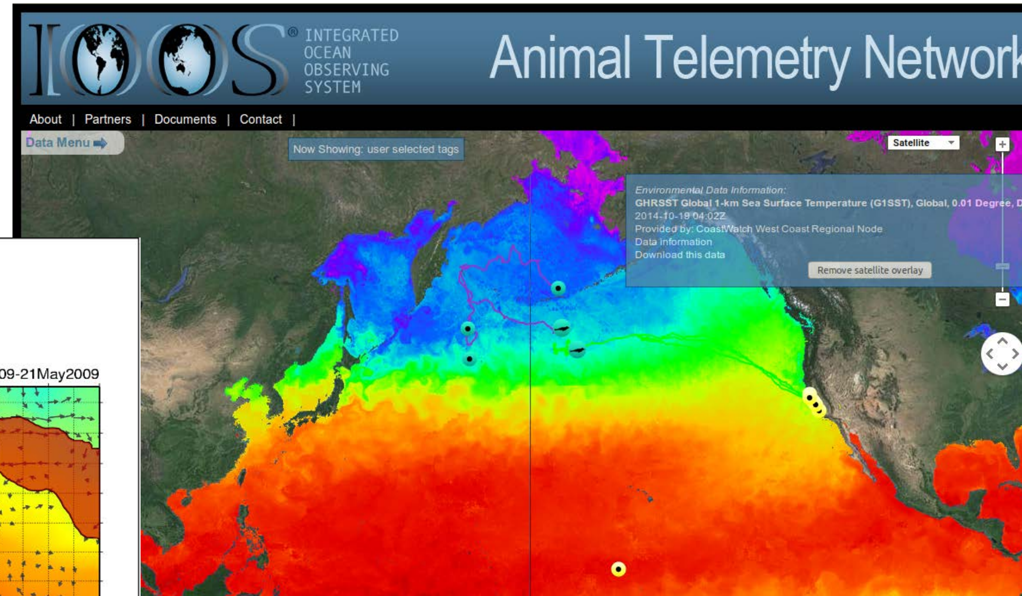
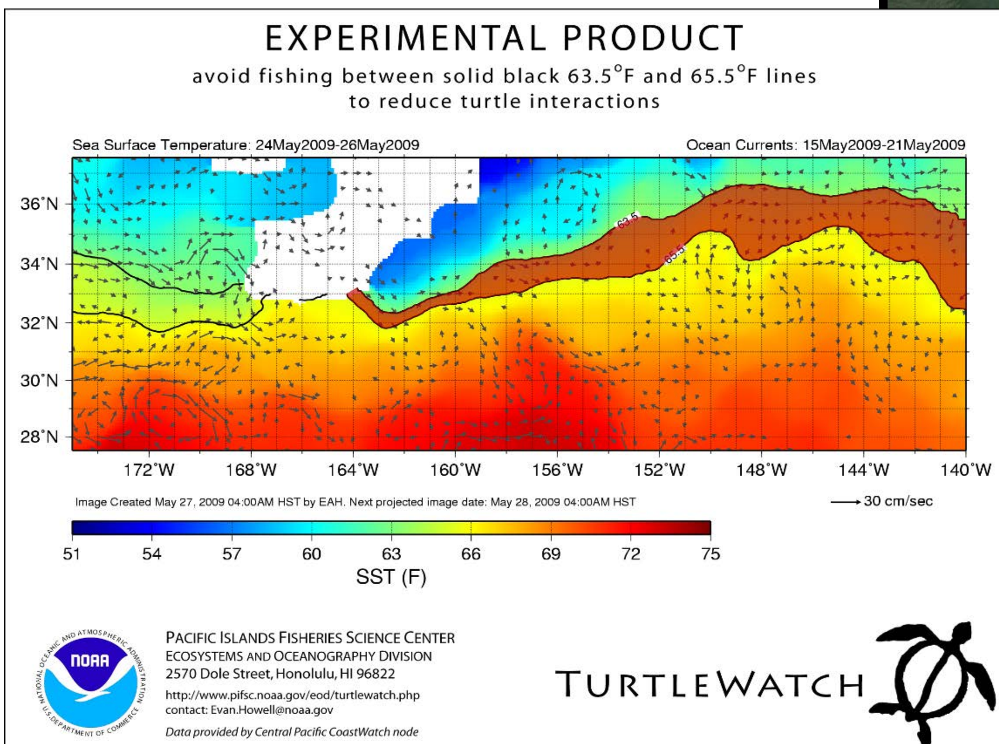
National Oceanographic Partnership Program

Multi-sensor Improved Sea-Surface Temperature for IOOS

MISST PIs Gentemann, Cornillon, Casey and project partners: 28 scientists from Navy, JPL, NOAA, academia, and private industry. Through international cooperation, MISST is providing 12 satellite SSTs in NRT at their native sampling (L2 data) and gap-free NRT data at 1 km, daily resolution.

