

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



***20 June 2011
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Director, National Ice Center
Commanding Officer, Naval Ice Center***



USCG



USN



NOAA

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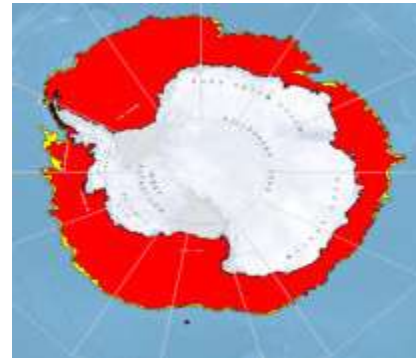
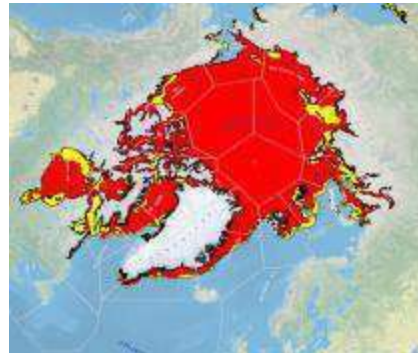
NIC Mission



- A multi-agency operational center operated by the United States Navy, National Oceanic and Atmospheric Administration, and United States Coast Guard.
- Located in Suitland, Maryland and employs over 50 military and civilian personnel.
- GLOBAL sea and lake ice analysis and forecasting.
- Over 140 International Customers, including SUBFOR, ONI, NOAA, NWS, NSF, USCG, MSC, and NASA.



NIC at NSOF
Suitland, MD



Mission: Provide the highest quality, timely, accurate, and relevant snow and ice products and services to meet the strategic, operational, and tactical requirements of U.S. national interests across a global area of responsibility.



International Partnerships

- **North American Ice Service (NAIS)**

- Multi-agency partnership between U. S. National Ice Center, Canadian Ice Service and International Ice Patrol.
- Mission: Transform individual organizational strengths into a unified source of ice information and meet all marine ice information needs and obligations of the United States and Canadian governments.



- **International Arctic Buoy Programme (IABP)**

- Global participants working together to maintain a network of drifting buoys in the Arctic Ocean to provide real-time operational requirements and research purposes including support to the World Climate Research Programme and the World Weather Watch Programme.



- **International Ice Charting Working Group**

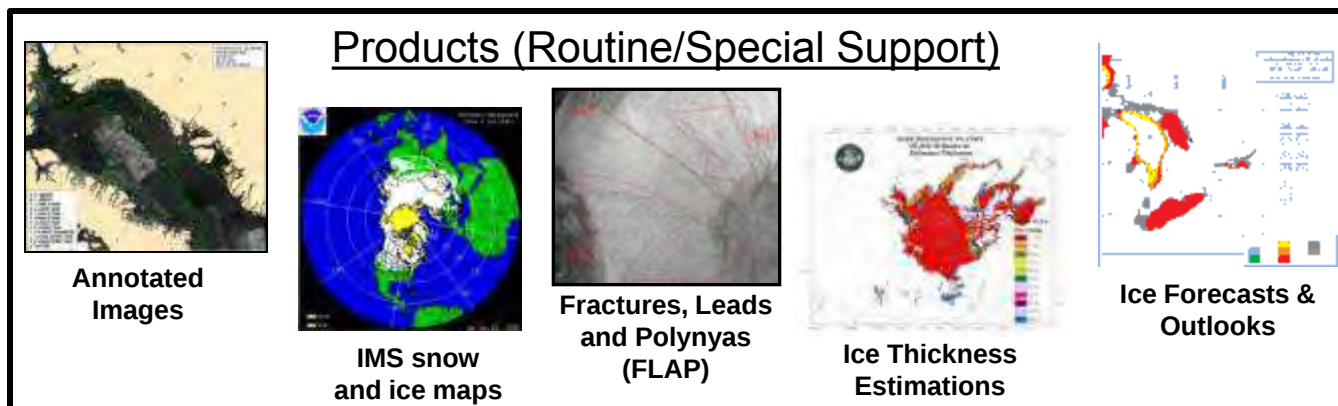
- Formed in October 1999 to promote cooperation between the world's ice centers on all matters concerning sea ice and icebergs.





