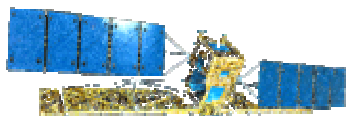


# U.S. National / Naval Ice Center (NIC) Support to Naval and Maritime Operations



10 July 2007  
CDR Ray Chartier, Jr.  
Director National Ice Center



**USCG**

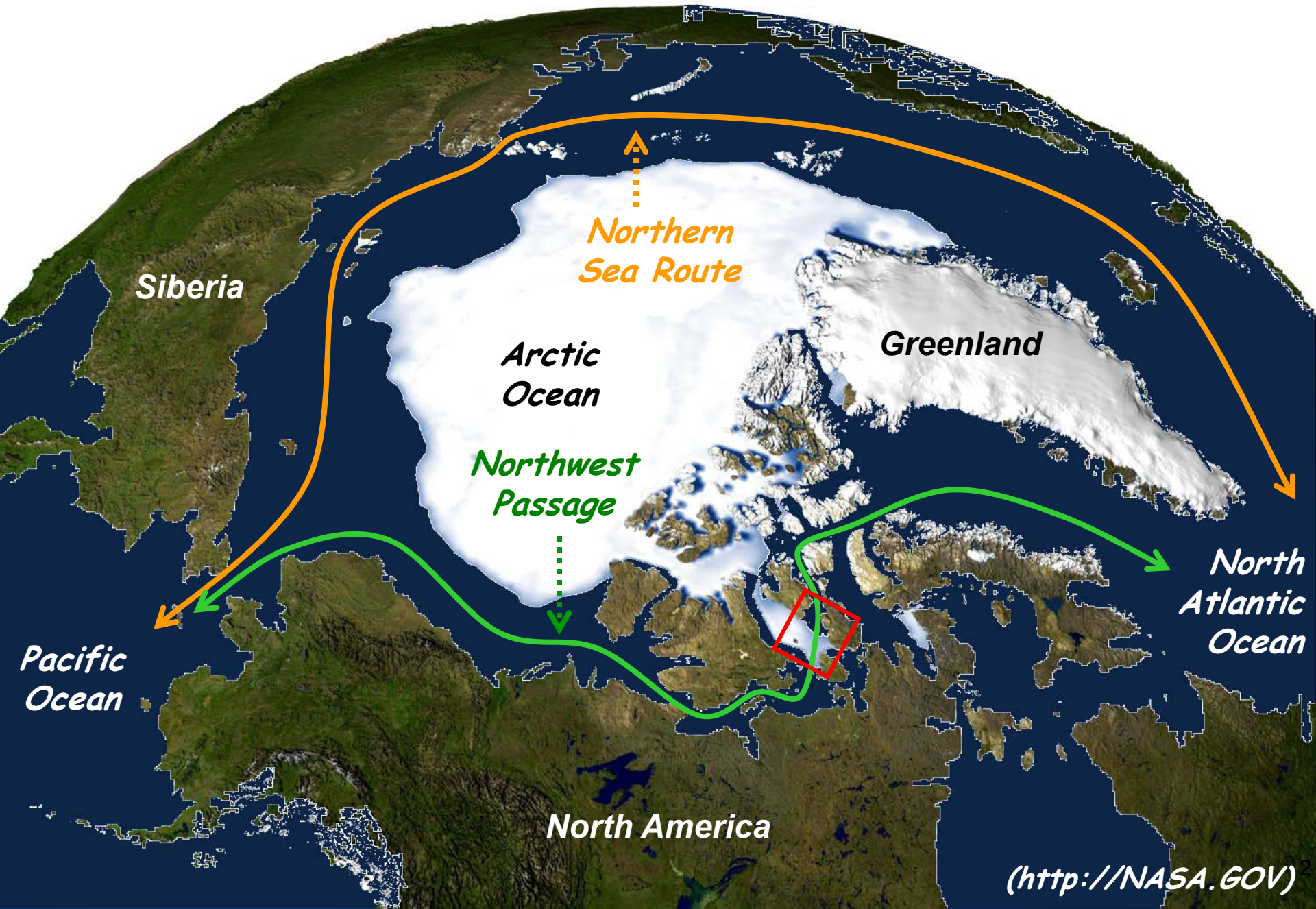


**USN**



**NOAA**

# Arctic Sea Ice Extent 2005 Record Minimum





# Outline

- **NIC mission and structure**
- **Products and customers**
- **Science activities**
  - Recent accomplishments
  - Transitional products
- **Future**





# NIC Mission and Structure

- **Tri-agency organization**
  - Over 60 military and civilian personnel located in Washington, D.C.
  - Global sea ice analysis and forecasting
- **International Partnerships**
  - **North American Ice Service (NAIS)**
    - Canadian Ice Service (CIS)
    - International Ice Patrol (IIP)
  - **International Arctic Buoy Programme (IABP)**
  - **International Ice Charting Working Group (IICWG)**



NAIS



IABP



IICWG

***NIC's mission is to provide the highest quality strategic and tactical ice services tailored to meet the operational requirements of U.S. national interests.***



# NIC Organization Structure



**United States Fleet  
Forces Command**

**NOAA**

**COMMANDANT  
United States Coast Guard**

