



U.S. National Ice Center



USN



USCG



NOAA

Director: CDR Heather Quilenderino, USN
Deputy Director: Mr. Kevin Berberich, NOAA

22 February 2021



History of USNIC

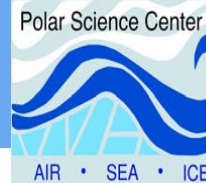
1976: USN and NOAA form the Joint Ice Center (JIC); begin issuing joint ice products in 1979.



1980: Joint Ice Working Group (JIWG) is formed between U.S. and Canadian Ice Service (CIS).



1990: JIC begins collaboration with the Polar Science Center (PSC).



2002: International Ice Patrol (IIP) joins JIWG, forming the North American Ice Service (NAIS).



1999: International Ice Charting Working Group (IICWG) forms based off on JIWG successes.



1995: The U.S. Coast Guard joins JIC to form the U.S. National Ice Center (USNIC).



2016: Naval Ice Center realigns from Naval Oceanographic Office to Fleet Weather Center, Norfolk (FWC-N).



2019: The Naval Ice Center logo is retired from products in favor of a consolidated USNIC logo.

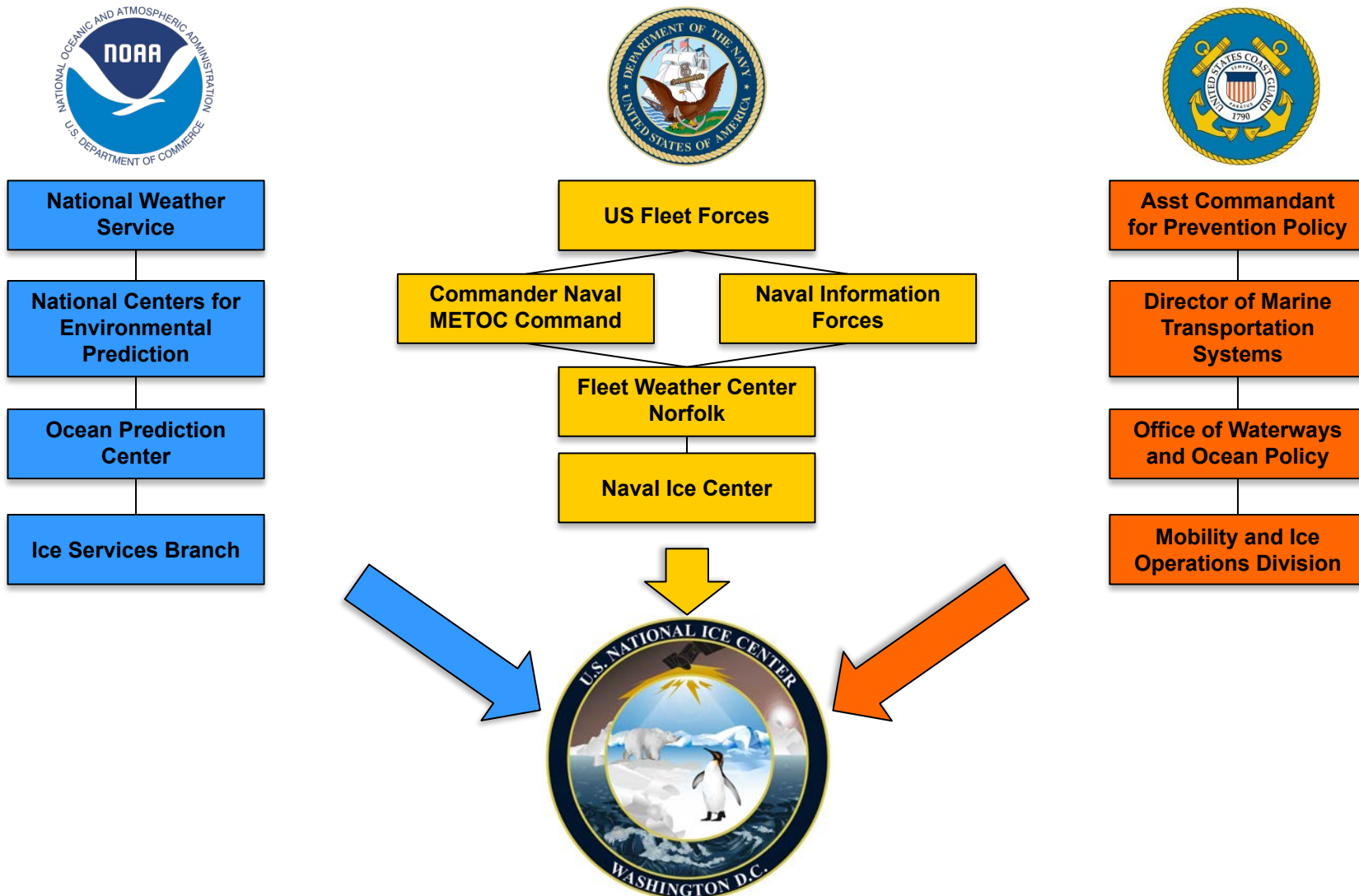


2020: NOAA component realigns from NESDIS to NWS.



