

# National / Naval Ice Center (NIC)



This brief is UNCLASSIFIED

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**USCG**



**USN**



**NOAA**



# SIPAS

## ■ Overview

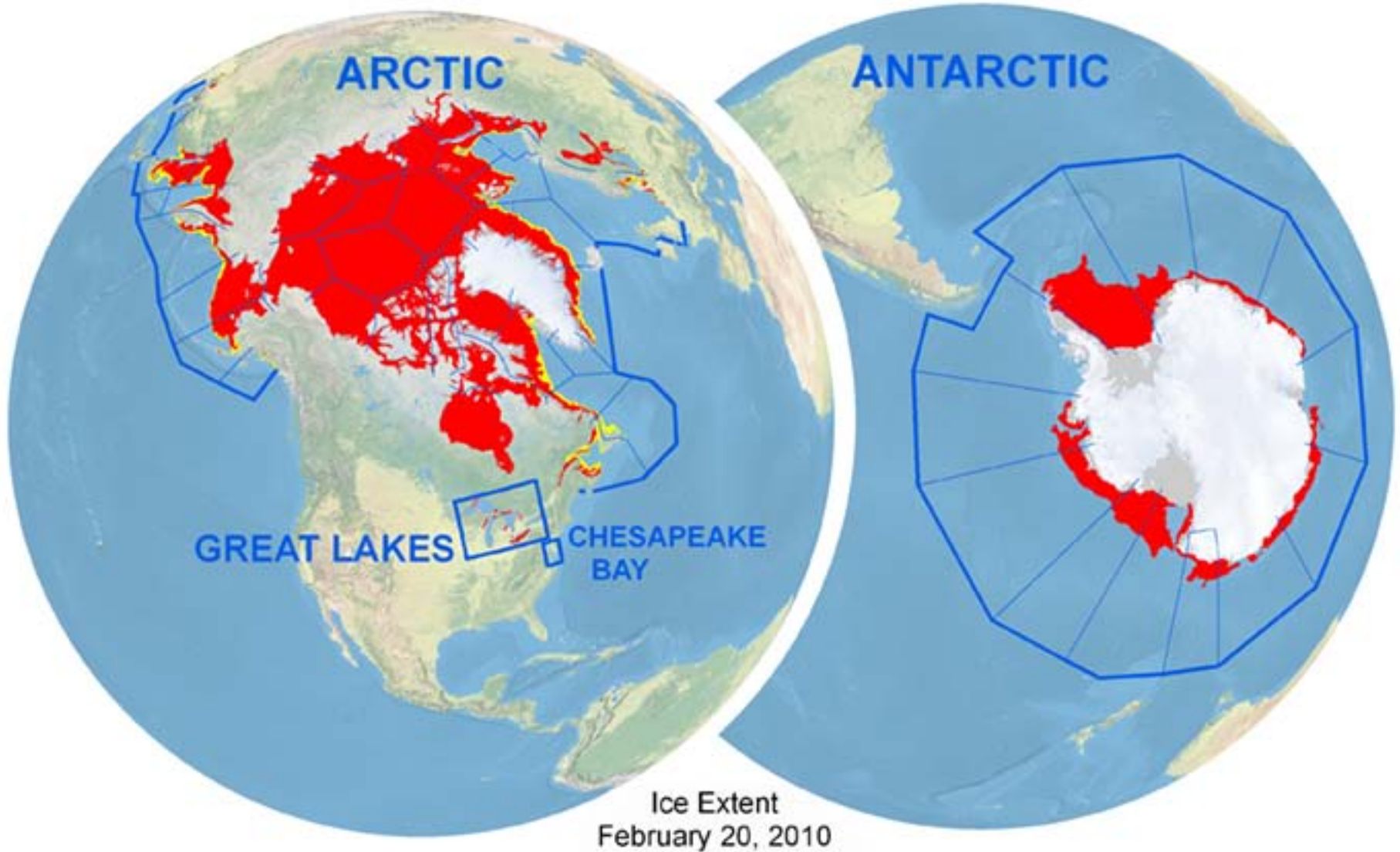
- NIC Area of Responsibility
- SIPAS (Exploiting ArcGIS)
- Comparing Min & Max Ice Extent
- Data sharing
- Can we share Knowledge?
- Future development





# ***NIC Area of Responsibility***

*22.78 Million Sq. Nautical Miles*







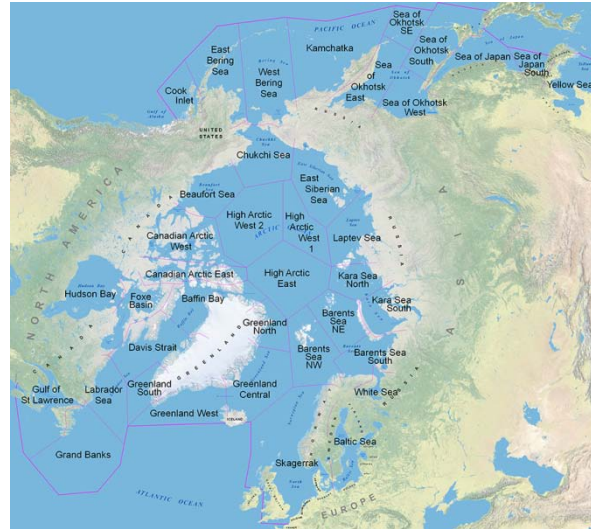
# SIPAS (Exploiting ArcGIS)

