ARCTIC 2023 – PROJECTS SELECTED FOR IMPLEMENTATION

Arctic and Antarctic Sea Ice – Thickness variability and Change, Ice Loads, and Navigability (SeaIce)

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ABSTRACT

The thickness of sea ice is one of it's most important properties affecting the energy and freshwater balance, ecosystem functions, and navigability of ice-covered waters. It is also an important climate indicator revealing the state of the ice at a given time. Here we propose to carry out extensive ship-based and on-ice measurements of sea ice thickness and other ice properties like, e.g., melt pond coverage, to complement our own long-term observations in the central Arctic and North Pole, as well as for satellite and model validation, and for the study ship-ice interaction and performance. Observations will be based on electromagnetic induction sounding, drone flights, and simple in-situ measurements, complemented by ice load and ship motion, ice load, and vibration data. We will also utilize the North Pole cruises to deploy drifting buoys as part of our contributions to the International Arctic Buoy Programme and our own long-term observations. This proposal is based on the successful outcomes of Ponant's demonstration cruise to the North Pole in 2021, and our own cruise participation in July 2022.

We also aim to establish a long-term and regular collaboration with Ponant to monitor and investigate sea ice properties and their changes from year to year and across the seasons, as well as long-term investigations on ship structures and ship performance in Arctic environments with a focus on cold temperatures and sea ice. Hence, our objective is to establish these measurements with minimal impact on a routine basis and thus to contribute to the Ponant scientific (sea ice) program as a reliable partner.