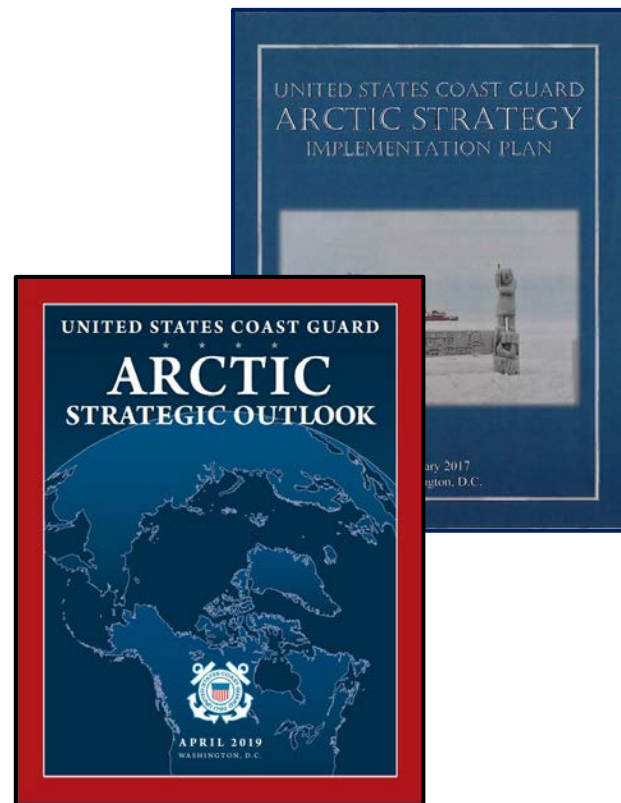
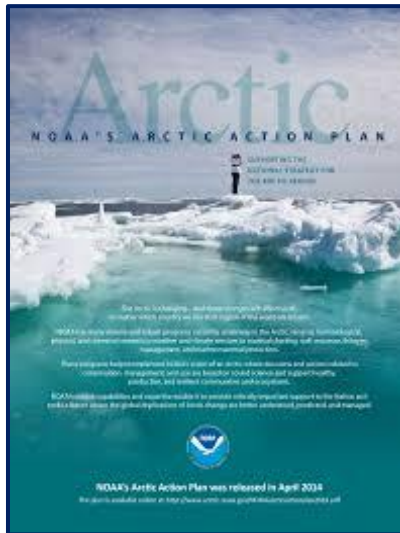
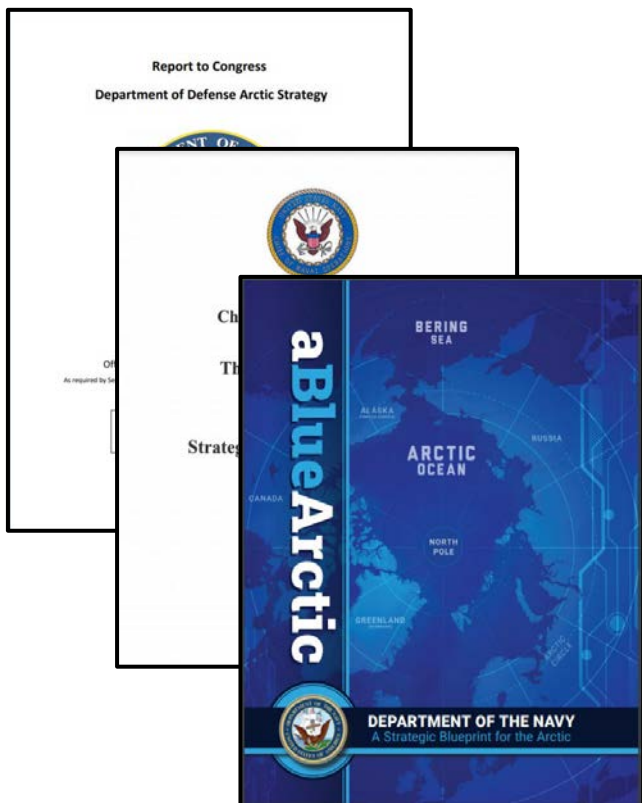


Organizational Alignment





Strategic Alignment



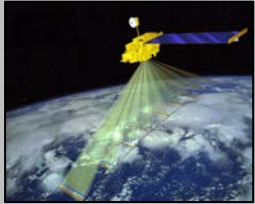
The U.S. National Ice Center provides global to tactical scale ice and snow products, ice forecasting, and related environmental intelligence services for the United States government.



