

# An Update on the Multidisciplinary drifting Observatory for the Study of Arctic Climate (MOSAiC): An Ongoing (Yay!) Year of Going with the Floe in the Central Arctic Ocean



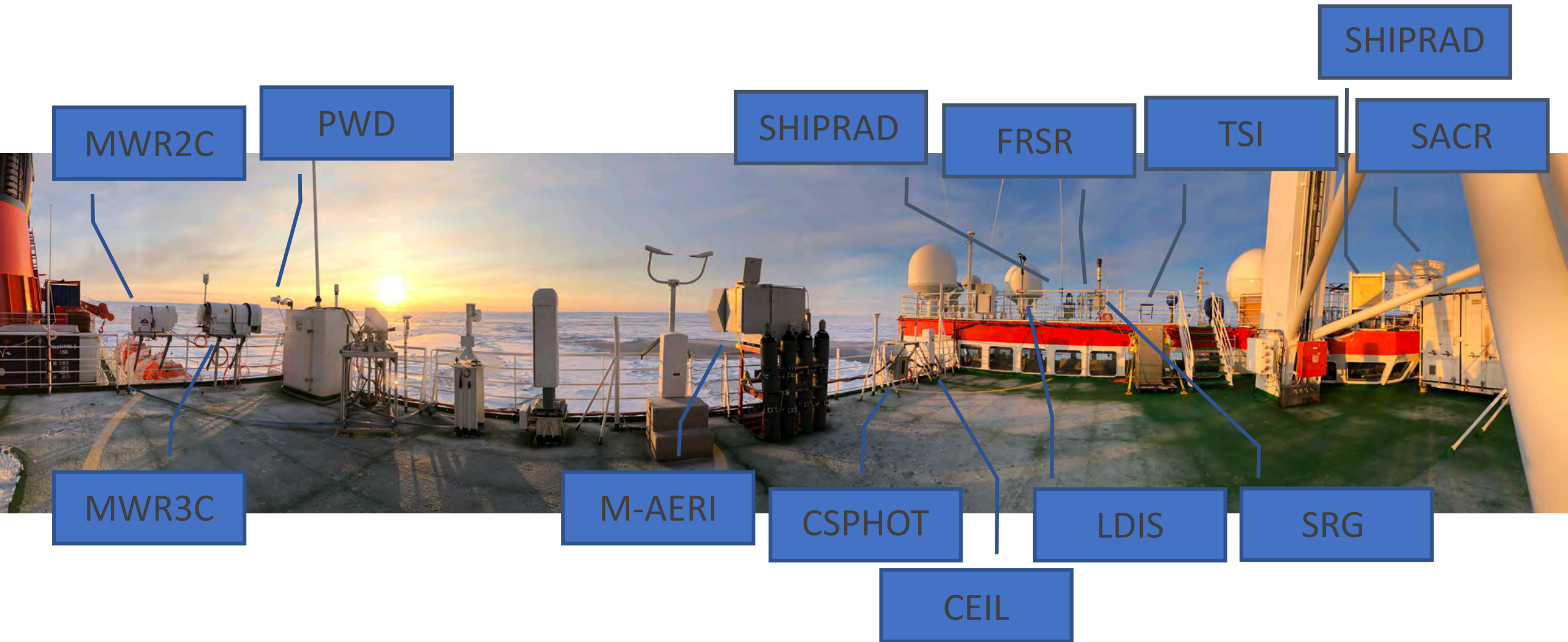
**Gijs de Boer**

On behalf Matt Shupe, Heath Powers, David Chu, Jessie Creamean, Kerri Pratt and the rest of the MOSAiC Consortium

# An Update on **MOSAiC** Track and Progress



# Status of **ARM** Instrumentation



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## In their own words

*M. Shupe:* "... the ARM data is looking great... in spite of the ship having to leave the ice for the last rotation, most of the ARM measurements continued, giving us a unique data set the transects the ice edge... Data quality for most instruments is good. There are many great cloud, storm, precipitation, aerosol cases.