## A Single Application with Multiple uses

### Image Ingest

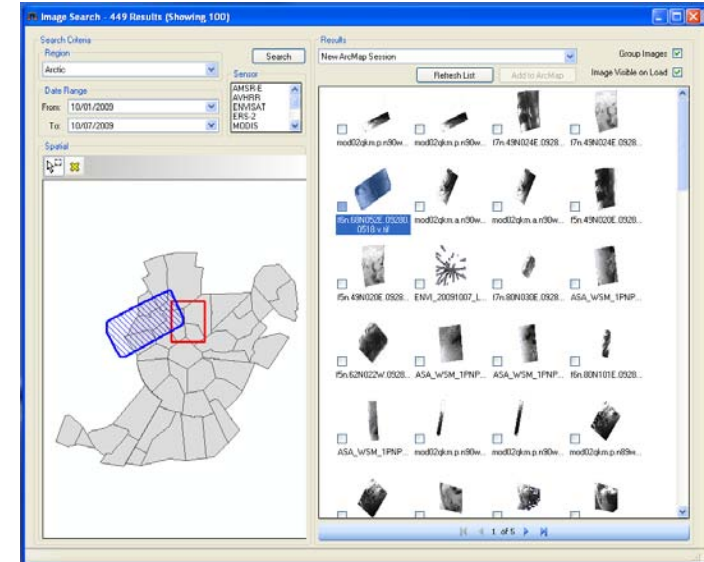
Converting Satellite data to image

- ESRI ArcGIS



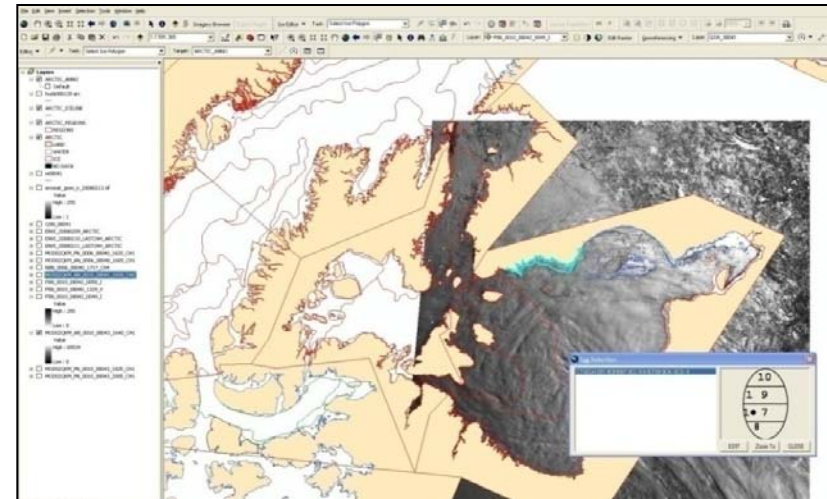
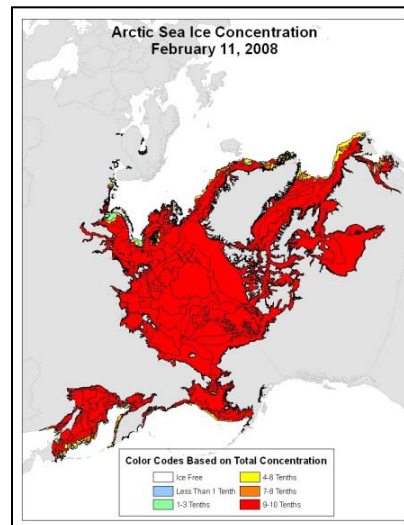
### Image Analysis & product creation

- ESRI ArcGIS



### Output /product Dissemination

- ESRI Geodatabase Format
  - Multiple products can be extracted from the Geodatabase





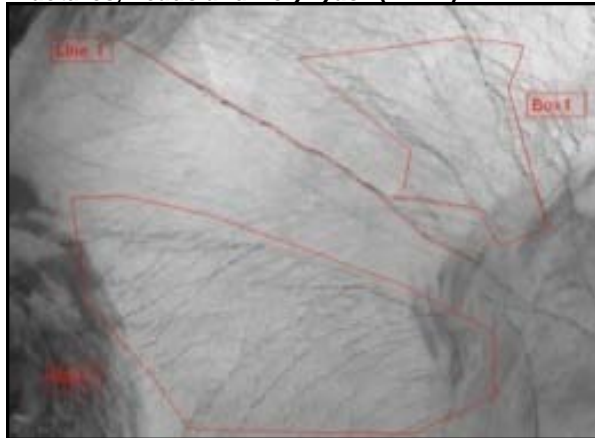
# SIPAS (Exploiting ArcGIS)