Domain Awareness



Observation: Remote and In Situ Sensing



Satellites



Buoys



Deployed Personnel

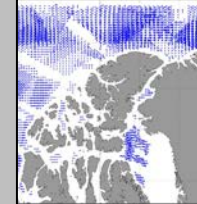


Surface Observations



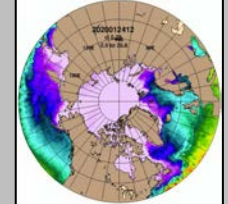
Radar

Computing



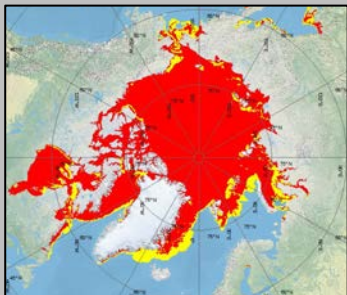
Extract Data from Satellite Imagery

Modeling



Nowcasting and Forecasting

Characterization

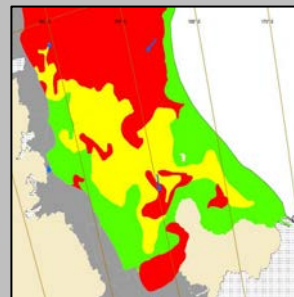


Sea Ice Extent, Concentration, and Thickness

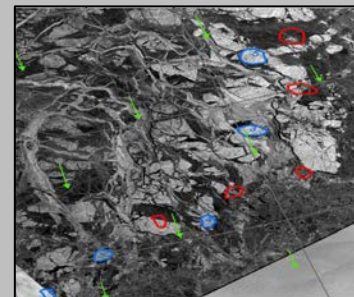


Gridded Snow and Ice Charts

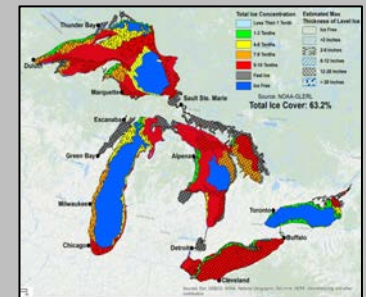
Exploitation: Tailoring and Integration



Ice Navigation and Avoidance



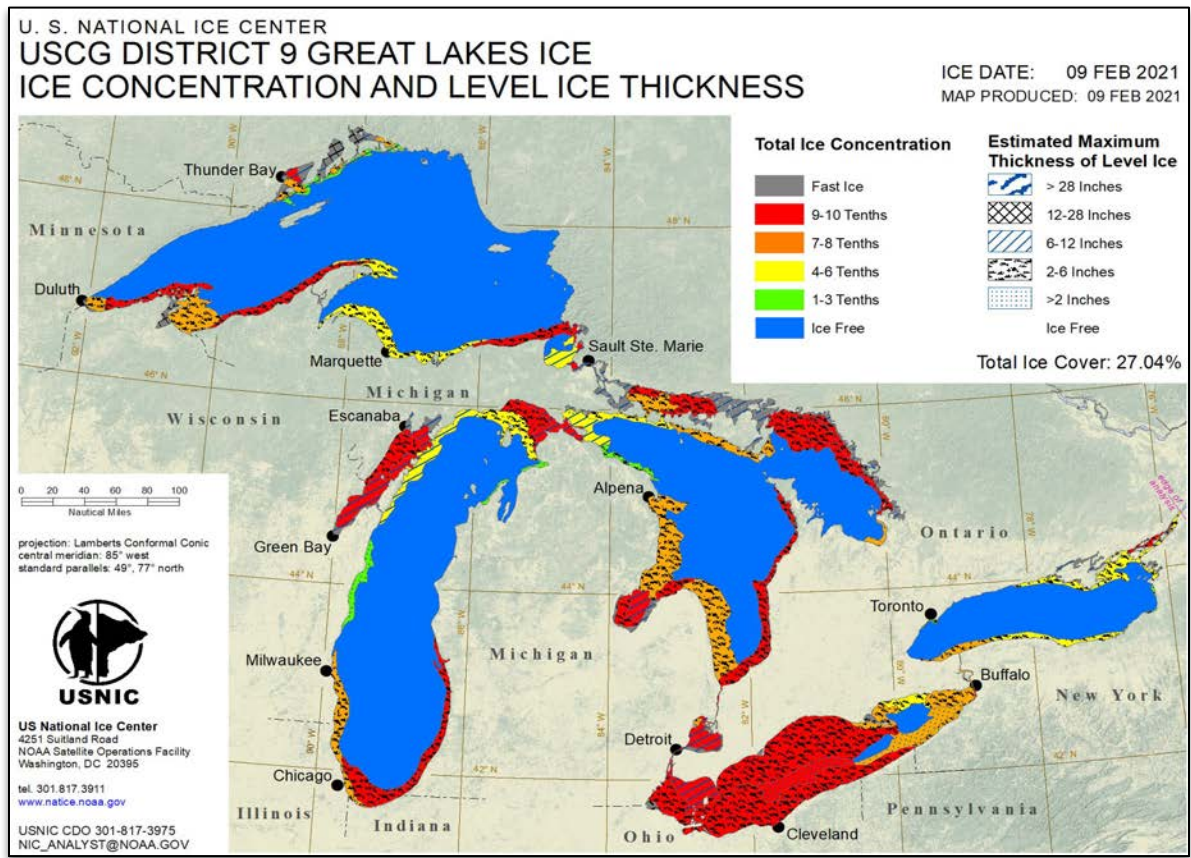
Environmental Intelligence



Operations Planning



Ice Impacts to Coast Guard Operations Asset Management



USNIC charts improve the management of limited assets over large geographical areas

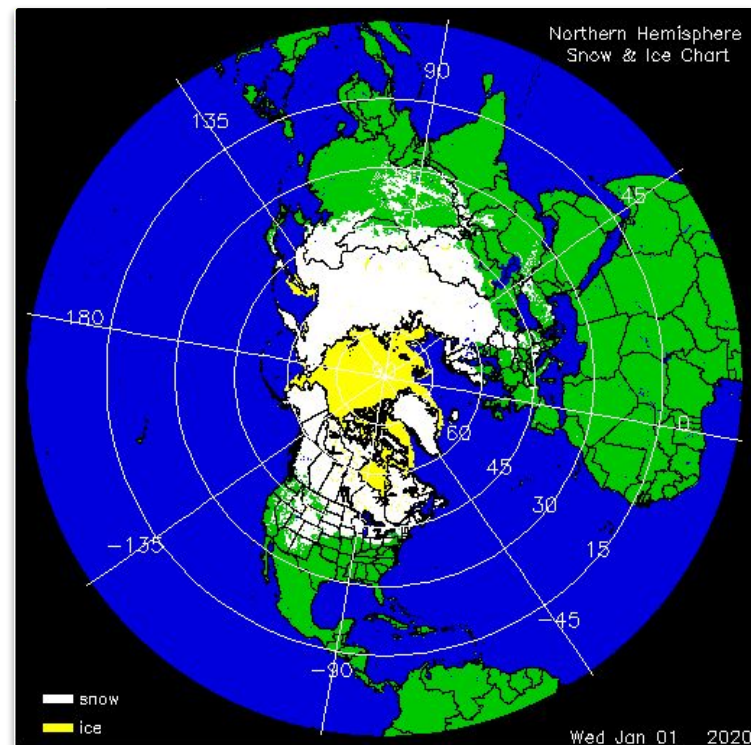
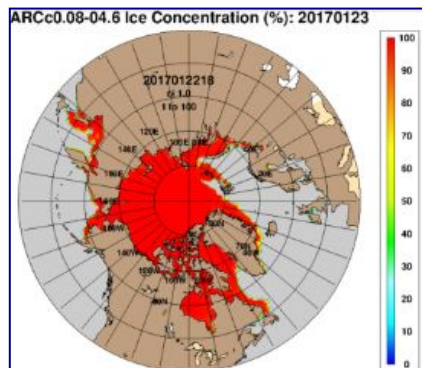


USNIC Snow Products



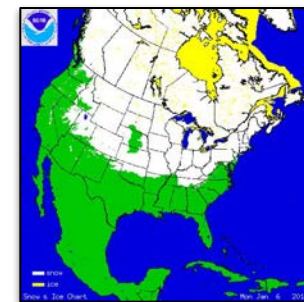
- Data used to initialize NCEP, USN, and other domestic and international weather models
- Data supports wildfire response planning, water resource engineering, and other operational activities
- Daily Northern Hemisphere Snow and Ice Cover chart production began in 1997 and migrated to USNIC in 2008
- Gridded product represents a binary analysis