The L2 satellite data are used to make daily high resolution gap free analyses of SST that are used operationally. NRT are available from the PO.DAAC and NOAA ERDDAP. Historical archive at NOAA NCEI (NODC).





Above shows the ATN's integration of 1 km, daily, gap-free SST with animal telemetry (cetacean, fish, pinniped, seabirds, and turtles) information to gain a better understanding of the ocean ecosystem

To the left shows "Turtlewatch" which uses another MISST gap-free SST analysis to set alerts of areas to avoid loggerhead turtle interactions

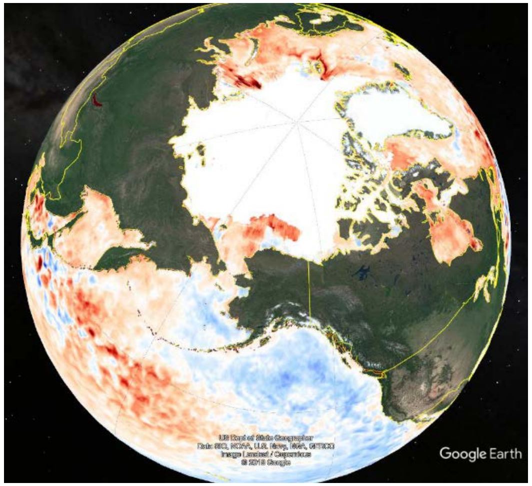
Sea Ice Remnant Svalbard July 17, 2008
Image credit: Camille Seaman

New Project 2018 - 2023

National Oceanographic Partnership Program

Multi-sensor Improved Sea Surface Temperature: continuing the GHRSST partnership & improving Arctic data

PI: Chelle L. Gentemann, Earth and Space Research
Co-I: Peter Minnett, University of Miami
Co-I: Michael Steele, University of Washington



16 partners in :

Industry: Richard Jenkins (Saildrone), Jean-Francois Cayula (Vencore)

Academia: Sandra Castro (U.Colorado), Peter Cornillon (U.Rhode Island), Dale Robinson (UC Santa Cruz), Andy Harris (U. Maryland)

Governmental: NASA: Edward M. Armstrong (JPL/Caltech), Toshio Mike Chin (JPL/Caltech), Jorge Vazquez (JPL/Caltech), Vardis Tsontos (JPL/Caltech)

Governmental: NOAA: Kenneth Casey (NCEI), Edward Cokelet (NOAA/PMEL), Eileen Maturi (NOAA/NESDIS/STAR), Gary Wick (NOAA/OAR/ESRL), Cara Wilson (NOAA/NMFS/SWFSC)

Governmental: ONR: Charlie Barron (NRL/SSC)