## Output Products

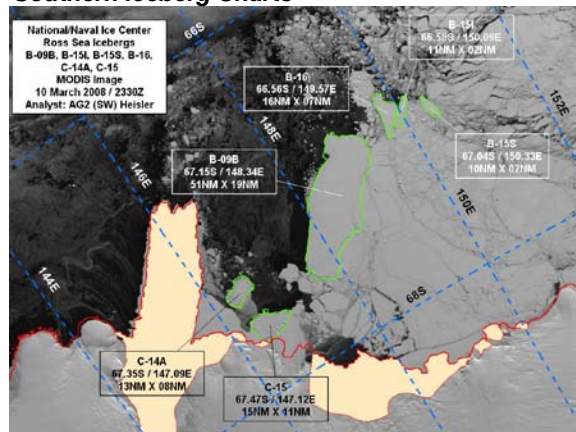
# 70 - 80 Tailored Products Per Week!

# 70 - 80 Automated Products Per Week!

Fractures, Leads and Polynyas (FLAP)



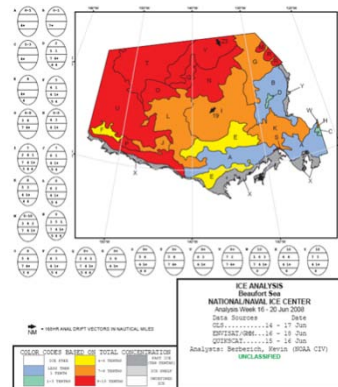
Southern Iceberg Charts



Ice Concentration Charts



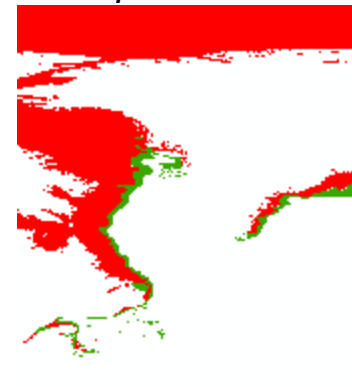
Traditional Ice Charts



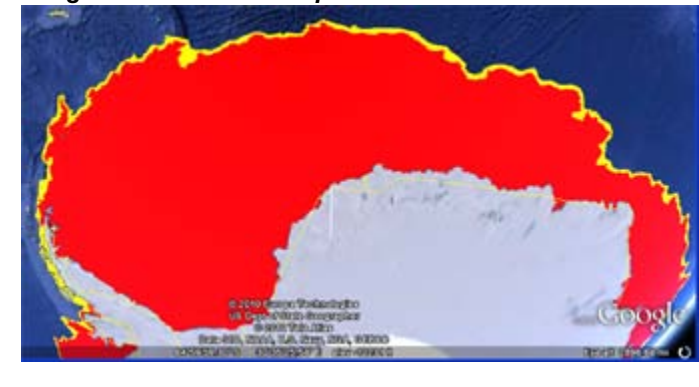
Text format products

```
MSGID/NAVCECEN/OVIY2/0082/MAY
OVIY/SPAROSLANT1/281510Z7/MAY/10F1
LINE/4/0/B/644621N3/0211623E5/6441
/650358N7/0213257E0
LINE/3/0/B/665657N5/0411658E5/6703
LINE/2/0/B/665027N6/0465046E5/6736
LINE/3/0/B/680347N8/0463135E2/6830
LINE/6/0/B/690340N2/0481341E1/6845
/692356N1/0503344E9/690839N5/05407
LINE/10/0/B/713635N5/0513422E7/709
/712348N5/0472022E7/720520N6/04743
/713201N4/0433155E1/702321N5/04654
/692032N2/0482719E1
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/764103N1/0545100E5/773123N3/05010
/763328N9/0222639E4/760928N2/01635
/774857N8/0103423E3/781215N4/01136
/790614N7/0111753E8
LINE/6/0/B/800324N7/0024646E2/8052
/800016N5/0172630E9/795406N1/01130
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LINE/24/0/B/604928N9/0473259W0/593
/614658N0/0414427W2/620659N8/04056
/644658N1/0423282W0/650049N0/04032
```