Modeling and Climatology Community Support



4 km and 1 km resolution

- GeoTIFF
- GRIB2
- (soon) netCDF

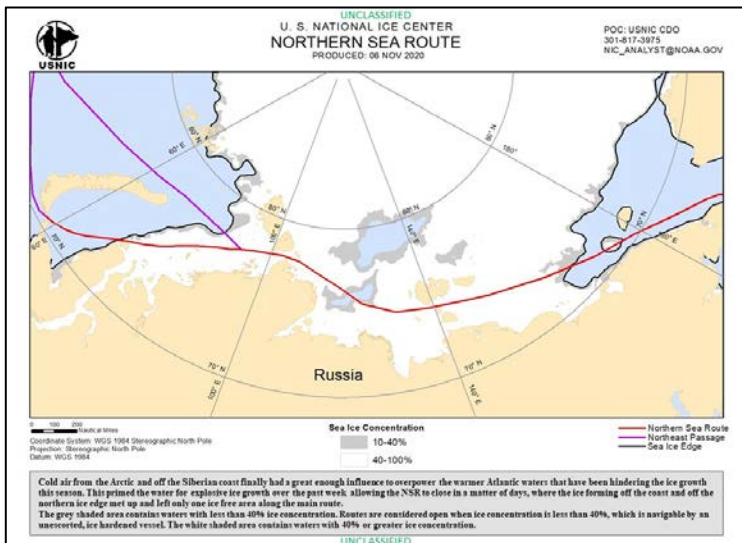




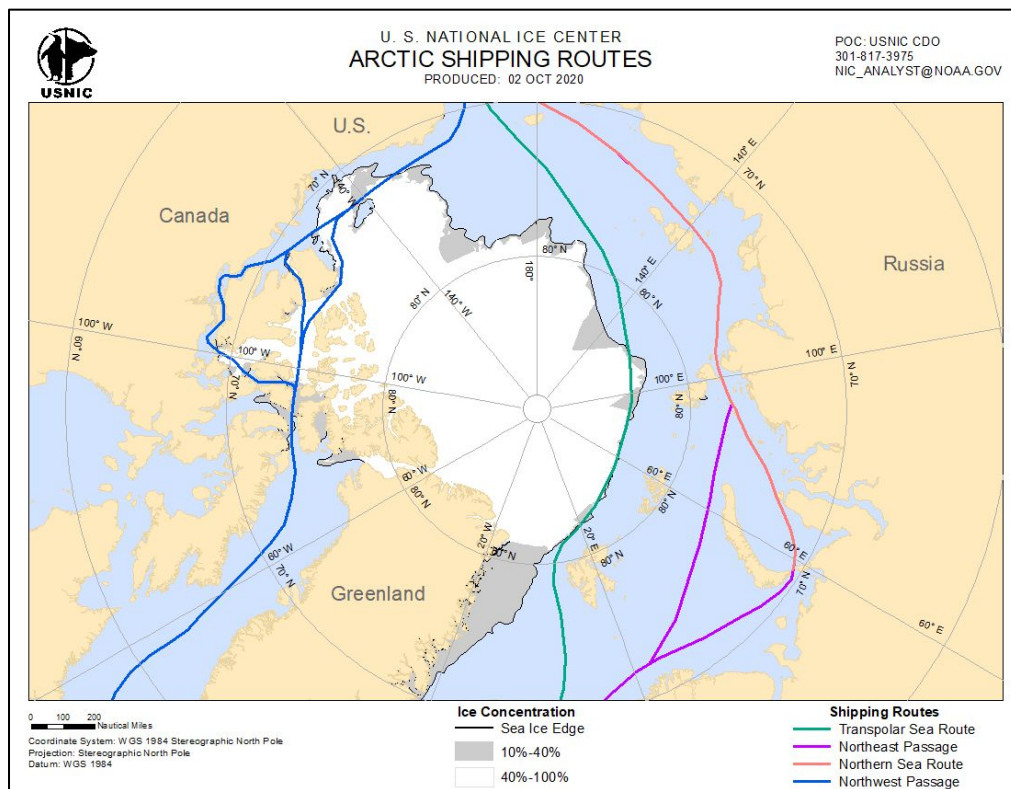
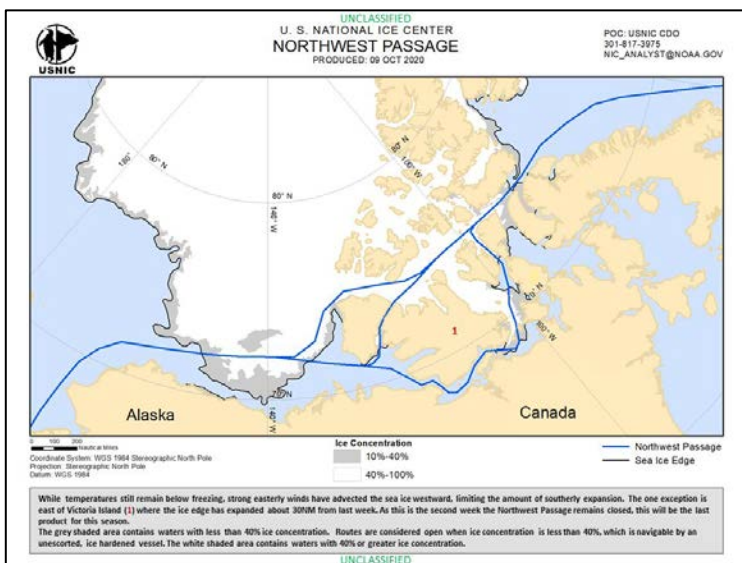
Arctic Shipping Routes