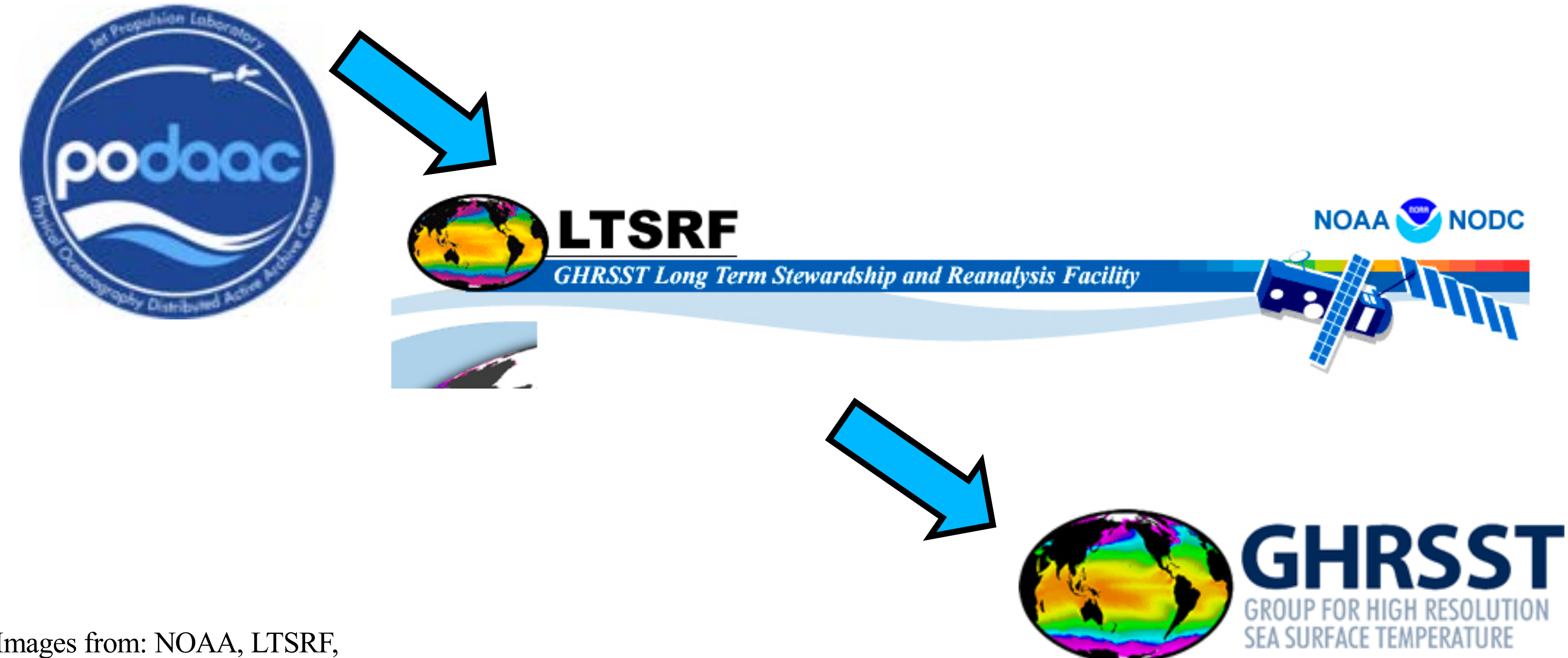
Project objectives

1) Coordinate and integrate new SST observations (e.g. GOES-R, VIIRS); improve data access; management and interoperability; and maintain and strengthen international collaboration.
2) Explore improving SST products through improved or expanded in situ SST observations in the Arctic
3) Focus on improving accuracy and uncertainty estimates of SSTs at high-latitudes
4) Explore improving SST products particularly in marginal ice zones through research into high latitude air-sea-ice interactions and regional ocean-atmosphere-ice feedbacks

Data

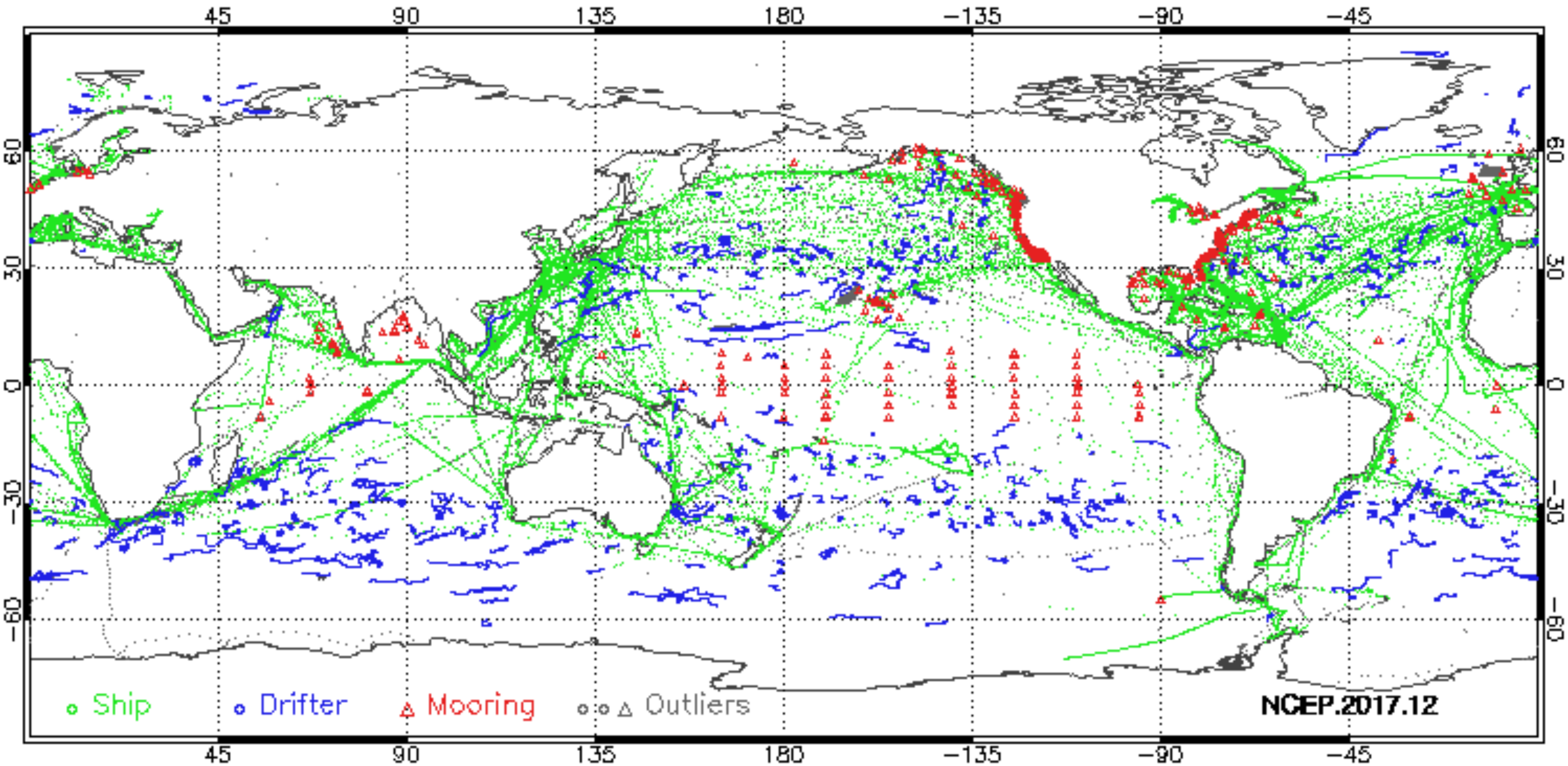
1) Coordinate and integrate new SST observations (e.g. GOES-R, VIIRS); improve data access; management and interoperability; and maintain and strengthen international collaboration.