Operations and Product Generation

Human, Derived, Automated, and Reconfigured





TODAY'S CHALLENGES

- **Minimally manned and resourced to meet current mission requirements.**
- **As a result, must continuously reprioritize support to meet expanding missions in the Arctic by USCG, Navy, and NOAA.**
 - **Change in type and number of missions to support (non-ice hardened ships and icebreakers).**
 - **Expanded forecast needs (5-7 days, 1-3 months, 1 year, 5-10 years).**
 - **Detailed ice information at high spatial resolution: type, thickness, age, movement.**
- **Availability of broad-based ice information.**

In order for NIC to plan, resource and provide operational support to its customers, those customers must clearly articulate their ice product requirements for current and future missions.



Summer Minimum Sea Ice Conditions

Sept. 26, 2005

5.941 million
square kilometers



Sept. 11, 2007

4.565 million
square kilometers



Sept. 21, 2009

5.843 million
square kilometers



Sept. 17, 2010

5.810 million
square kilometers



projection: Lambert Azimuthal
Equal Area
central meridian 0°



FUTURE MISSION REQUIREMENTS

- Strengthen partnerships and collaboration with other Arctic countries on safety of navigation, cryospheric science/research, data collection, and ice charting.
- Increase data sources
 - Real-time operational availability of all-weather, day and night, high resolution Synthetic Aperture Radar (SAR) imagery is crucial.
 - Improved coverage of the high Arctic, NWP, and NSR.
 - Distributed seasonal ice buoys and open ocean drifting buoys; hydrographic and atmospheric sensors; and the potential exploitation of UAVs and AUVs
- Improve modeling and forecasting capabilities (OTSR/WEAX)
- More trained ice analysts, ice pilots, and Arctic marine weather forecasters as demand signal for support in the region increases.
- Increased automated analysis and data merging capabilities.
- Continued access to Ice Reconnaissance data and platforms: USCG/NSF icebreakers, D-17/IIP C-130 flights, and Navy/NOAA ships



FUTURE SATELLITE MISSIONS FOR ARCTIC MONITORING

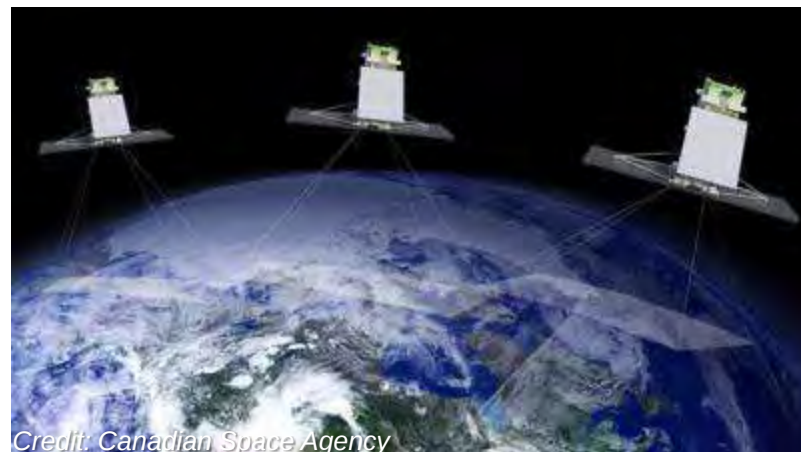
ESA Sentinel-1



Credit: European Space Agency

LAUNCH PLANNED FOR 2013-2015

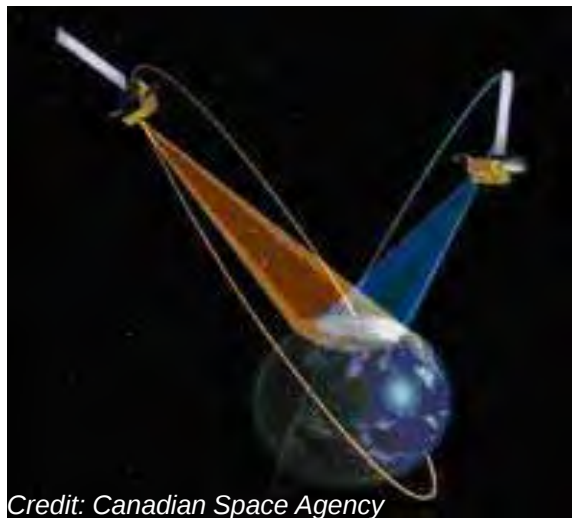
CSA RADARSAT Constellation Mission (RCM)