**Commander  
Naval Meteorology &  
Oceanography  
Command (CNMOC)**

**National Environmental  
Satellite, Data &  
Information Service  
(NESDIS)**

**Operations  
Directorate (CG-3)**

**Naval Oceanographic Office  
Stennis Space Center, MS  
(NAVOCEANO)**

**Office of Satellite  
Data Processing  
& Distribution (OSDPD)/  
Center for Satellite  
Applications & Research  
(STAR)**

**Waterways  
Management  
Directorate (CG-3PW)**

**Office of Maritime  
Transportation System  
(CG-3PWM)**

**NAVICECEN  
Naval Ice Center**

**National  
Ice  
Center**

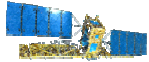
**Mobility & Ice  
Operations Division  
(CG-3PWM-3)**

**National  
Ice  
Center**



# NIC Operational Products

## Inputs



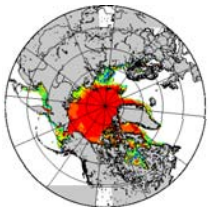
Satellites



Aircraft



Surface Obs



Models

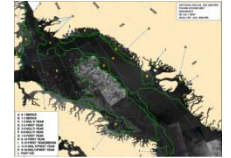


Buoys

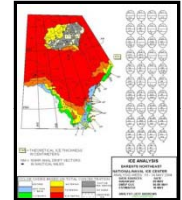


**Expert Ice Analysis,  
Forecasting, and Quality Control**

## Products



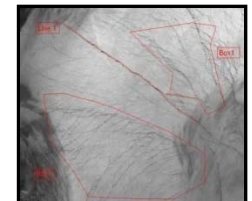
Annotated Imagery



Hemispheric Ice Charts



Special Arctic  
Oceanographic Synopsis  
(SPAROS)

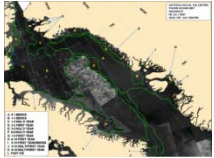


Fractures, Leads and  
Polynyas (FLAP)