*H. Powers:* "... most things have been working incredibly well... one exception is the malfunction of the SACR X-band... The SACR Ka-band has been working well... Phenomenal success in most of the instruments... Part of the on-ice laser disdrometer consumed in a pressure ridge and some problems with MET City power lines... able to maintain 30-plus data streams during the time the Polarstern left the ice."

## Some notes

- Aerosol measurements have been challenged a bit by local pollution from the ship,
- Data usage: ARM data is available via the ARM archive (currently into April, prefix "mos"). ASR-funded PIs working on MOSAiC-related research can join the MOSAiC consortium, providing access to other MOSAiC data before it becomes public (latest 1/1/23)

**Objective:** Characterize the sources and properties of aerosols that affect Arctic cloud formation

**Status:** Successful continuous operation of DRUMs, source sample collection, and C3PO deployments for the first 3 legs!

## Measurements:

- DRUM aerosol impactors: size-resolved INPs and single-particle morphology and composition (CSU + Michigan)
- Filters: total, heat-labile, organic, and mineral INPs & DNA sequencing (CSU)
- C3PO portable aerosol sampler: collect filters for INPs near leads and melt ponds (CSU)
- Sea water, snow, and sea ice samples: assess possible local biological aerosol sources (CSU)

Sample tally (legs 1-3)	#
DRUM	1,603
Filter	143