GIS data products



Google Earth KML format products ... and dozens more







# SIPAS (Exploiting ArcGIS)

## Products on Demand

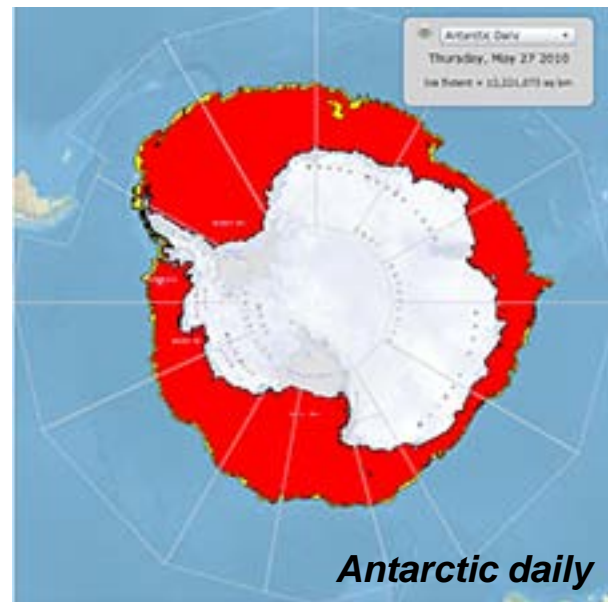
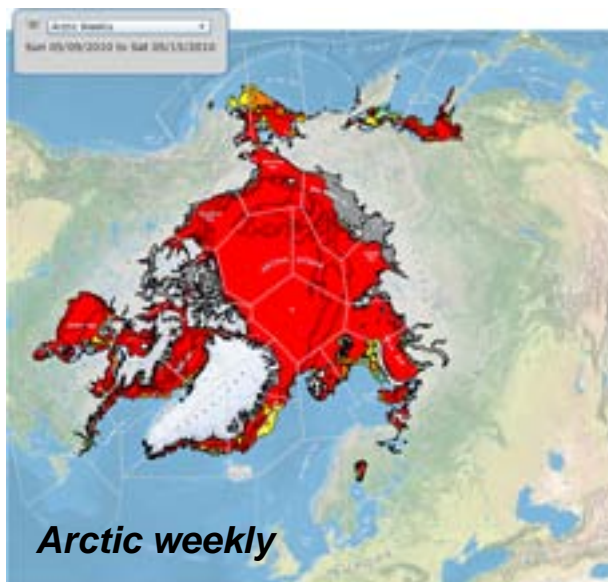
### Demonstration of the on demand system

## Capabilities

- From FAX to On Demand
- View maps & data
- Download maps & data
- Print maps & data
- Search & Query  
by Date and Area of Interest
- Interactive user Help
- User Feedback

## Output Formats

- Geodatabase
- Shape files
- Raster (JPEG)
- Document (PDF)
- Text file





# SIPAS (Exploiting ArcGIS)

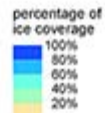
## *Ice information products*

- Ice extent



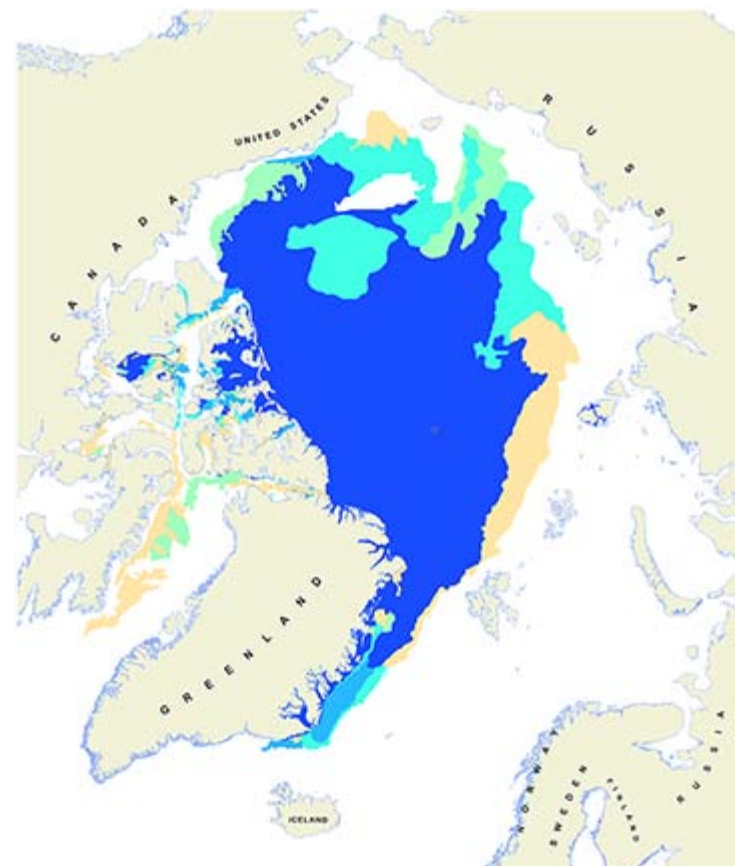
Weekly Ice Concentration  
February 14, 2010