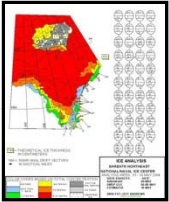


# NIC Operational Customers

## Products



**Annotated Imagery**

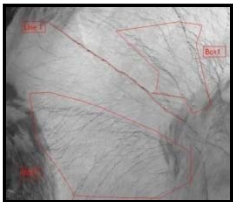


**Hemispheric Ice Charts**

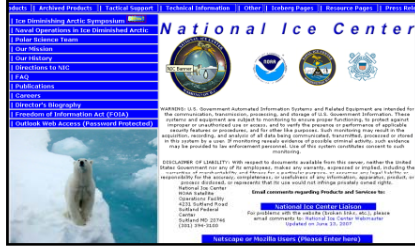


**Marginal Ice Zone**

**Special Arctic Oceanographic Synopsis (SPAROS)**



**Fractures, Leads and Polynyas (FLAP)**



**Public web page  
117,000 hits in  
2006**

**WWW, Navy  
Message Traffic,  
Secure Network,  
INMARSAT, Iridium**



**NWS**



**NOAA**



**USN**



**NSF**



**MSC**



**USCG**



**Local Gov't**



## Mission/Goal Supported

**Battlespace Awareness**

**Safety of Life and Property At Sea/  
Safety of Navigation**

**Scientific Research**

**Maritime Shipping**

**Commercial Fisheries**

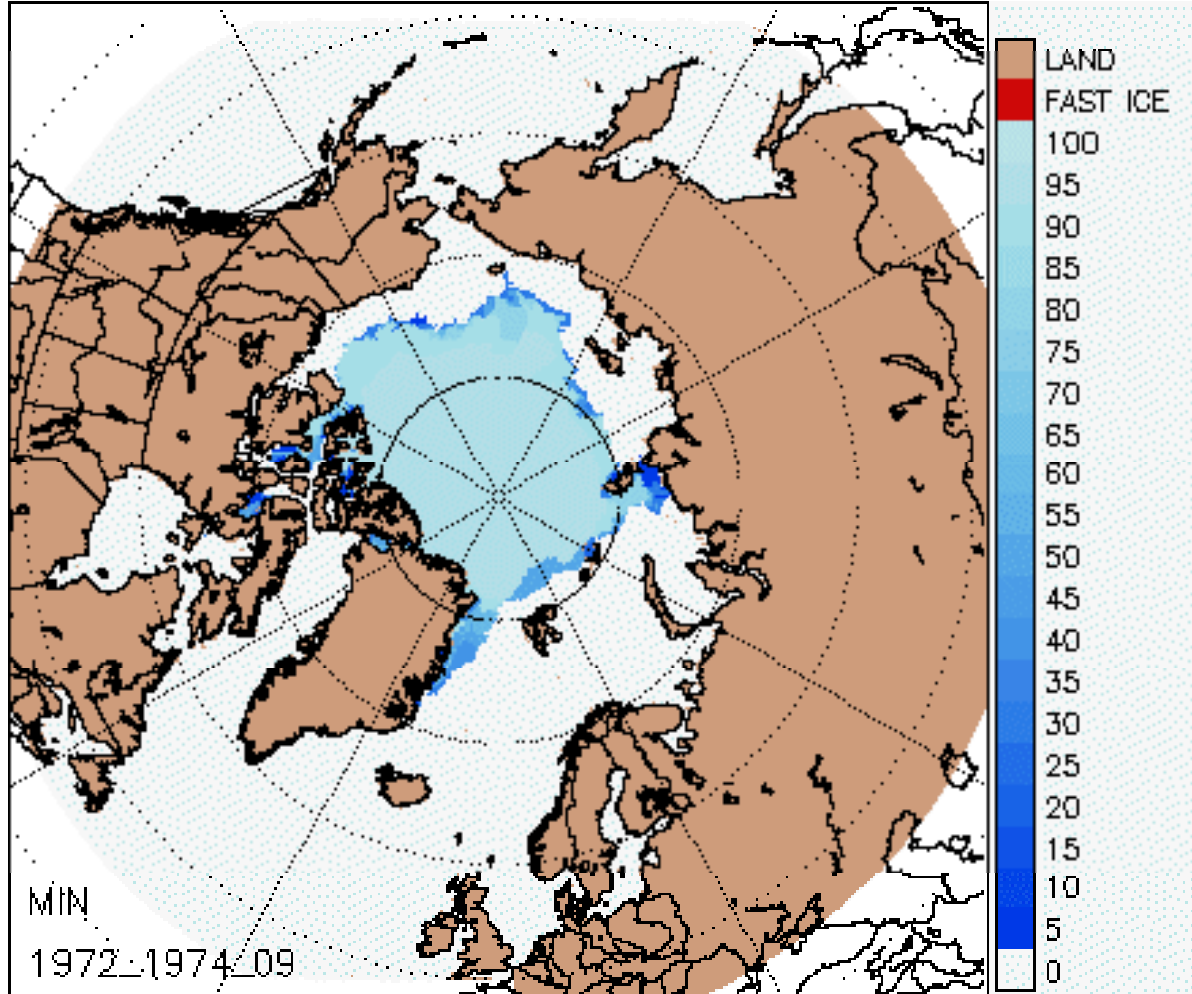
**Oceanographic and Atmospheric Models**

