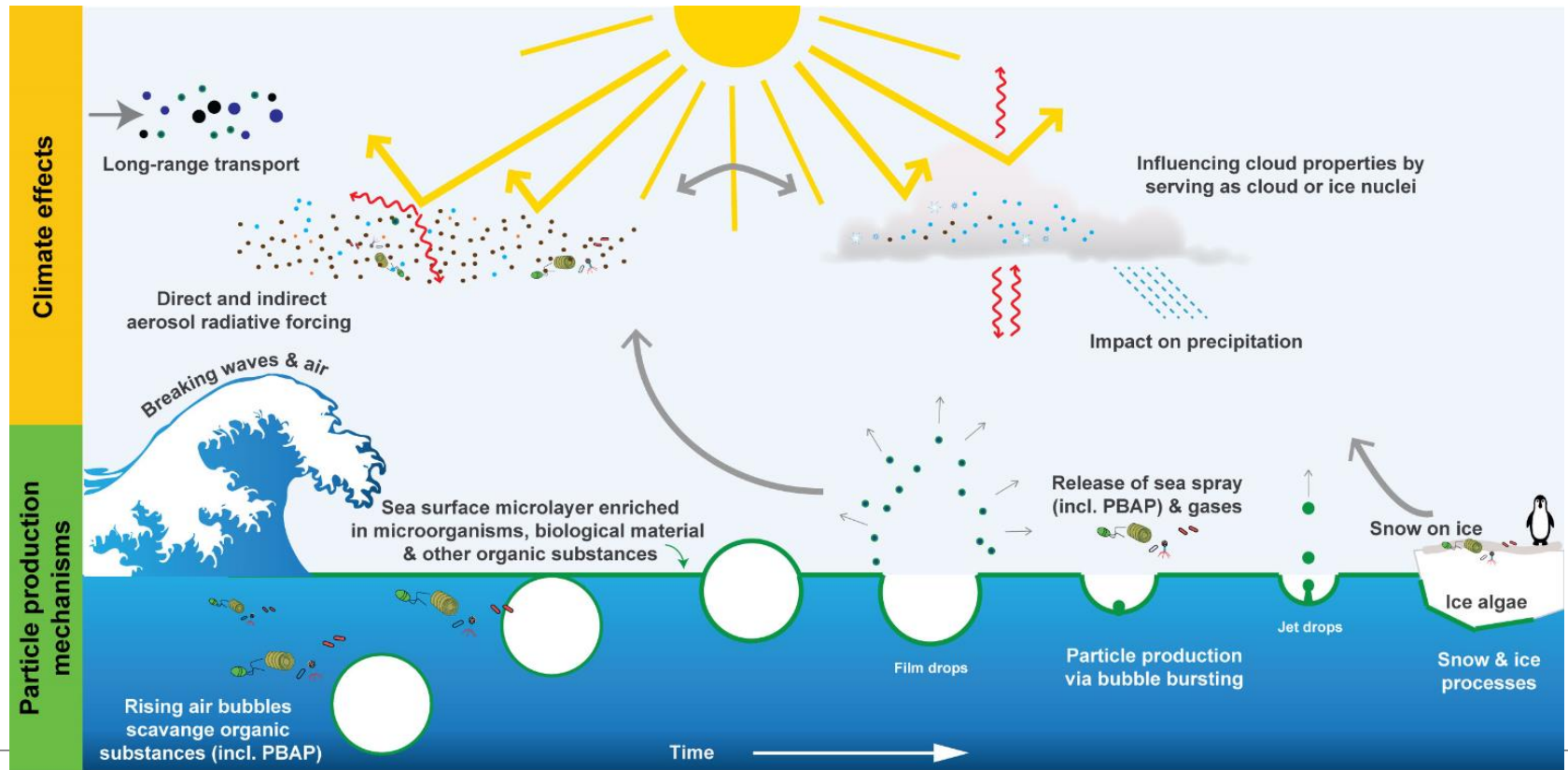


Pulse of the Weddell Sea

The role of marine primary biological aerosol particles for clouds and climate (MARIBIOCLOUDMATE) – Research Topic 1



Pulse of the Weddell Sea

The role of marine primary biological aerosol particles for clouds and climate (MARIBIOCLOUDMATE) - Research Topic 1

Principal Investigator: Paul Zieger, Stockholm University, Department of Environmental Science (ACES), Atmospheric Scientist

Co-PI: Matthew Salter, Stockholm University, ACES, Atmospheric Scientist & oceanographer

Participant(s): Future PhD student and/or PostDoc, N.N.



Scientific hypotheses / Research questions

1. What are the properties of primary **biological aerosol particles** (PBAP) emitted from **natural aerosol sources** (e.g. ice, snow, water) in the Antarctic environment?
2. What is their potential **climate-relevance** in comparison to other aerosol particles relevant for **clouds**?