Coordinate with the GHRSST Project Office (GHRSST-PO) on the proposed new distributed data system with a single point of entry



Images from: NOAA, LTSRF, GHRSST-PO

2) SST algorithm development



In situ SST observations 12/2017

Image credit: IQUAM NOAA

More in situ data

2) Explore improving SST products through improved or expanded in situ SST observations in the Arctic

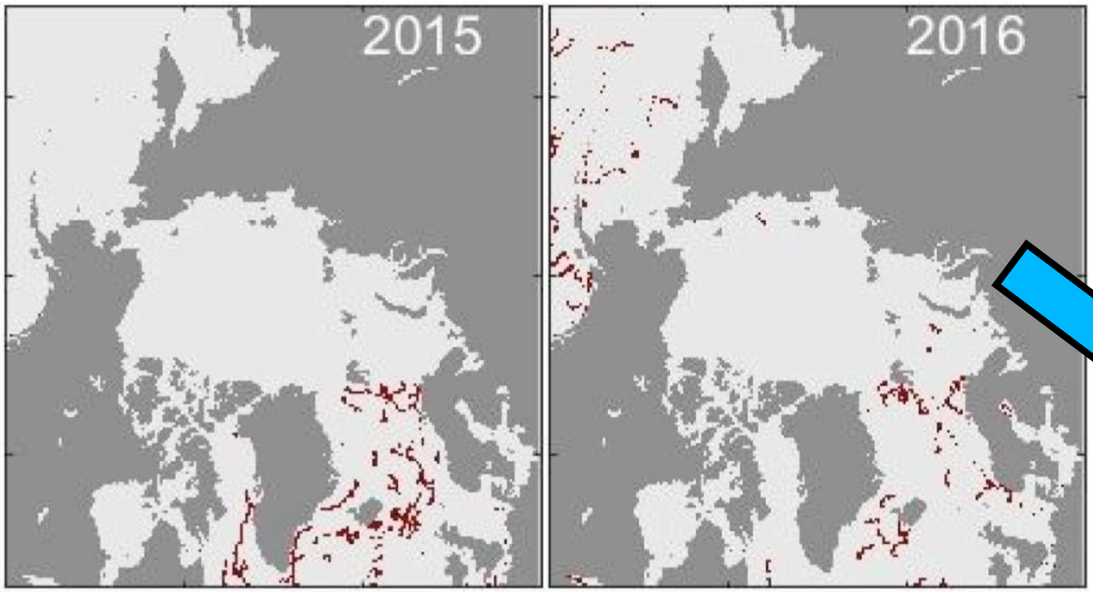


Figure 1. ICOADS Arctic SST observations from 2015 and 2016.