Credit: Canadian Space Agency

LAUNCH PLANNED FOR 2014-2015

CSA Polar Communication and Weather (PCW) Mission



Credit: Canadian Space Agency

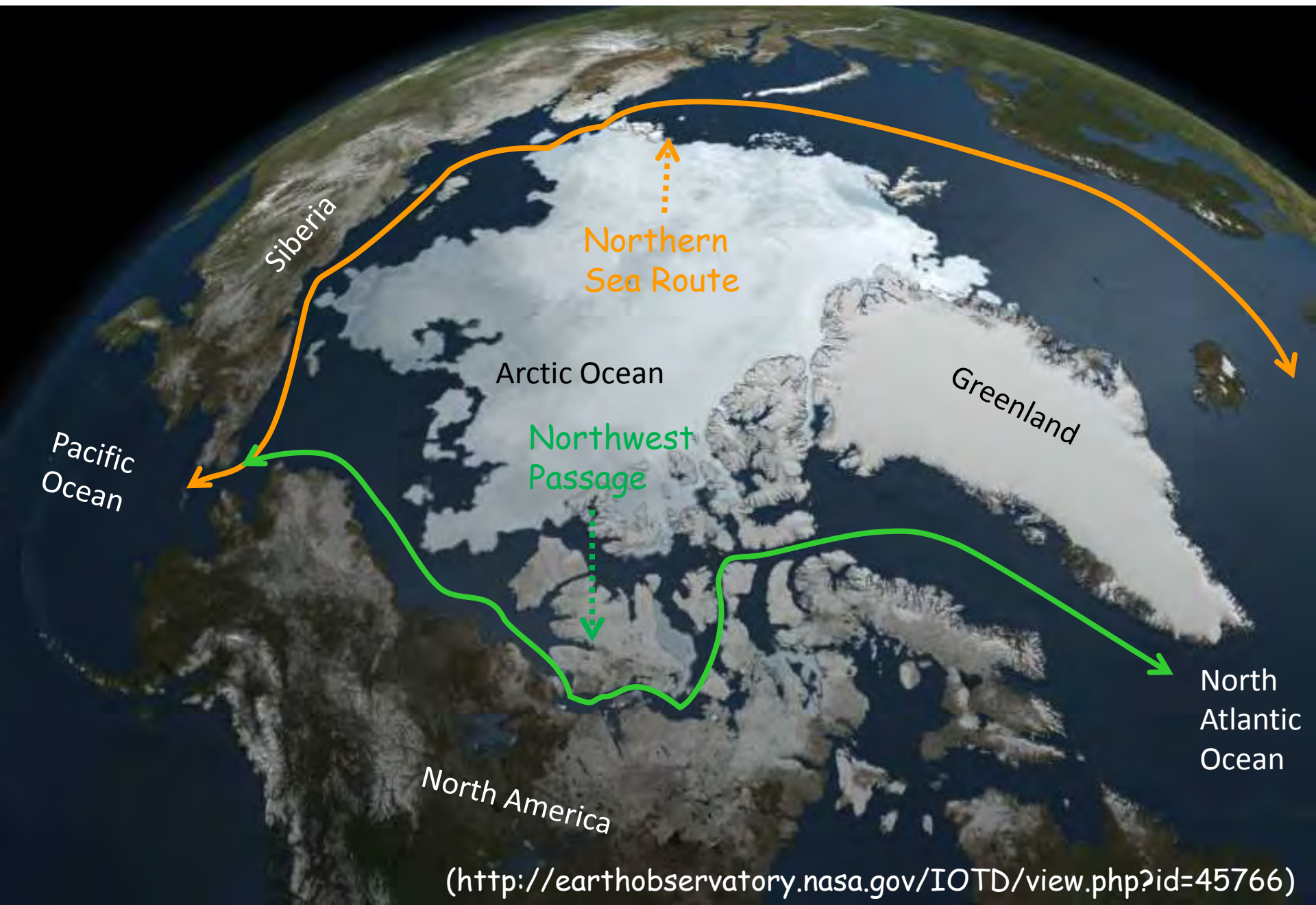
TENTATIVE LAUNCH PLANNED FOR 2016



Questions?



Arctic Routes and 2010 Sea Ice Minimum



(<http://earthobservatory.nasa.gov/IOTD/view.php?id=45766>)

What is next and when???