**NWP Models**



# Scientific Accomplishments

## NIC Arctic sea ice charts and 33 year climatology dataset



### Uses

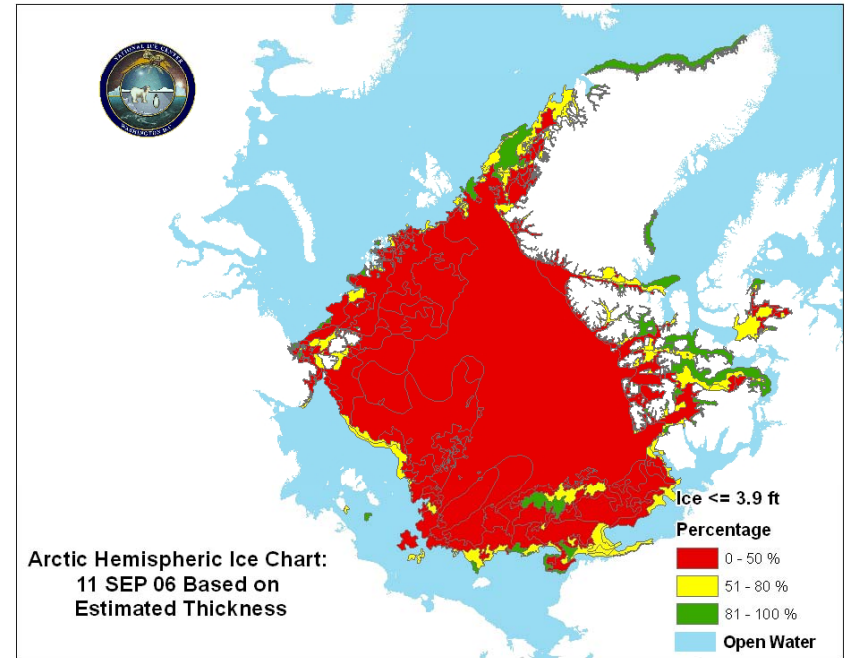
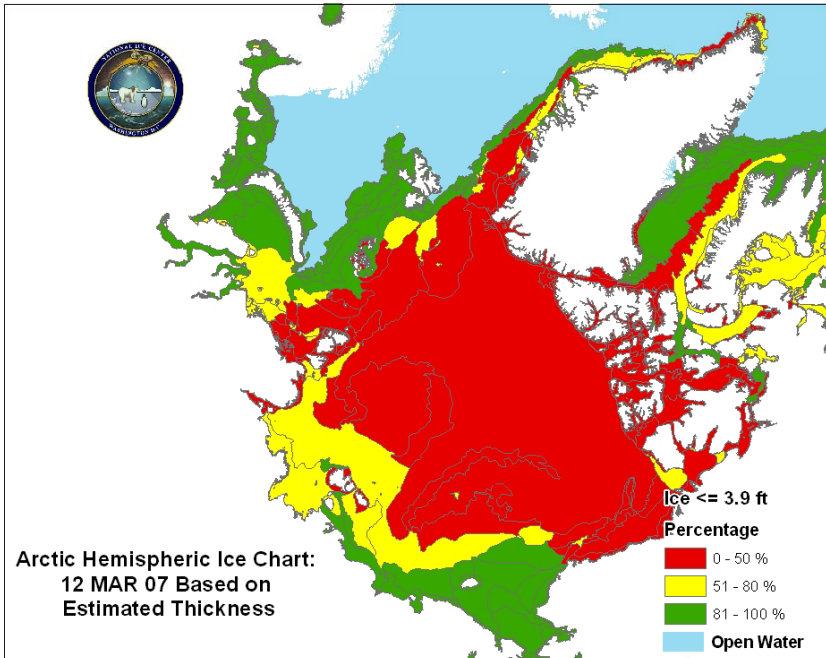
- Input to NIC analysis
- Input to numerical forecast models
- Climate research
- Mission / route planning



