climate change, and in particular to study the evolution of sea ice mass and sea ice balance. During the MOSAIC expedition (https://mosaic-expedition.org/) an L-band radiometer called ARIEL will be deployed and will perform measurements during the whole year-round. Moreover, many routinely in situ acquisitions will be performed during MOSAIC like ice and snow thickness, temperature and salinity of the ice and snow, density profiles, permittivity of the sea ice. These measurements will allow us to improve the emissivity and dielectric constant models for sea ice and snow and improve the accuracy of the sea ice thickness measurements from the SMOS satellite.

Simulating Plankton Evolution with Adaptive Dynamics (SPEAD) - Pedro Cermeño, Sergio Vallina, Guillaume Le Gland

Ocean plankton ecosystem models assume that the distributions of plankton populations depend on the "ecological selection" of species by environmental factors and biotic interactions (competition, predation). However, current state-of-the-art models do not consider the enormous potential of plankton to have "adaptive evolution" in the face of changing environmental conditions. Evolution can be understood using the notion of dynamic fitness landscapes, which gives the relationship between genotype and survival fitness for non-constant environmental conditions. The project SPEAD seeks to simulate the ecological evolution of planktonic organisms for the global ocean using this framework. The objectives of this project are: i) to develop an ocean ecosystem model that includes the adaptive evolution of planktonic organisms along three environmental gradients (nutrients, temperature, irradiance) in order to ii) better predict the response of marine ecosystems to future climate change scenarios. To achieve this goal we propose to combine two approaches that are so far being developed independently. The SPEAD project seeks to combine both approaches (discrete populations + continuous trait diffusion) in order to build a unified model that is able to resolve the adaptive evolution of several species-traits for many populations of phytoplankton simultaneously.

Polar atmosphere-ice-ocean Interactions: Impact on Climate and Ecology (PI-ICE) - Manuel Dall'Osto

PI-ICE (Polar atmosphere-ice-ocean Interactions: Impact on Climate and Ecology) studies the natural marine aerosol, which is of paramount importance at the global scale and influences the Earth's radiative budget and the biogeochemical cycles. As climatic changes are rapidly amplifying in polar regions, understanding biogeochemical processes involved in the air-sea-ice interface is crucial to pinpoint climate feedbacks. PI-ICE aims to directly identify atmospheric aerosols emitted in the polar regions, their biological origin and their impact on the indirect radiative effect, with particular emphasis on the ice-water-atmosphere biogenic nitrogen cycle. This multidisciplinary project will (1) design, develop and construct a portable aerosol chamber to study the role of sea-water-air interactions in the formation of polar primary aerosols including newly formed particles and aerosolized biogenic toxins; (2) apportion the emissions of primary marine aerosols in the polar regions by means of laboratory studies; with particular emphasis on superficial waters impacted by ice melting and (3) obtain real time atmospheric data by collection of ambient aerosols at fixed platform (Antarctic base Juan Carlos I), allowing characterization of a wide range of ambient primary and secondary aerosols, including new particle formation and potentially aerosolized biogenic toxins.