Exploring the microbiomes in the South Atlantic Meridional Overturning Circulation

Recent studies have revealed that few litters of seawater can support a striking abundance and yet unknown diversity of ocean life. Some ecological aspects of planktonic communities are still poorly understood, such as the interaction between virus and their hosts.

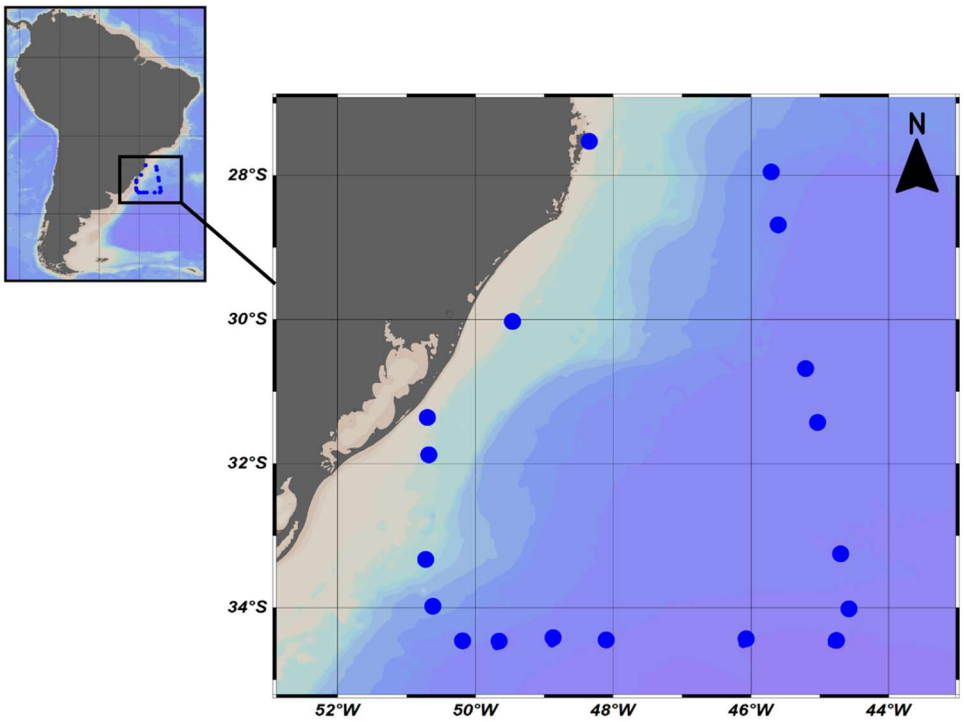
As part of the AtlantECO flagship cruises, surveys for sampling planktonic microorganisms of the South Atlantic Ocean were conducted in partnership with the SAMBAR project, which aimed to investigate the interannual variability of the heat content and the meridional transports across the South Atlantic Meridional Overturning Circulation (SAMOC). XBTs and CTD casts, deployment and redeployment of PIES/CPIES moorings on the seafloor and sampling of marine microbiomes were performed during the cruise. The campaign was conducted by 15 scientists and a crew of 18 people on board R/V Alpha Crucis, the research vessel of the Oceanographic Institute of the University of São Paulo (Brazil). The campaign covered the coordinates 27.5° - 34.5°S, 50.5° - 44.3°W, from July 28th to August 11th, 2022.

Days of rough and calm sea were experienced. The navigation plan was modified to avoid turbulent waters caused by storms and cyclones. Despite the vessel's stability, falling asleep was challenging some nights. Sunny days were rare. However, good days could be fully enjoyed. The scientific team and the crew were always adapting the sampling schedule with a good mood and enthusiasm, including special breaks to photograph birds, play tambourine and celebrate birthdays.

Despite the unforeseen events, 18 stations were sampled for marine microbiomes. From 10 to 20 L of seawater were pre-filtered using a 20 µm mesh (to remove untargeted plankton species) and filtered again using a peristaltic pump with 3 µm and 0.2 µm filters to sample unicellular eukaryotes and prokaryotes, respectively). Subsequently, an iron chloride stock solution was added and samples were incubated for few hours. The sample was filtered again (with a 0.8 µm filter) to retain viruses. The samples will be later subject to DNA sequencing. In terms of AtlantECO objectives, the scientific focus of this

expedition was to collect samples covering an important and yet underexplored region of the South Atlantic, including oceanic and coastal areas, to expand the worldwide microbiome database.

R/V Alpha Crucis in Santos (Brazil). Photo: Luiz Nonnato.



Region covered by the SAMBAR/AtlantECO cruise in July-August 2022. Blue dots indicate sampling stations.

Filter recovery following seawater filtration using customized unit containing special filter holders and a peristaltic pump. Photo: Ophelie Choupin.

Scientists on board R/V Alpha Crucis during the SAMBAR/AtlantECO cruise in July-August 2022. Photo: Ophelie Choupin.