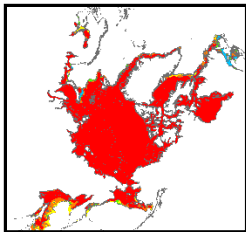


# Scientific Transitional Products

## Sea Ice Thickness Proxy Using NIC Analyzed Charts



NIC  
Products



| ICE TYPE       | ICE THICKNESS    | ICE DENSITY | ICE AGE | ICE CLASSIFICATION |
|----------------|------------------|-------------|---------|--------------------|
| Open Water     | 0 - 3.9 ft       | 0.917       | 0       | Open Water         |
| Thin Ice       | 4.0 - 15.0 ft    | 0.915       | 1       | Thin Ice           |
| Medium Ice     | 15.1 - 30.0 ft   | 0.913       | 2       | Medium Ice         |
| Thick Ice      | 30.1 - 45.0 ft   | 0.911       | 3       | Thick Ice          |
| Very Thick Ice | 45.1 - 60.0 ft   | 0.909       | 4       | Very Thick Ice     |
| Ice Edge       | 60.1 - 75.0 ft   | 0.907       | 5       | Ice Edge           |
| Ice Shelf      | 75.1 - 90.0 ft   | 0.905       | 6       | Ice Shelf          |
| Ice Mountain   | 90.1 - 105.0 ft  | 0.903       | 7       | Ice Mountain       |
| Ice Plateau    | 105.1 - 120.0 ft | 0.901       | 8       | Ice Plateau        |
| Ice Ridge      | 120.1 - 135.0 ft | 0.899       | 9       | Ice Ridge          |
| Ice Wall       | 135.1 - 150.0 ft | 0.897       | 10      | Ice Wall           |
| Ice Spine      | 150.1 - 165.0 ft | 0.895       | 11      | Ice Spine          |
| Ice Pillar     | 165.1 - 180.0 ft | 0.893       | 12      | Ice Pillar         |
| Ice Tower      | 180.1 - 195.0 ft | 0.891       | 13      | Ice Tower          |
| Ice Mountain   | 195.1 - 210.0 ft | 0.889       | 14      | Ice Mountain       |
| Ice Plateau    | 210.1 - 225.0 ft | 0.887       | 15      | Ice Plateau        |
| Ice Ridge      | 225.1 - 240.0 ft | 0.885       | 16      | Ice Ridge          |
| Ice Wall       | 240.1 - 255.0 ft | 0.883       | 17      | Ice Wall           |
| Ice Spine      | 255.1 - 270.0 ft | 0.881       | 18      | Ice Spine          |
| Ice Pillar     | 270.1 - 285.0 ft | 0.879       | 19      | Ice Pillar         |
| Ice Tower      | 285.1 - 300.0 ft | 0.877       | 20      | Ice Tower          |

