



Multidisciplinary Drifting Observatory for the Study of Arctic Climate

Background

The central Arctic climate system is changing dramatically as the ice pack shrinks, opening the Arctic to commerce and transportation, affecting marine ecosystems and fisheries, and potentially impacting weather and climate at lower latitudes. MOSAIC is a field program that aims to study the Arctic system, and specifically how coupled atmosphere, sea ice, and ocean processes contribute to observed and future changes. Comprehensive year-round measurements, extending from the atmosphere through the sea ice and into the ocean of the central Arctic Basin, will advance understanding of critical Arctic processes, to enhance model predictive capabilities and to improve sea-ice forecasting tools.



The Plan

A manned, ship-based ice camp will drift with the central Arctic ice pack for a full year (2019-2020) to collect coordinated observations of atmospheric, oceanic, sea ice, biogeochemical, and ecosystem processes. This central, intensive observatory will be embedded within a constellation of distributed measurements made by buoys, remote stations, underwater drifters, unmanned aerial systems, aircraft, additional ships, and satellites. The resulting

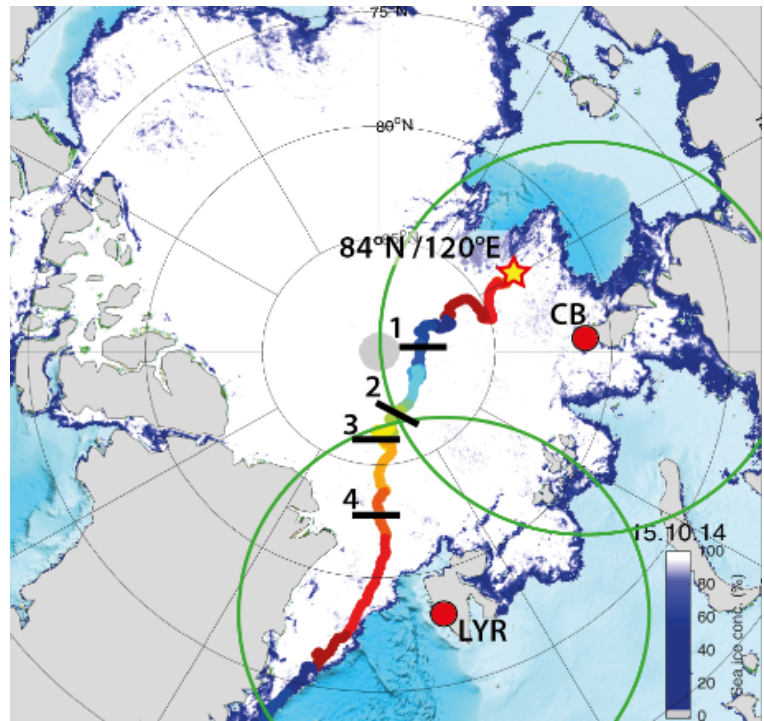
MOSAIC observations will underpin multi-scale modeling and synthesis activities that will contribute towards the development of earth system models that are better able to represent the Arctic system and its change. A broad consortium of nations and funding agencies will jointly facilitate, coordinate, and support this international and interdisciplinary initiative.

NOAA's Role

- Support for observations of the atmosphere-surface interface, including meteorological tower and autonomous surface energy budget stations.
- Operational satellite product evaluation and technique development.
- Experimental sea-ice and surface flux forecasting and assessment.
- Coupled system model evaluation and assimilation studies.

Outcomes and Benefits to NOAA and the Nation

- A comprehensive, coupled-system, central Arctic observational data set of atmosphere, sea ice, and ocean processes that can be used to evaluate regional- and global-scale versions of NOAA Unified Forecast System (UFS) and guide model development.
- Enhanced Arctic observing system through evaluation and development of autonomous sensors and techniques.
- Research quality measurements of energy and moisture fluxes in the complex, coupled atmosphere-ice-ocean system.
- Enhanced utility of operational satellite observations and ice services through process-based ground validation and evaluation.
- Operational model assimilation studies for a data sparse region.
- Assessment of operational and experimental weather and sea-ice forecasting systems.



Potential movement of the observatory along the Transpolar Drift beginning at the star and taking one year to reach #4.

Project Partners



TROPOS

Leibniz Institute for
Tropospheric Research



DFG Deutsche
Forschungsgemeinschaft

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