driving variability in primary productivity and trace gas distributions. This will inform our understanding of future climate-dependent biogeochemical changes in this rapidly evolving ocean region. Our scientific measurements will be integrated with onboard public education and outreach activities, providing passengers with a meaningful opportunity to engage with oceanographic research, and better understand the physical, chemical and biological processes that shape Antarctic marine ecosystems.