Seawater, sea ice, snow	2,581



# ARM Observations and Model Evaluation

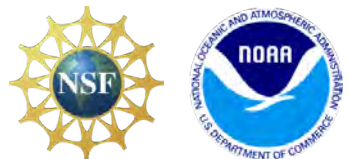
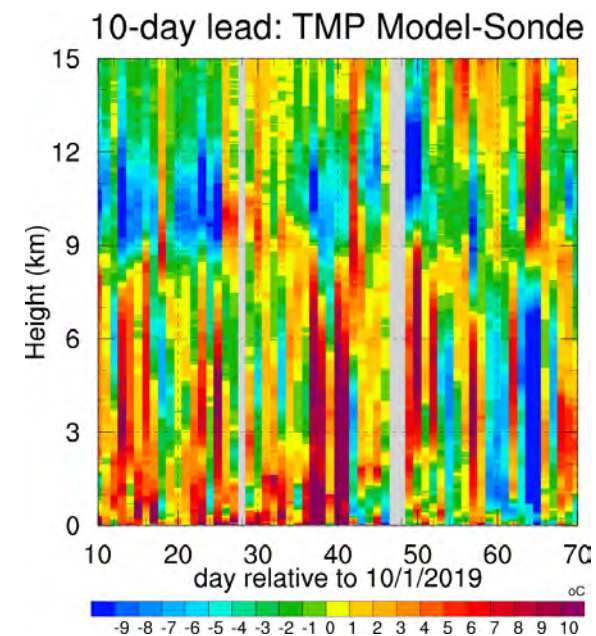
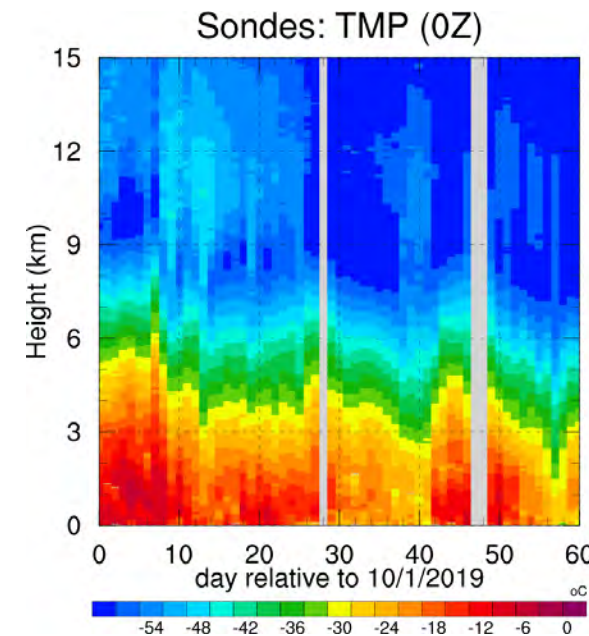
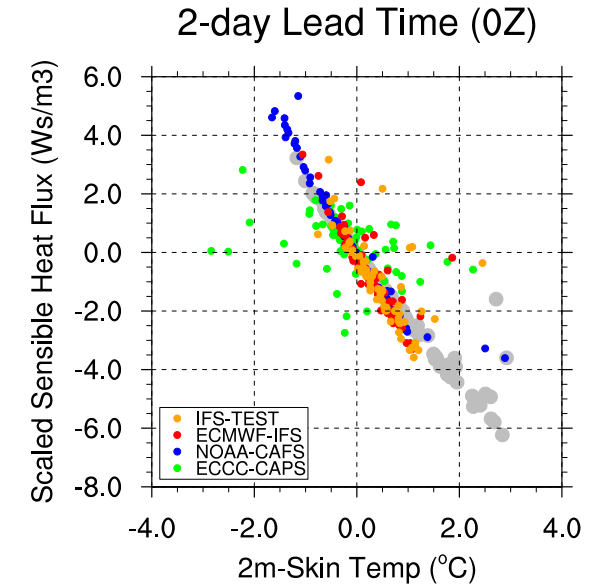
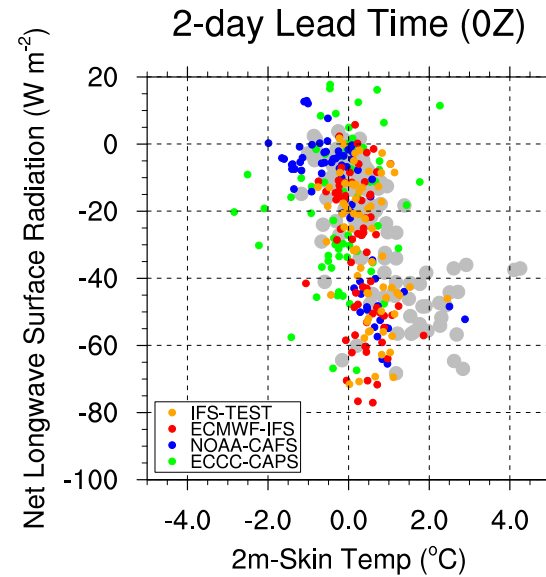
## **Near** Real-time Verification of Short-Term Forecasts during MOSAiC (MOSAiC-NRV)

The MOSAiC Near Real-Time Verification Project (MOSAiC-NRV) uses observations taken during MOSAiC to improve the simulation of coupled processes unique to the Arctic. Short-term forecasts help identify potential errors in the representation of "fast" processes that cause biases in climate model projections of Arctic climate change.

Observations of snow/sea-ice characteristics (from IMBs, **prec sensors**), the atmospheric structure (from **soundings**), cloud characteristics (based on **radar/lidar**), and surface fluxes (from 3 separate surface flux stations, **ground fluxes**) are used in the evaluation. **Red font indicates ARM measurements.**

Currently working to identify case studies to allow participating modeling centers (NOAA, ECCC, ECMWF, US Navy, MetNo, MeteoFrance, OSU, SLAV) to produce MMDFs (integrated files with ocean, ice, atmos variables) for model intercomparison

[https://www.esrl.noaa.gov/psd/people/amy.solomon/MOSAiC\\_NRV.html](https://www.esrl.noaa.gov/psd/people/amy.solomon/MOSAiC_NRV.html)





# ARM Heritage: Datahawks and other UAS