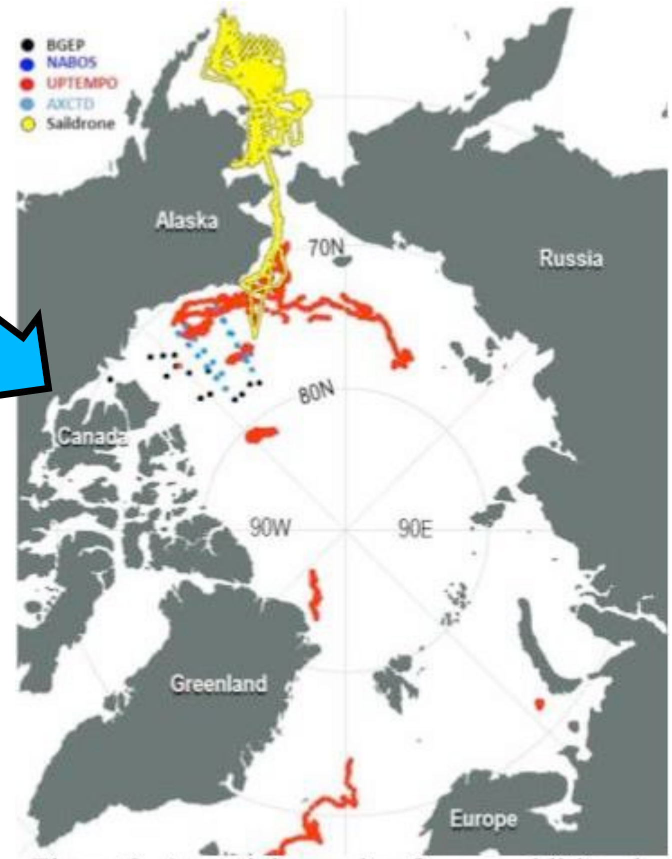


Figure 2. A partial sample of some additional *in situ* observations available in 2015.

Uptempo buoys, AXCTDs, Glider CTDs, Ship temperature data, Saildrone USVs (existing & future!)

Integrate data into ICOADS & MDB

5 Arctic Cruises

National Oceanographic Partnership Program

Image credit: NOAA PMEL

Five 90-day cruises to Arctic

Additional SST profile obs

Improved SST skin

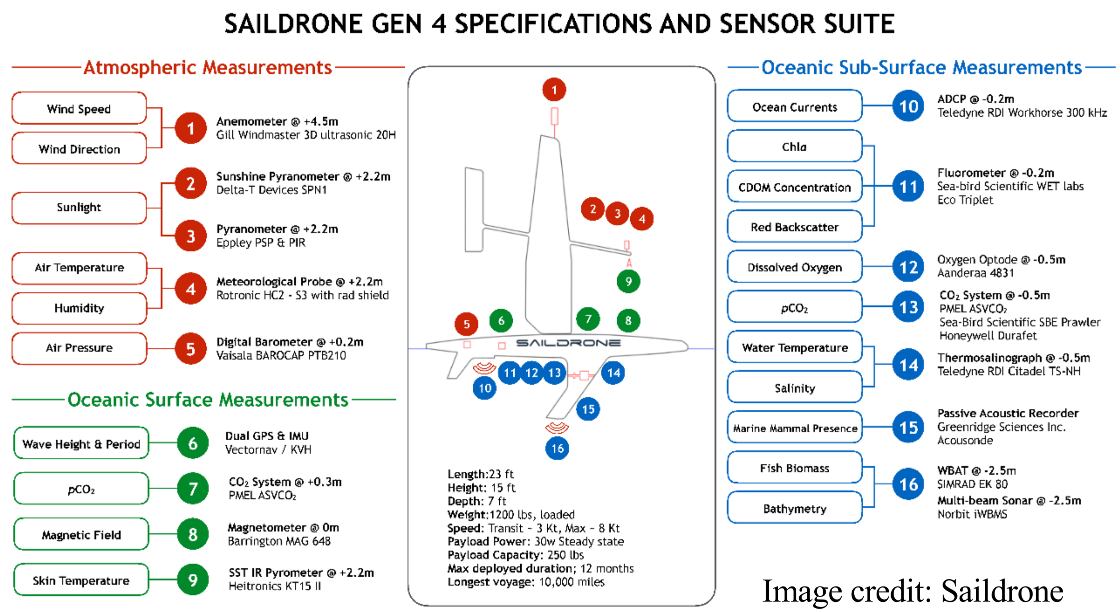


Image credit: Saildrone

SST algorithms

3) Focus on improving accuracy and uncertainty estimates of SSTs at high-latitudes

IR

-at high latitudes different algorithm formulations

-very dry atmosphere.