National Ice Center  
Washington, DC



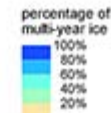
14,989 million square km  
ice extent  
scale: 1:50,000,000  
projection: Lambert Azimuthal  
Equal Area  
central meridian 25° west  
map date: June 3, 2010

- Multi year Ice



Percentage of Multi-year Ice  
February 14, 2010

National Ice Center  
Washington, DC

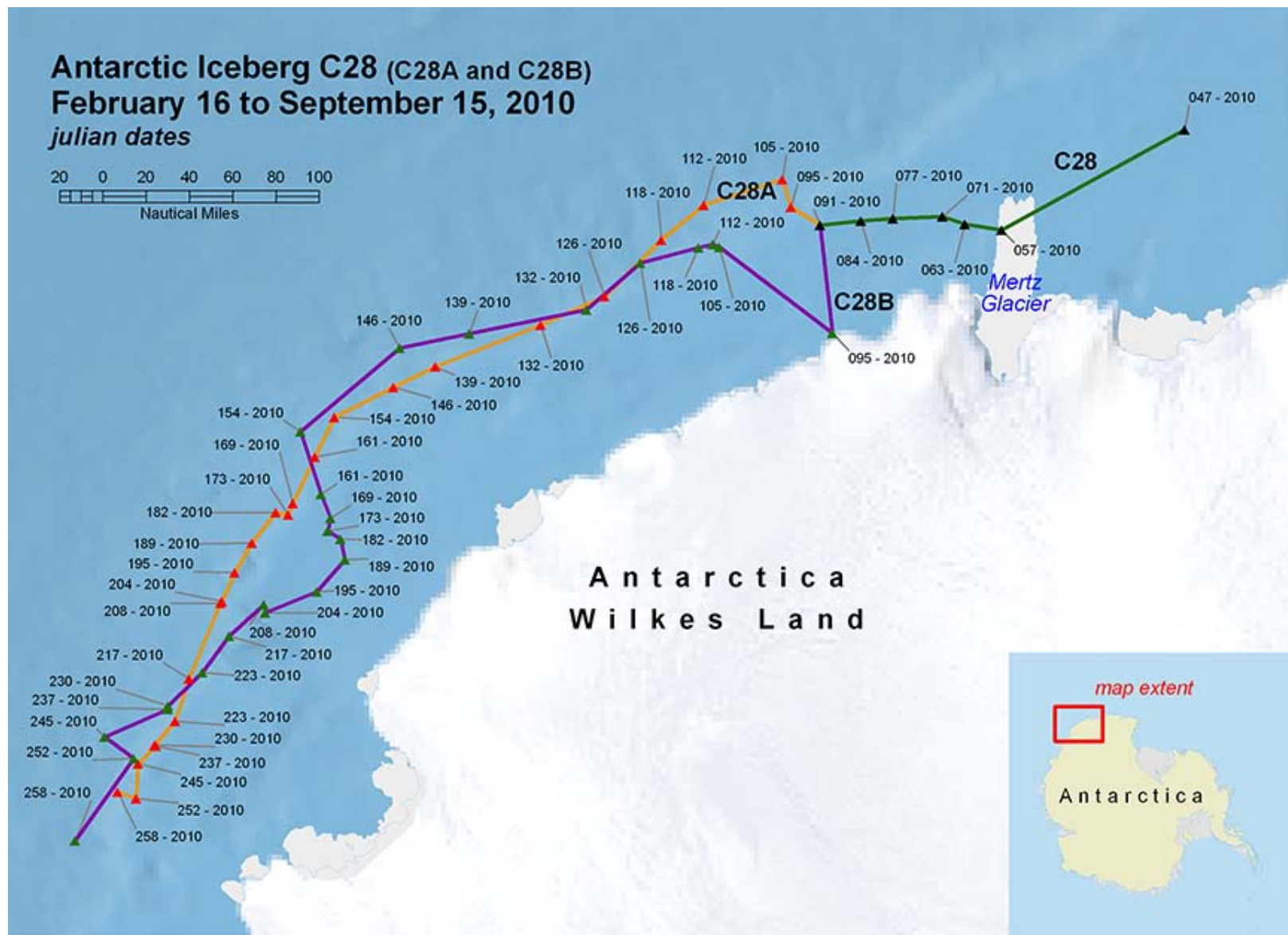


5,958 million square km  
multi-year ice extent  
scale: 1:25,000,000  
projection: Lambert Azimuthal  
Equal Area  
central meridian 0°  
map date: June 4, 2010