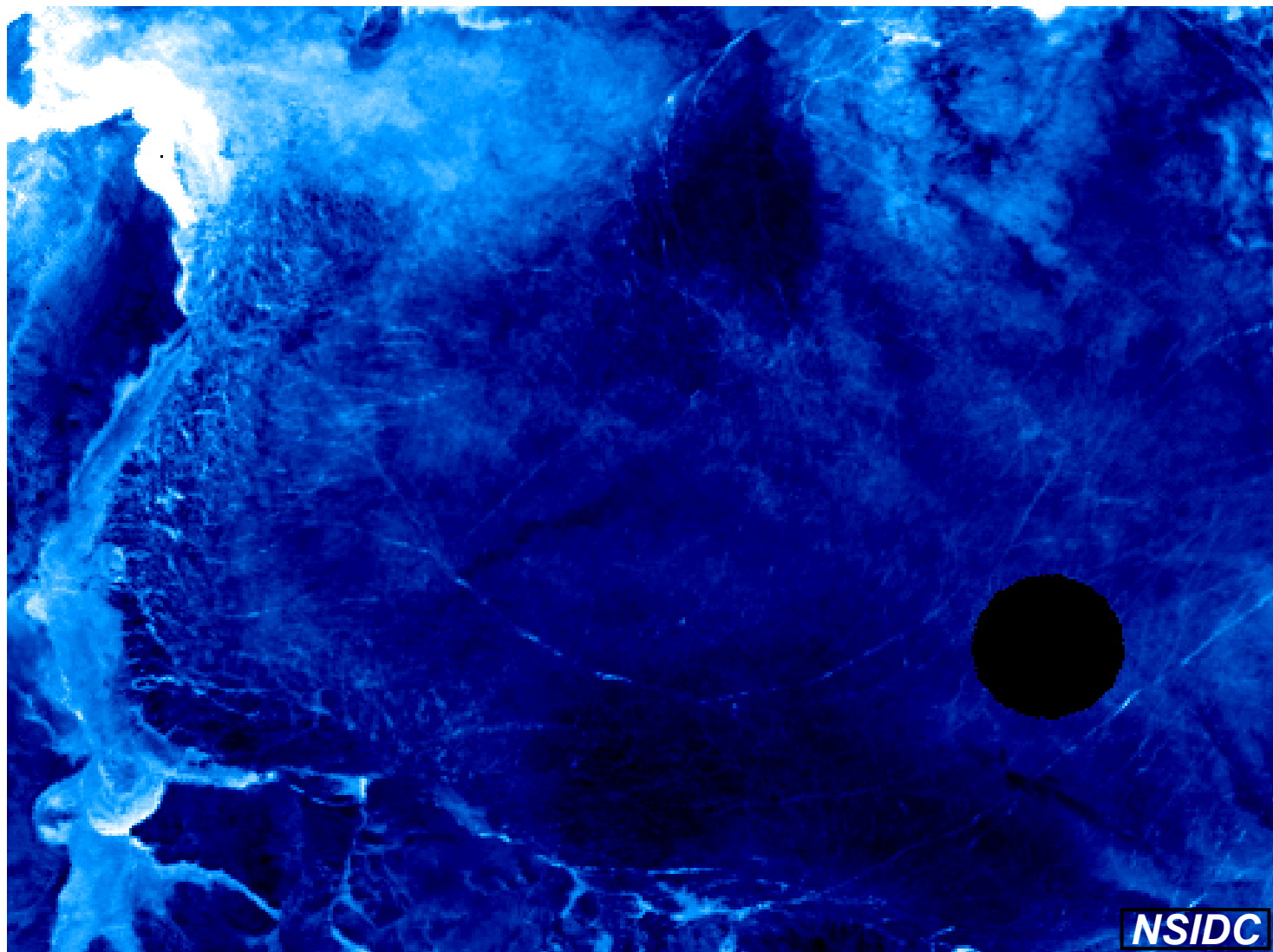


Validation

Operational Support 9/13



# Scientific Transitional Products



**AMSR-E 89 GHz  $T_B$**