Northern Sea Route

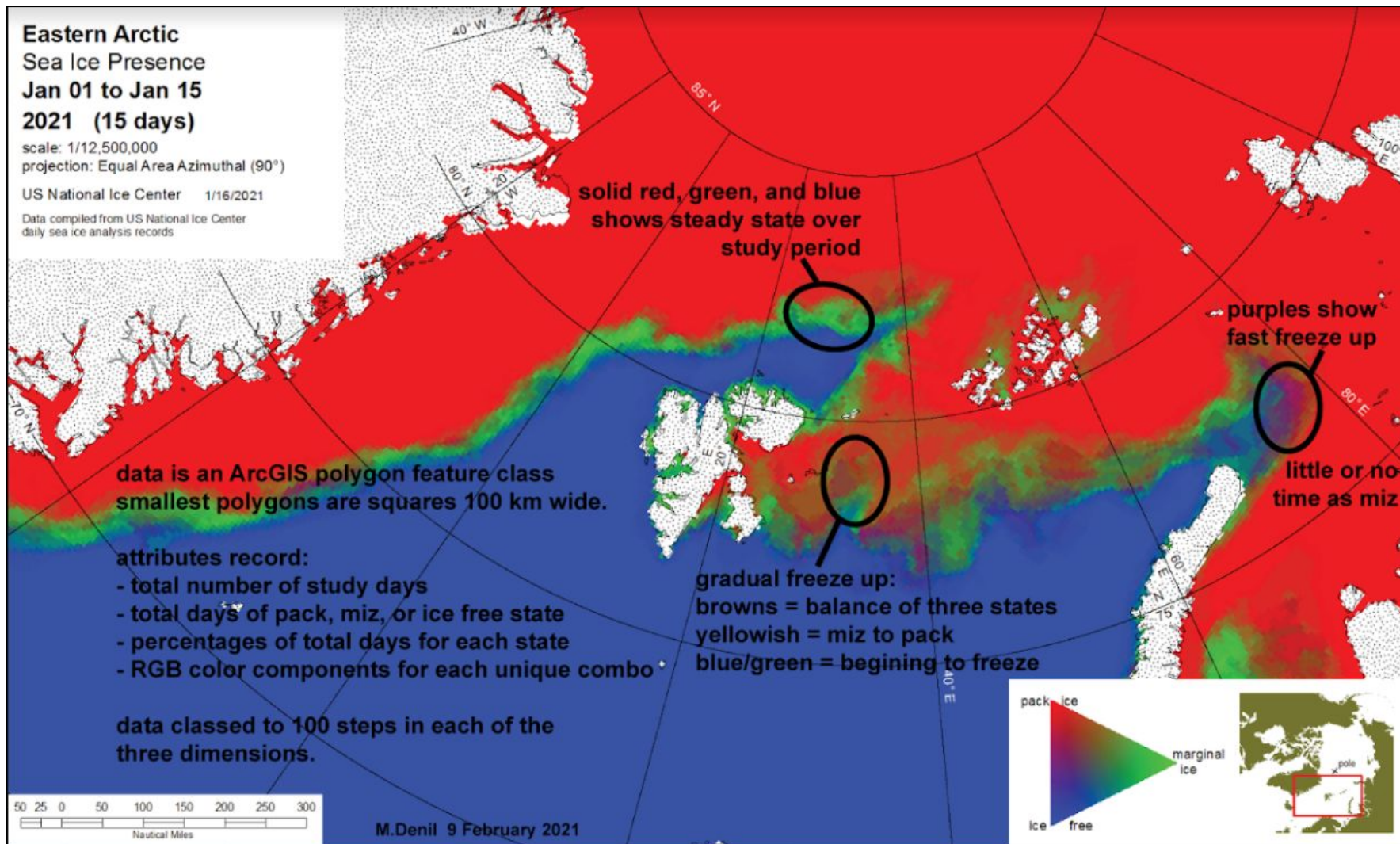


Northwest West Passage





Trivariate Climatology

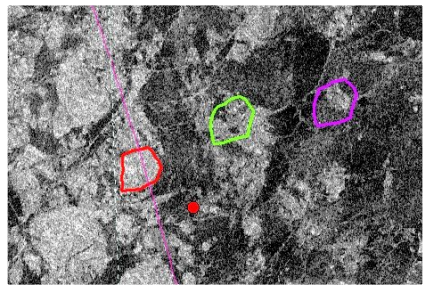




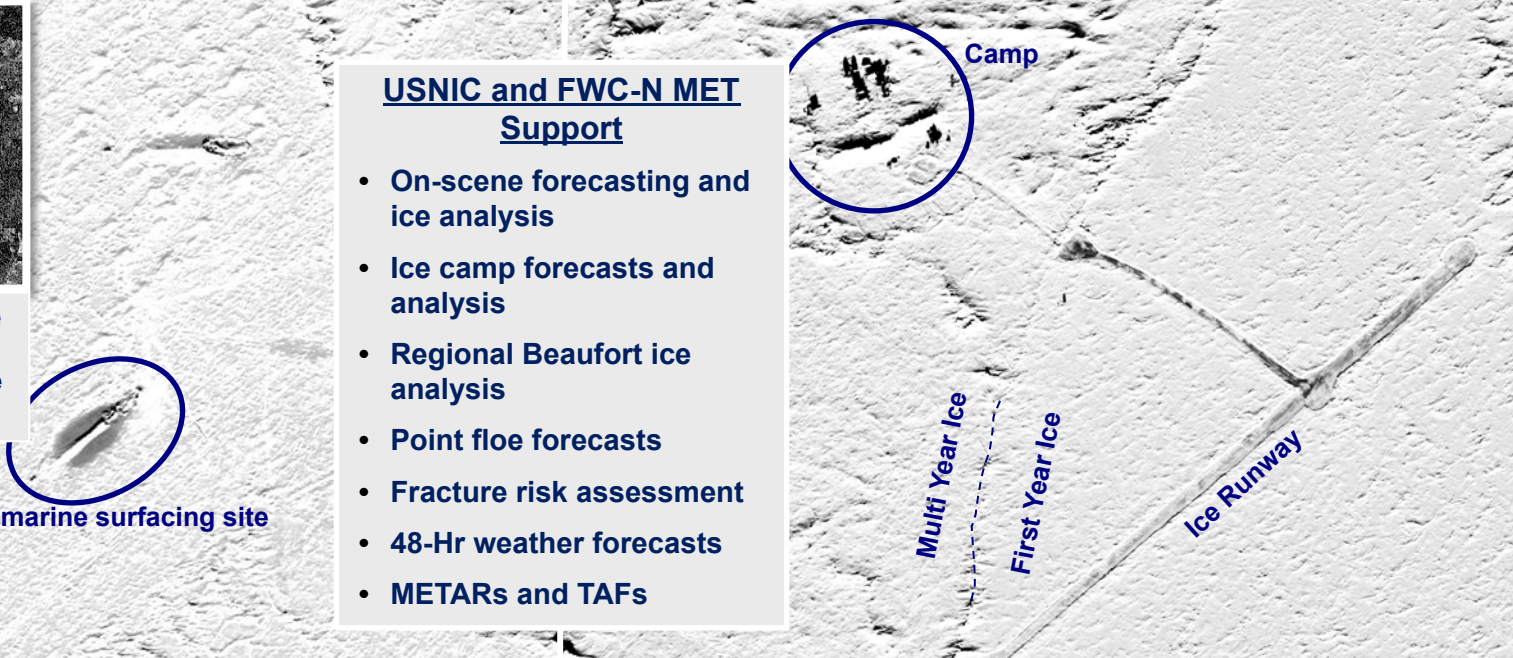
Ice Exercise 2020



ICEX: a biennial multinational exercise led by the Arctic Submarine Lab on an ice floe-based camp to support submarine exercises in the vicinity. ICEX 2020 occurred 04-15 March, with Ice Camp SEADRAGON approximately 130-150nm NE of Deadhorse, AK



The floe drifted Eastward due to strong winds blowing against normal Beaufort Gyre movement



USNIC and FWC-N MET Support

