



Invitation

## ARICE-SPRS planning workshop for the expedition ARTofMELT

The expedition ARTofMELT is aiming to catch the start of the surface melt in the Arctic Ocean during spring 2023 using I/B Oden.

SPRS is now welcoming international collaboration and related research for this expedition with a workshop.

The workshop will also serve as a workshop within the ARICE project (Arctic Research Icebreaker Consortium) where it will contribute towards the ARICE goal of implementation of joint international research cruises in the Arctic Ocean. The results from the workshop will be used in strengthening the dialogue between Arctic researchers and Polar Research Vessel operators to plan and implement joint cruises.

**When** November 10, 2021

**Where** Stockholm, Sweden & online

The number of participants in the workshop is limited.

Please, send a description of your interests, scientific focus and your funding agency to: [ted.karlsson@polar.se](mailto:ted.karlsson@polar.se) no later than **2021-08-01**.

For scientific details, please contact:

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! Please note, a full background description to the workshop and the ARTofMelt project can be found on the following pages.



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# Planning workshop for the expedition ARTofMELT with the Swedish icebreaker I/B Oden spring 2023

## Background to the workshop

Last year, the Swedish Polar Research Secretariat (SPRS) launched a new approach to infrastructure support at programme level called the Polar Research Process. Within this process, an open call was held in November 2020 regarding themes in polar research. This resulted in ARTofMELT (Atmospheric rivers and the onset of sea ice melt) and two other proposals being selected in a peer-review process with the Secretariat's international expert group.

The expedition ARTofMELT is aiming to catch the start of the surface melt in the Arctic Ocean during spring 2023 using I/B Oden. SPRS is now welcoming international collaboration and related research for this expedition with a workshop. The workshop will also serve as a workshop within the ARICE project (Arctic research icebreaker consortium) where it will contribute towards the ARICE goal of implementation of joint international research cruises in the Arctic Ocean. The results from the workshop will be used in strengthening the dialogue between Arctic researchers and Polar Research Vessel operators to plan and implement joint cruises.

The workshop is open to all and SPRS invite scientists from international partners to collaboratively take the planning of the ARTofMELT expedition further. The approximative cost for a berth during the expedition will be 1 MSEK (final cost will be determined when the research program is decided). It is of great importance that the logistical requirements of the invited projects are compatible with the ARTofMELT project; see the detailed description below.

## Lead Scientists for ARTofMELT

Michael Tjernström & Paul Zieger, Dep. of Meteorology & Dep. of Environmental Science, Stockholm University

## Background to the ARTofMELT project

The science objective of ARTofMELT is to study the onset of the annual surface melt in the North-Atlantic sector of the Arctic pack ice and the impacts on this from intrusions of warm and moist air from the open ocean to the south; these intrusions often occur in the form of filaments of air transported northward and are sometimes referred to as atmospheric rivers. There are very few in-situ observations from the melt onset, while few expeditions endeavour into the pack ice at this time of the year, and observations of atmospheric rivers have only happened when an expedition by chance happened to be at the right location. ARTofMELT will deploy an innovative strategy to remedy this. This strategy is simple and based on two tenets:

1. Be early. Deploying the Oden in the Arctic Ocean pack ice north of the Fram strait in the spring of 2023.
2. Be at the right location. Using ensemble forecasting of so-called extreme forecast indexes, we will pinpoint timing and area for atmospheric rivers at 5-10 days' lead time. Oden will then navigate towards that area, while ensemble trajectories will help pinpoint an optimal observing location. Arriving there before the event, we will wait for it to happen and can observe the evolution when it does.

The project is spearheaded by the ACAS (Arctic Climate Across Scales) project at Stockholm University and within this we will attempt cover many aspects of atmospheric science (boundary layer meteorology and the surface energy budget, aerosols and clouds, atmospheric structure,



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etc.). But no group can cover all aspects and we are always looking for partners that can either complement or supplement observations with additional instruments or other sampling techniques, or else take advantage of our strategy. For the benefit of ARTofMELT following priorities are wished for:

1. Complimentary atmospheric projects: For example, continuous remote-sensing wind profile observations and more advanced lidar observations. Additional aerosol observations are also welcome.
2. Projects that directly relates to the surface energy budget, for example dealing with the physics or chemistry of the sea ice or snow, the upper ocean vertical structure and energy budget etc.
3. Other projects 1: Projects that relate to the atmospheric transport theme, e.g. transport of pollutants or trace gases or projects with an environmental or a climate focus.
4. Other projects 2: Any other project that can coexist with ARTofMELT and take advantage of this particular cruise profile

A necessity for participating is that most observations use Oden as a base. Measurements on the ice will be possible when Oden is stationary, for example when waiting for a favourable forecast or when on location waiting for a forecasted atmospheric river to show up. Such measurements need to be designed so they can be interrupted at a relatively short notice (< 1 day) and possibly redeployed at a different location. As we do not govern what the atmosphere does, measurements that targets specific geographic areas will also be suboptimal. Since our in-situ air observations will be conducted mainly on the 4th deck of Oden (with the ship turned into the main wind), activities in front of the ship and access to the foredeck will be regulated; not impossible but permanent work on the foredeck should be avoided.