Tools:

- Controlled aerosol experiments using a variety of natural sources (e.g. sea water, snow, ice) and characterization of ambient aerosol characteristics
- Later implementation and testing of parameterizations in models

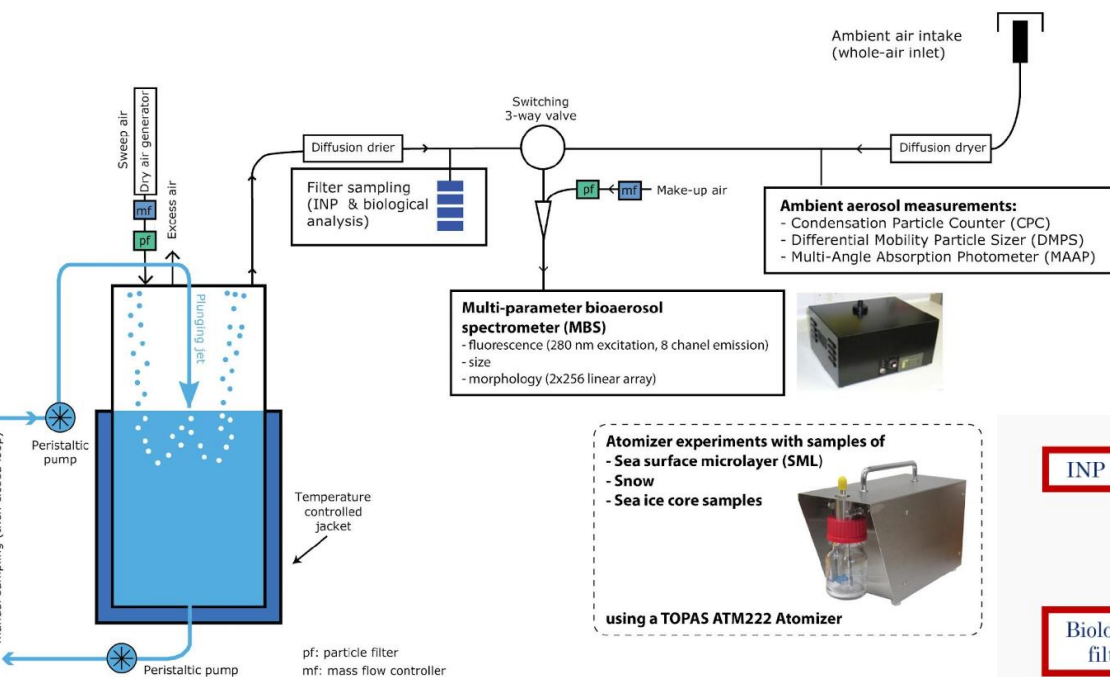


Parameters measured within the project

- » **Multiparameter Bioaerosol Spectrometer (MBS):** Concentration and optical properties (fluorescence, size, morphology) of aerosol particles $> 0.8 \mu\text{m}$ on a single-particle basis
- » **Differential Mobility Particle Sizer (DMPS) and Condensation Particle Counter (CPC):** Concentration and size of aerosol particles between approx. 10 and 900 nm
- » **Multi-Angle Absorption Photometer (MAAP):** Equivalent black carbon concentration
- » Various **filter samples** for potential biological analysis and ice nucleating particle concentration

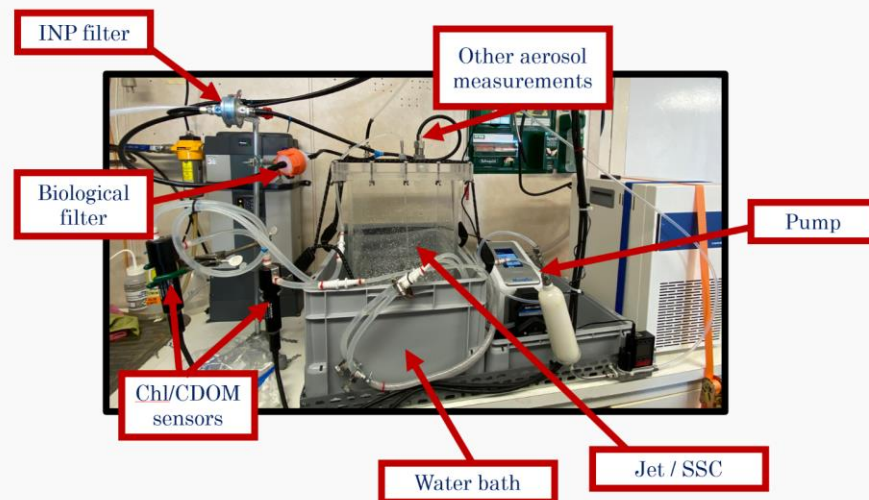
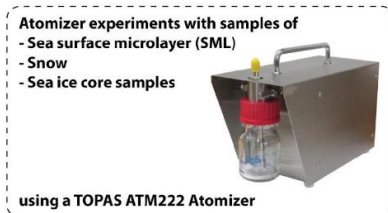


Type of data collection



1. On-board analysis of sea water, ice and snow samples using (a) sea spray simulation chambers and (b) atomizers

2. Ambient air sampling of additional (basic) aerosol parameters



MAAP, MBS and DMPS installed in racks

Installation of sea spray chamber during ARTofMELT2023



**POLARFORSKNINGS
SEKRETARIATET**
SWEDISH POLAR RESEARCH SECRETARIAT

Pulse of the Weddell Sea – Planning workshop
Abisko March 2024

Logistic support requirements

» On board:

- *3-4 standard bench spaces for instrumentation and sea spray chamber*
- *Access to sink & clean working space (laminar flow hood?)*
- *Air intake / inlet*

- » Regular water samples (from CTD or ship's clean sea water supply)
- » Regular sampling of ice core, sea surface microlayer and snow
- » Sampling from other ice floes further away from ship
- » Turning of ship into main wind during station