# SIPAS (Exploiting ArcGIS)

## *Iceberg Tracking*







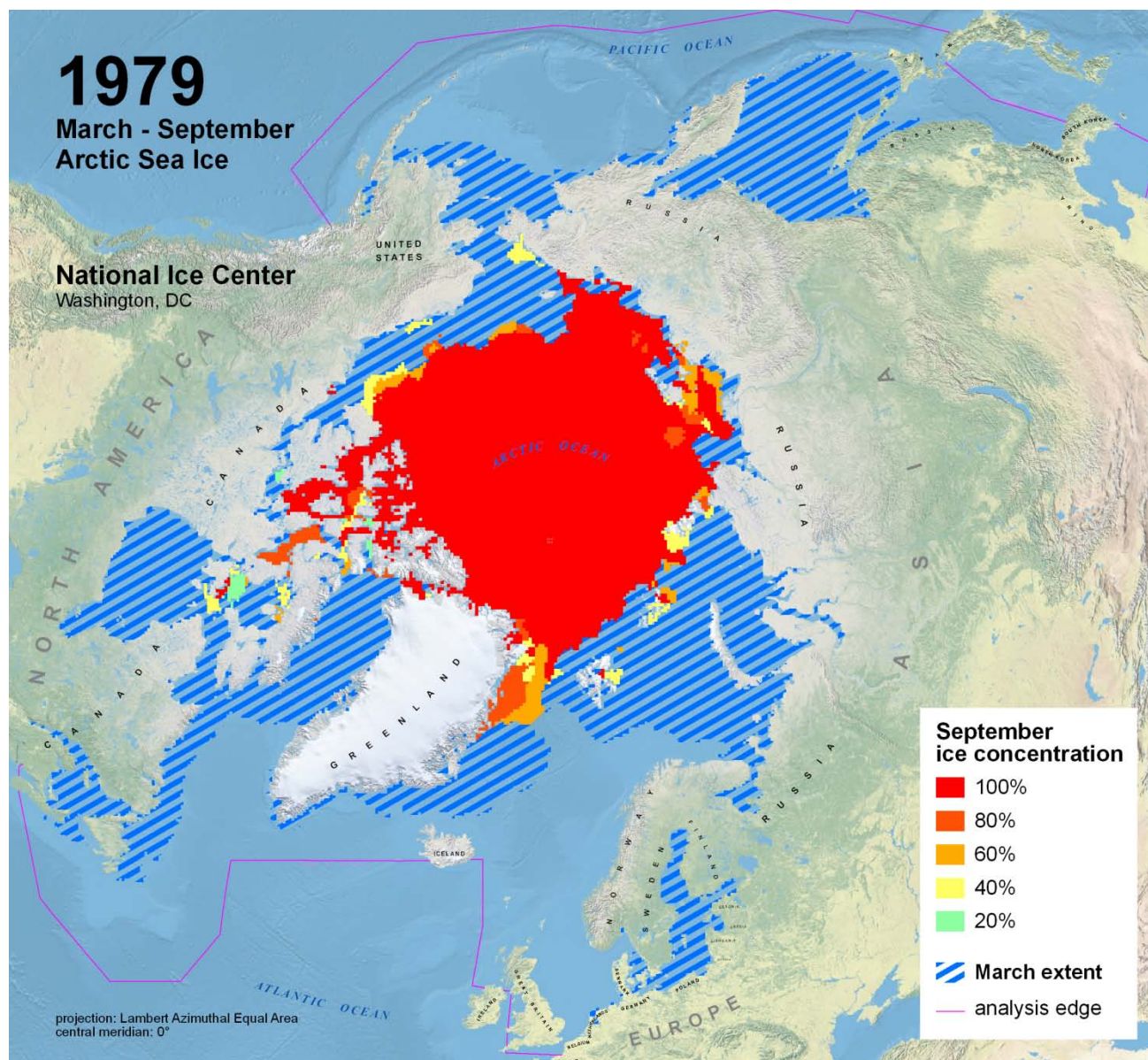
# Comparing Min & Max Ice Extent

## Min and Max 1979

**Max Extent = 16.46M Sq. KM**

**Min Extent = 7.576M Sq. KM**

**Data collected by the National Ice Center from 1972 to Present**







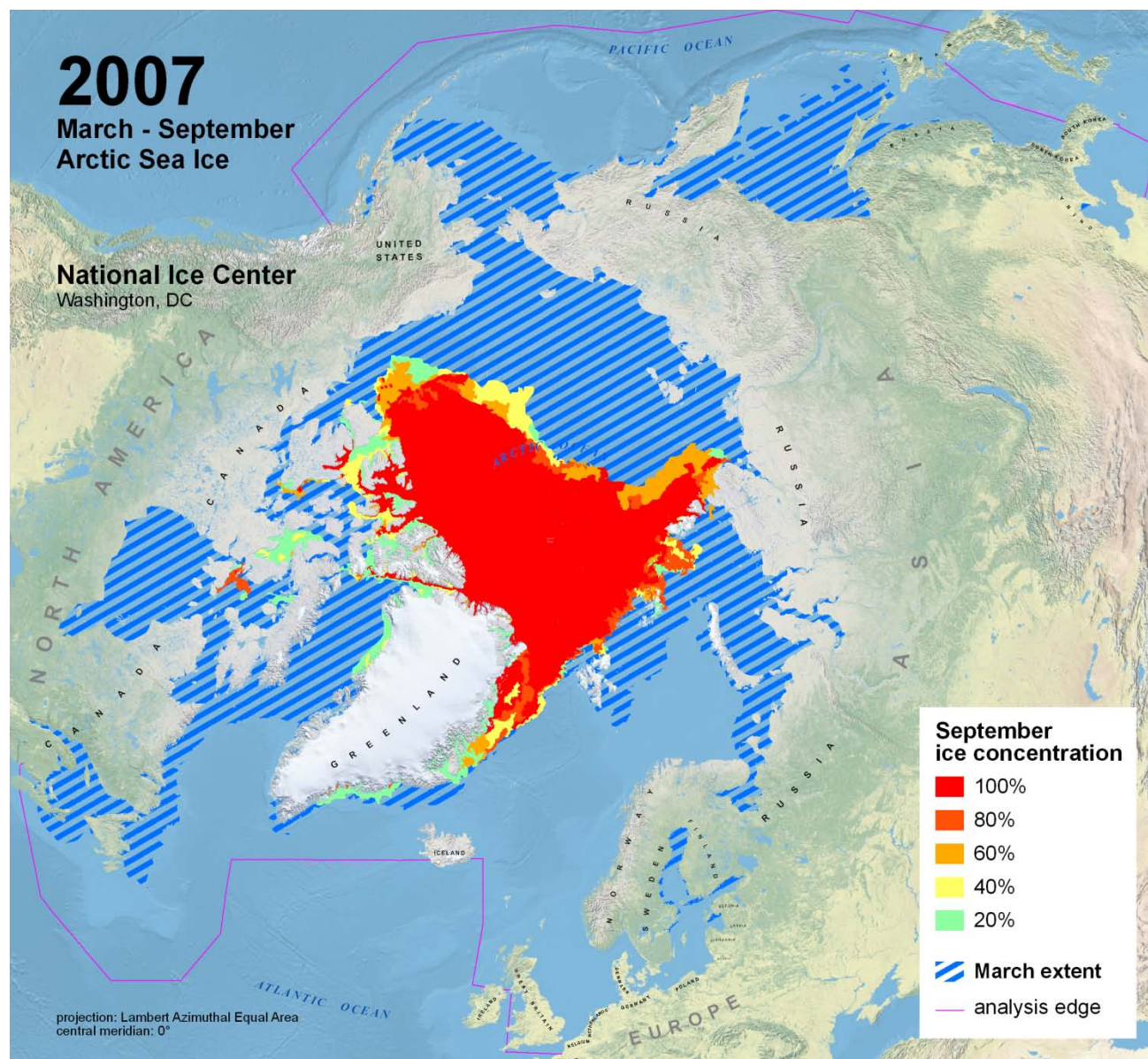
# Comparing Min & Max Ice Extent

## Min and Max 2007

**Max Extent = 15.17M Sq. KM**

**Min Extent = 4.93M Sq. KM**

**Data collected by the National  
Ice Center from 1972 to Present**



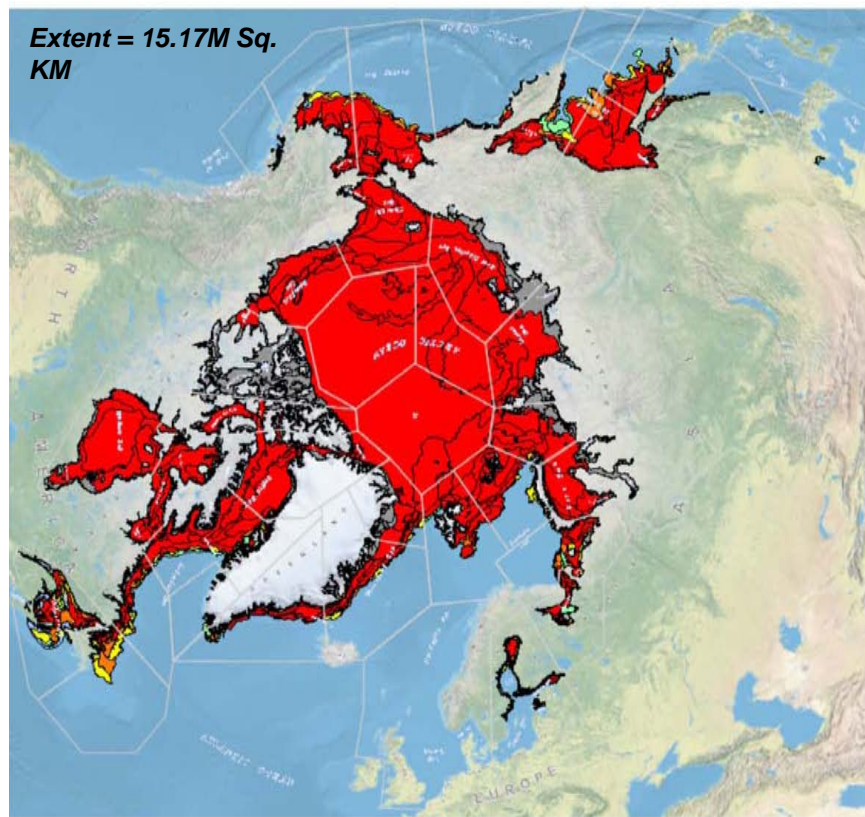




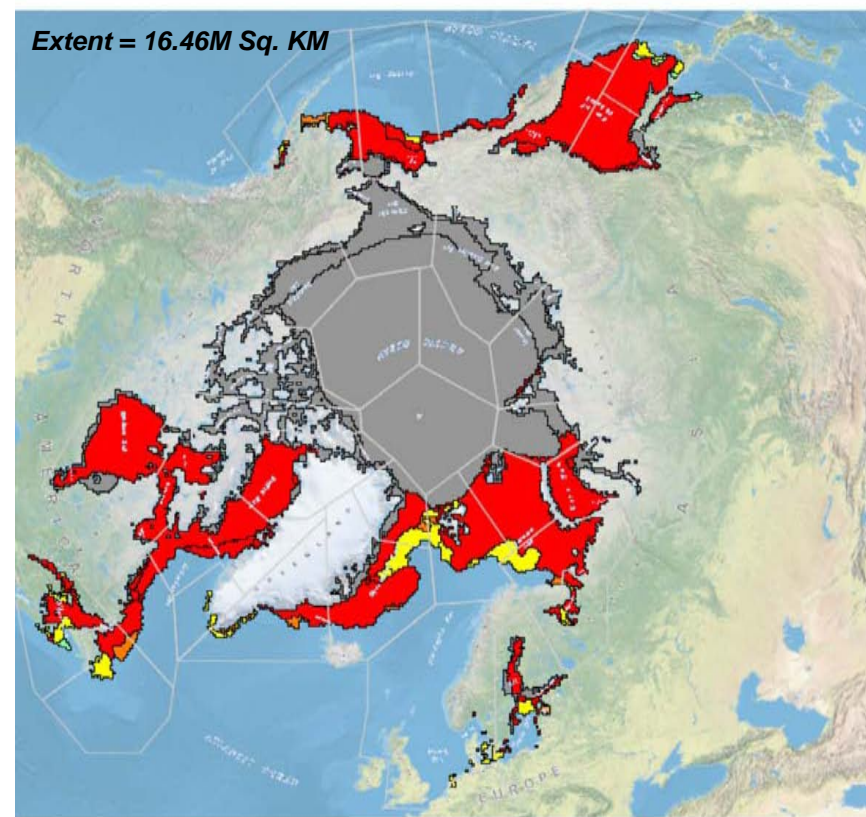
# Comparing Min & Max Ice Extent

## Maximum Smallest 2007 / Largest 1979

Arctic Weekly  
Sun Mar 11 to Sat Mar 17, 2007



Arctic Weekly  
Sun Mar 04 to Sat Mar 10, 1979



"Not to be used for Navigation"

National Ice Center







## ***Can we share Knowledge?***

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- Can we share knowledge and products? **Yes**