- On-scene forecasting and ice analysis
- Ice camp forecasts and analysis
- Regional Beaufort ice analysis
- Point floe forecasts
- Fracture risk assessment
- 48-Hr weather forecasts
- METARs and TAFs

05MAR2020 Digital Globe image shows camp and submarine surfacing site

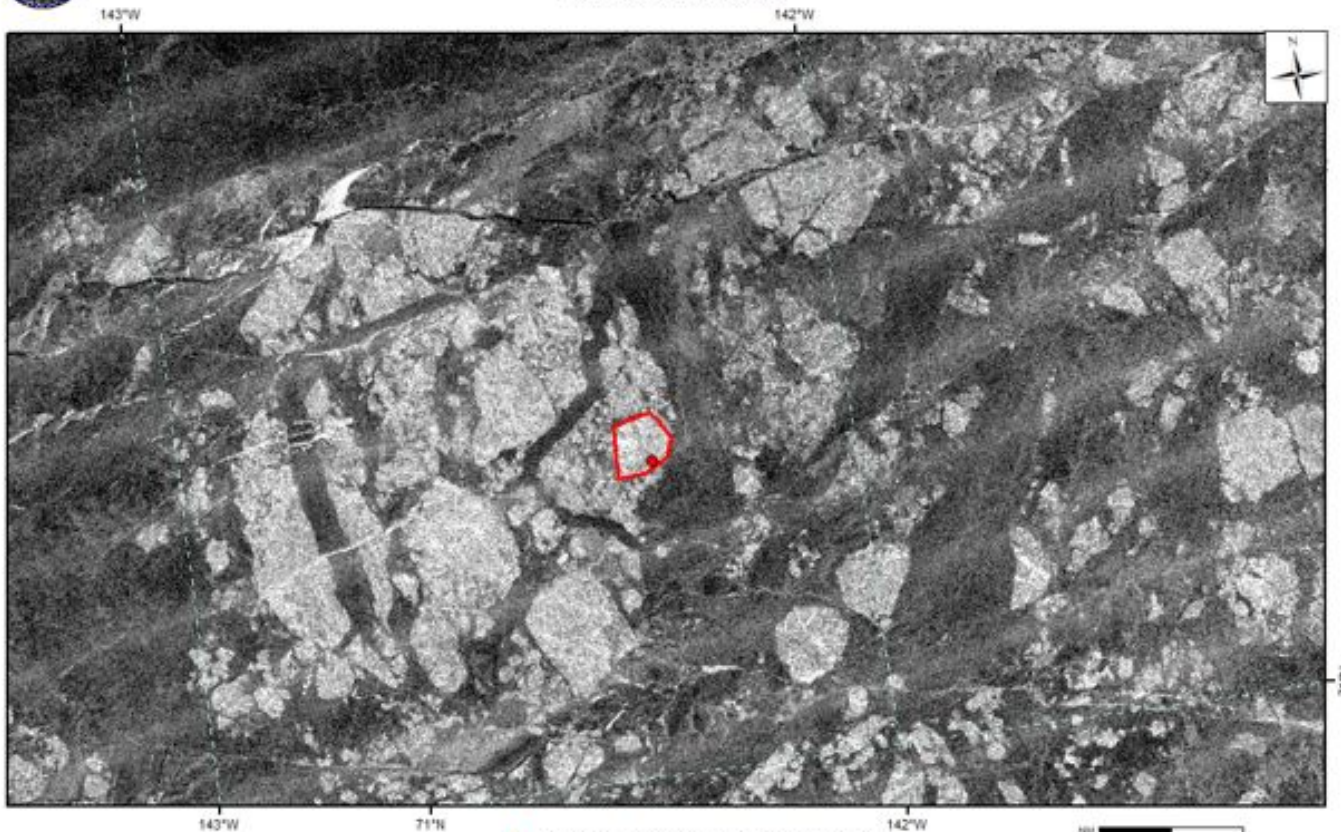


Ice Exercise 2020



U. S. NATIONAL ICE CENTER
ICEX20 - CAMP SEADRAGON
PRODUCED: 25 FEB 2020

POC:USNIC CDD
301-817-3975
NIC_ANALYST@NOAA.GOV



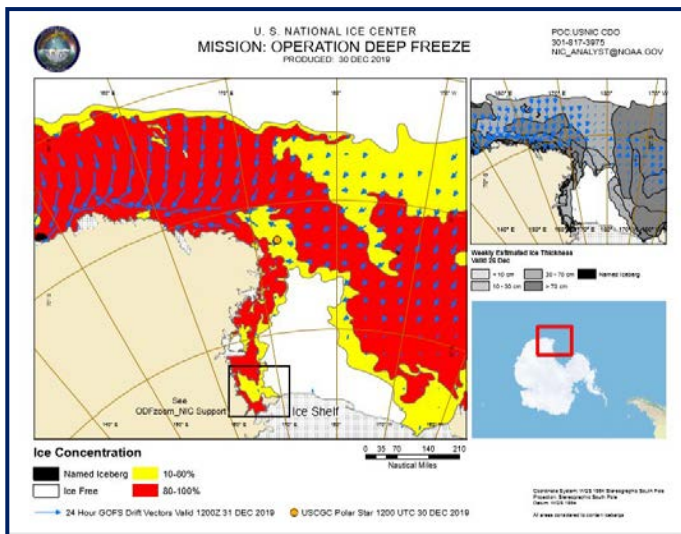
- SEADRAGON Tracker Position 25 FEB 1300Z
- SEADRAGON Valid: 25 FEB 0255Z
- SEADRAGON Distance to Deadhorse 131 nm