-surface emissivity more important

PMW

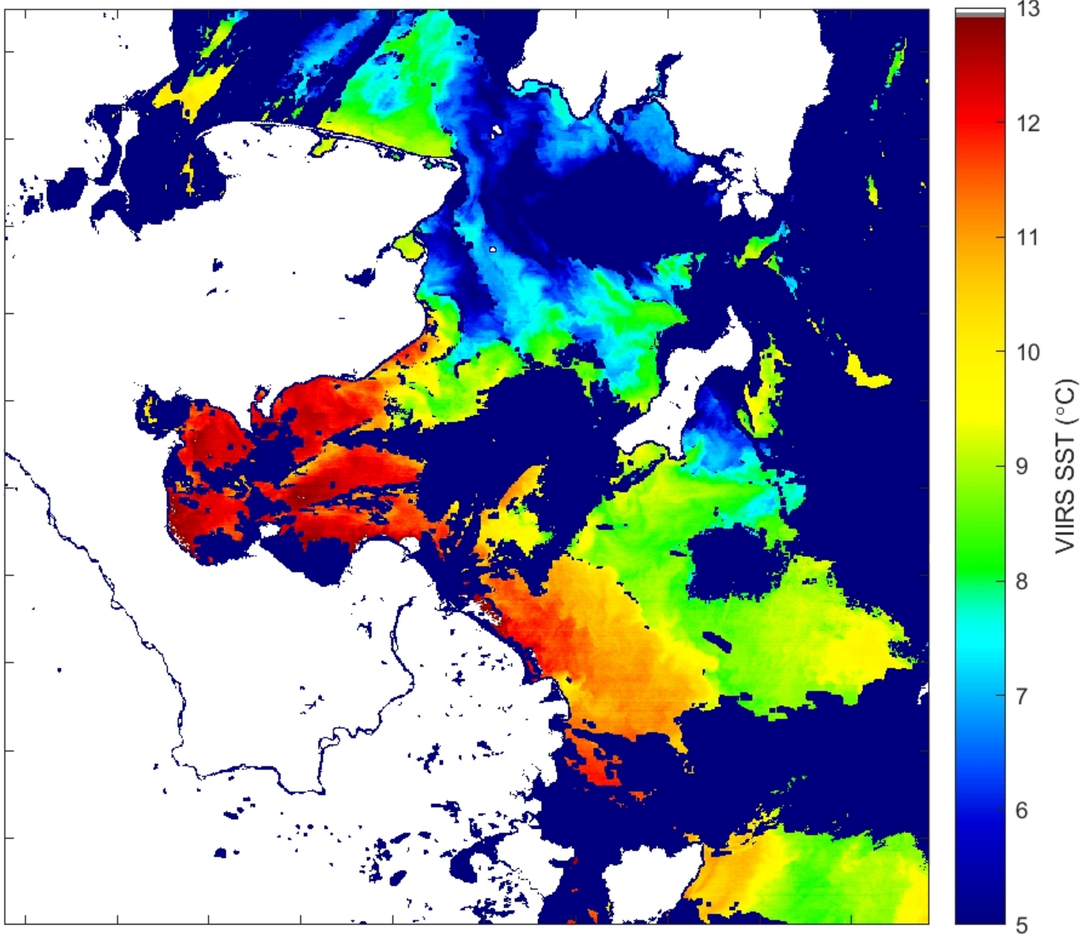
-10.7 channel not good for SST.

-Wind speed and direction errors lead to larger errors.

Algorithm development:

-RTM – simulated TB based on environmental conditions that are not well sampled

-In situ databases – not well sampled at high latitudes



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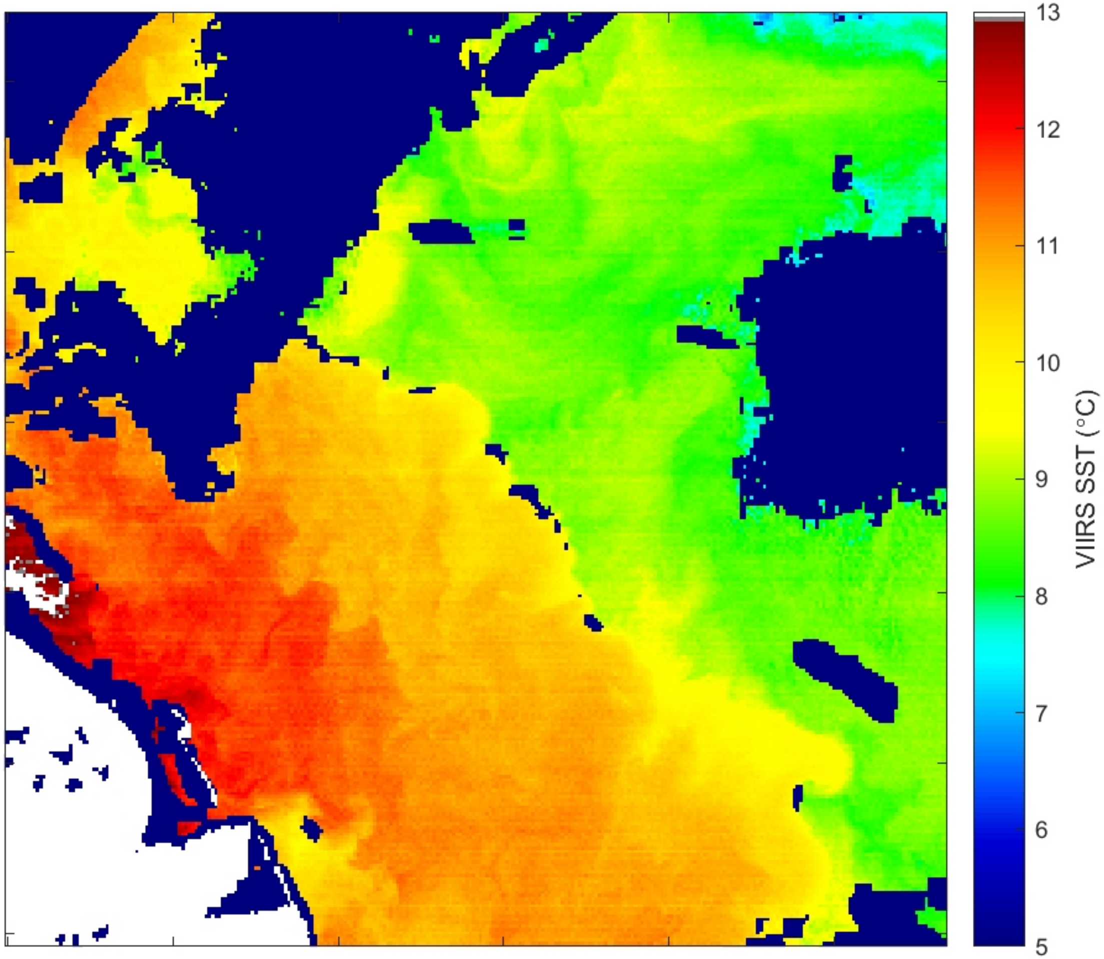

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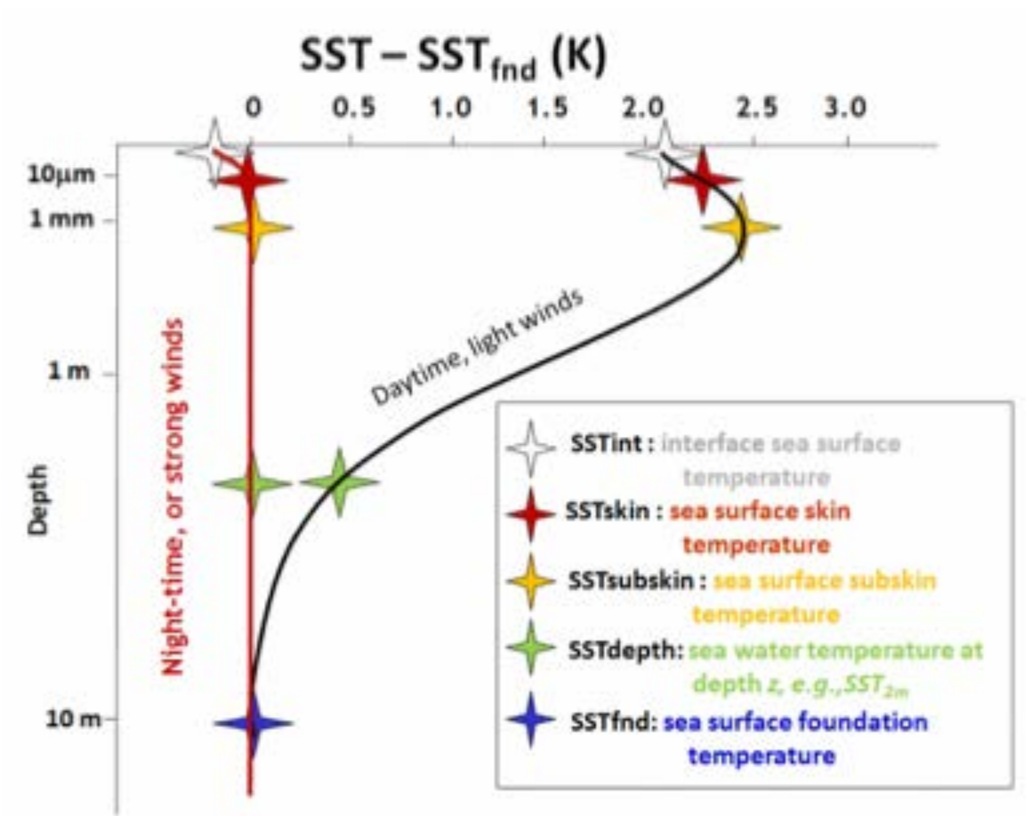