- SIPAS is simply ArcGIS 9.3 customized to meet our needs, but developed with the assumption that there would be multiple users. The system can be used to:
  - **Perform any type of image analysis**
  - **Assign attributes to meet different requirements (with minor changes)**
  - **It can ingest, analyze, and disseminate products**
- **NIC made 38 years of ice data available to the public**
- **NIC is willing to work with all ice centers that are willing to improve the development of ice analysis techniques.**



## ***Future Plans***

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- **ArcGIS 10 (FY10-11 test and implementation)**
- **Greater emphasis on coordination with other National and International partners**



# ***Future Plans***

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- **Ice analysis improvements that include the capability to select multiple regions for analysis**
- **Data sharing: ingesting other Ice Centers' data**
  - **With close partners (NAIS)**
    - Seamless data exchange
  - **With other Ice Centers**
    - Work closely to explore the possibility of sharing data
    - Use their data as an overlay
- **Update web functionalities to better support customers**





# Questions ?????

## 2007 Arctic Sea Ice Extent Record Minimum Evolution As Captured by NIC Charts

*The National Ice Center produces weekly and bi-weekly Arctic charts that have captured the evolution of the 2007 sea ice extent record minimum.. The animation of bi-weekly NIC charts to the right shows changing sea ice conditions from March 12 to September 24 2007. NIC hemispheric charts are produced based on the detailed analysis of observations from a diverse number of satellite missions including CSA RADARSAT-1, ESA Envisat, NASA QuikSCAT, NASA Terra and Aqua, DMSP, and NOAA.*