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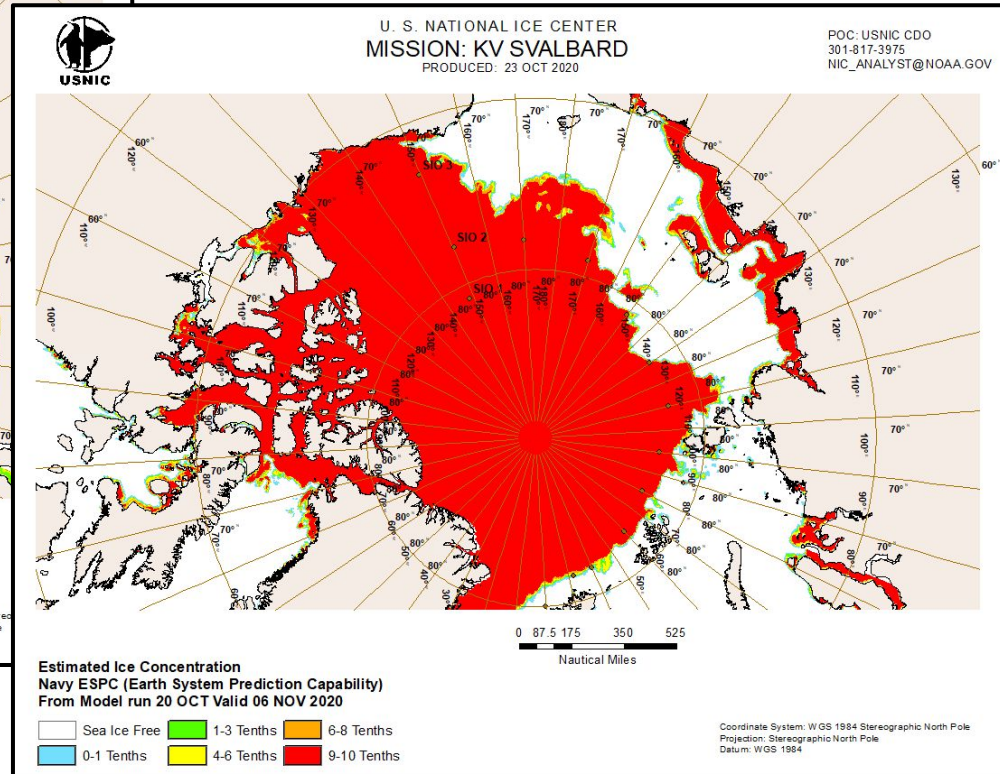
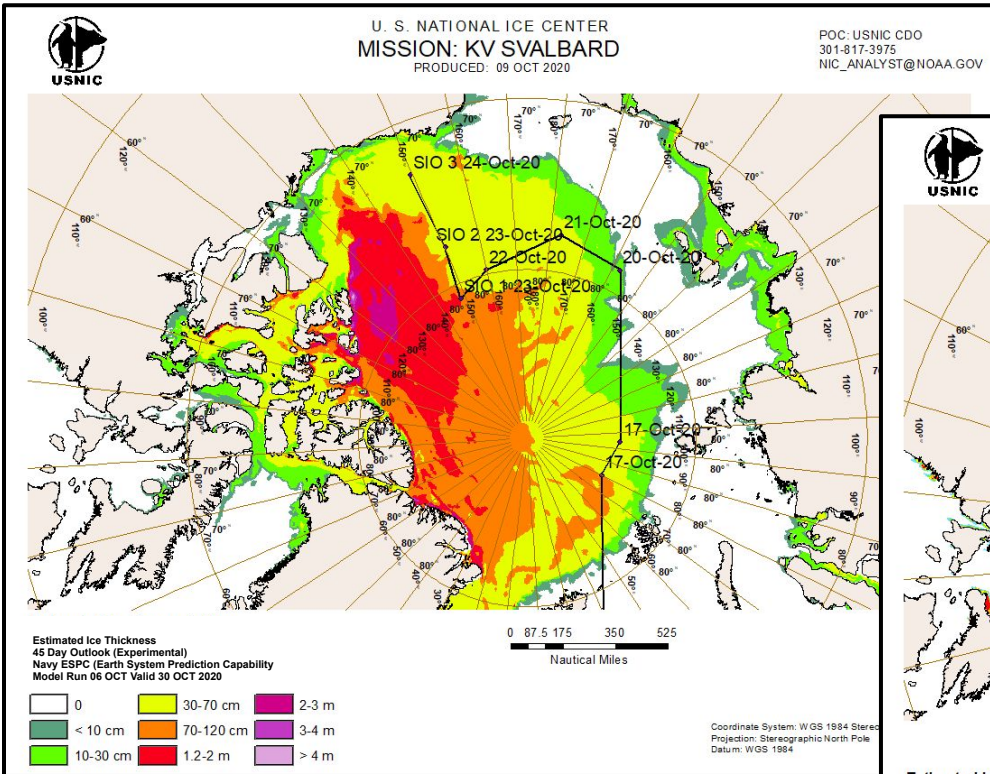
Operation DEEP FREEZE 2020 Antarctica Resupply



Onboard ice analysis to resupply research stations in Antarctica



KV Svalbard 2020



Navy ESPC capabilities greatly assisted the KV Svalbard mission to retrieve Office of Naval Research moorings