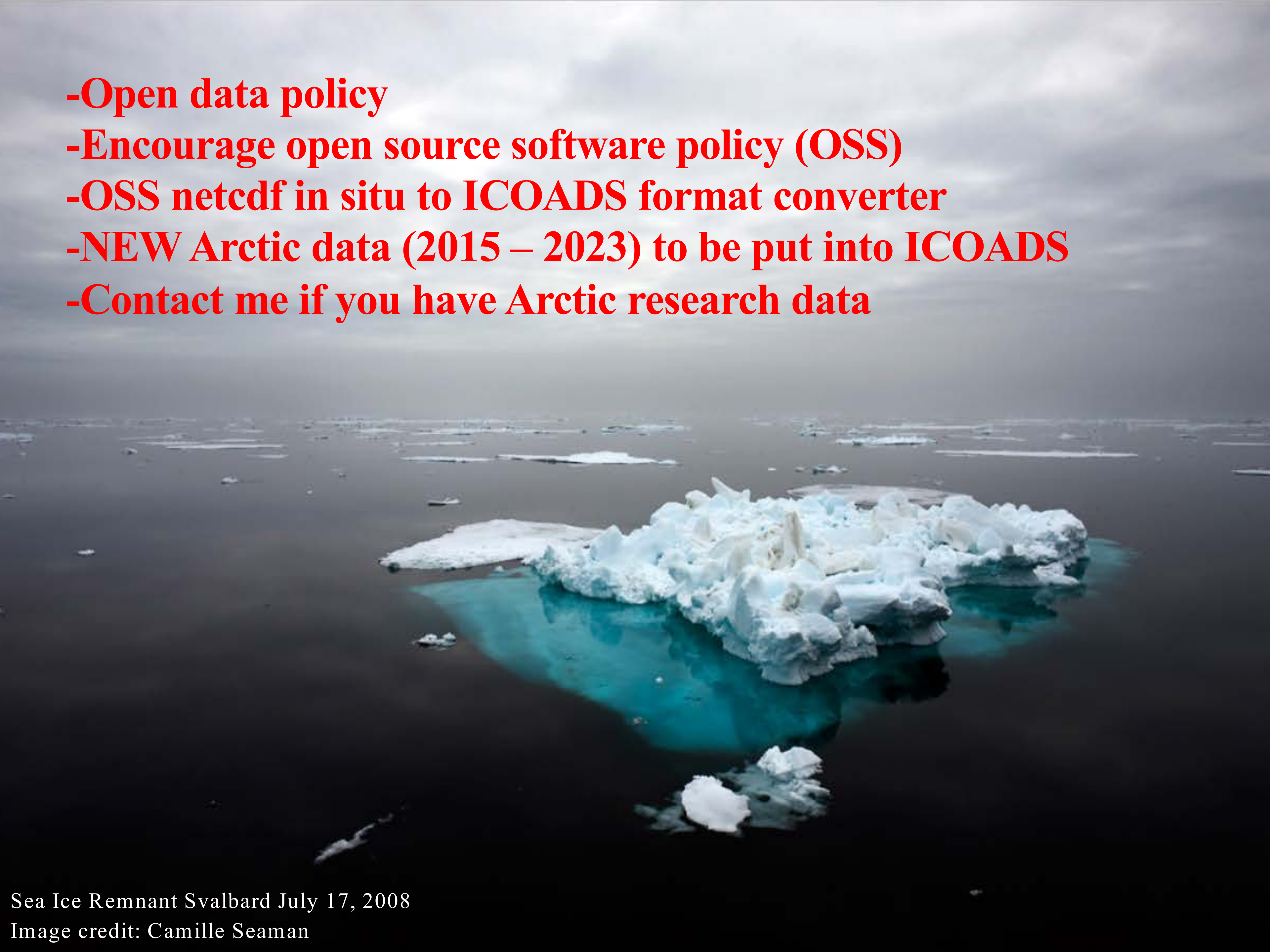
Image credit: GHRSST Project Office

What is a foundation SST?

How do L4 handle SST in the MIZ?

How do salinity layers affect upper ocean heating?

Measure turbulent heat fluxes (in situ) at high latitudes. How does upper ocean stratification affect air-sea interactions?



Sea Ice Remnant Svalbard July 17, 2008
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