International Arctic Buoy Program (IABP)



Buoys are vital for:

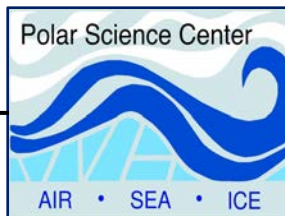
- In situ observations
- Initialization and forcing of NWP models
- Validation of satellite-derived environmental data
- Identifying trends in the polar environment

Co-manager



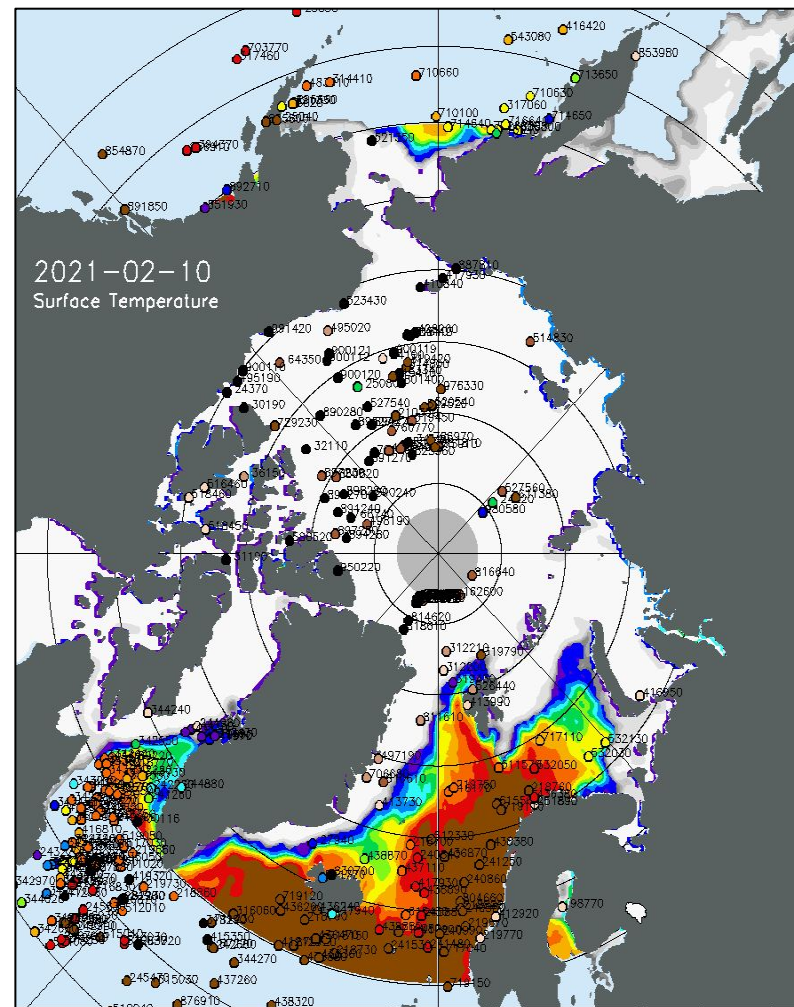
U.S. Interagency Arctic Buoy Program (USIABP)

Co-manager



IABP

Canada, China, France, Germany, India, Japan, Norway, Russia, Scotland, South Korea, Switzerland & USA





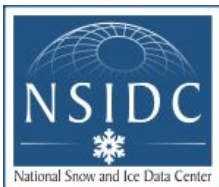
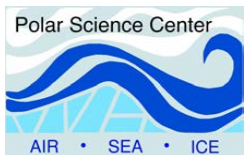
2020 Collaborations



| Agency | Projects/Achievements | Agency | Projects/Achievements |
|------------------|--|---------------------------------|---|
| ONR | Historical ice data; KV Svalbard | ADAC | ICECON Great Lakes data ingest |
| NRL | Iceberg Drift and Deterioration Model; FNMOC ESPC | ASL | ICEX 2020; Arctic Service Ribbons; Ice Floe Research |
| STAR | SNWG presentation; IMS NetCDF Conversion; Rose-L & NISAR study; STAR SAR Ice Drift; SCATSAT; JPSS Proposal | University of Wisconsin-Madison | <i>Improved Operational Sea Ice Products using Spatially Enhanced AMSR2 Data Letter of Commitment</i> |
| GLERL | GLOFS model development | IICWG | 21-25 Sept 2020; 3 Task Teams |
| PSC | 10 AXIBs funded through USIABP; Remote Sensing Strategy | University of Washington-APL | Letter of Commitment for Arctic Salinity Research 2022 |
| NSIDC | MIZ archival; ASINA on MASIE; USNIC User Guide | AMS | Topic: Advances in Sea Ice Science and Applications for Operational Ice Service |
| NWS-AR | Daily Arctic exercise collaboration | ASIP/ATB | Shapefile analysis & validation |
| Northrup Grumman | Ice data integration with USCGC ECDIS | NPS | Dr. Maslowski Regional Arctic System Model (RASM) Letter of Support |
| ONI | Intel and Ice collaboration | NAIS | RCM; WCPS; NAIS University (23OCT20) |
| NGA | Snowfox Ice component | ICE-PPR | KNUD RASMUSSEN |



Increasing Collaboration and Leveraging Partnerships



- Domestic
- NAIS/IICWG/ICE-PPR/IABP
- NAIS/IICWG/ICE-PPR
- IICWG/ICE-PPR/IABP
- IICWG/ICE-PPR
- IICWG/IABP
- IICWG
- ICE-PPR
- IABP





R&D Needs



- AI/ML for sea ice classification
- Semi-automation of routine products
- Time-stepped satellite image for use as navigation decision aids
- Methodology for confidence levels of USNIC products
- Validation of USNIC products
- Buoy funding and deployment opportunities
- Modeling
 - Discrete element modeling for individual ice floes
 - Factors that will predict ice floe deformation (e.g. fracturing)
 - Assimilation of USNIC data sets into models
 - Validation of long term models
- Derived Products
 - Hazards to navigation (e.g. ice ridging)
 - Forecast of freeze up/melt dates





Questions and Comments



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<https://usicecenter.gov>

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