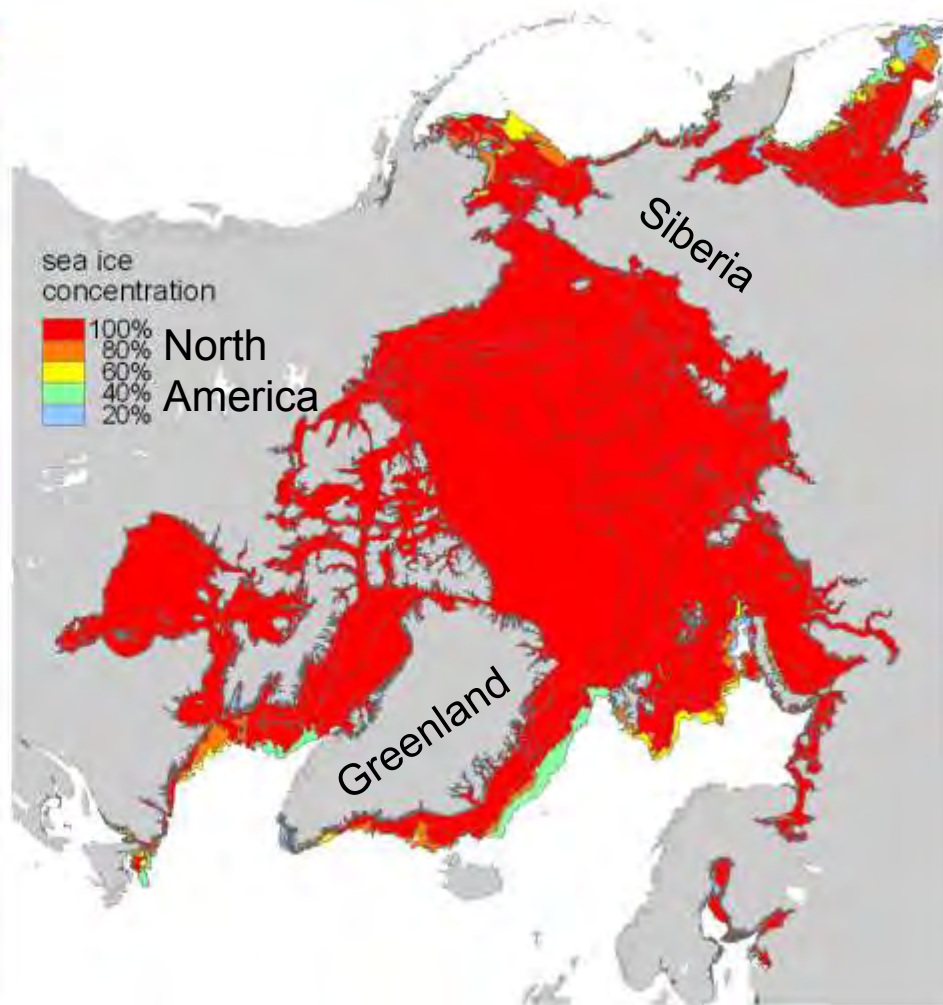


Increased Detail of NIC Analysis

1979 to 2011



Week of March 26, 1975
15.467 million square kilometers



Week of March 27, 2011
14.969 million square kilometers



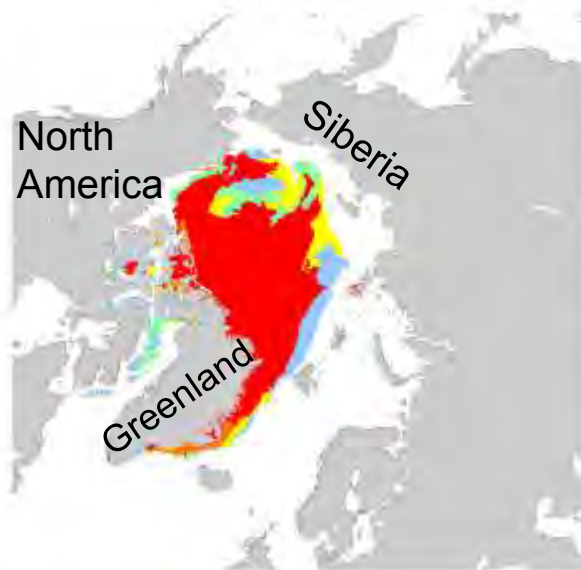
Arctic Sea Ice Extent vs. MYI Distribution

March 28, 2010

total ice extent
15.467 million
square kilometers



total Multi-Year
ice extent
6.253 million
square kilometers

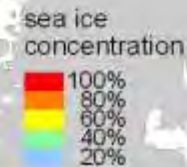


Sept. 26, 2010

total ice extent
5.629 million
square kilometers



total Multi-Year
ice extent
4.769 million
square kilometers

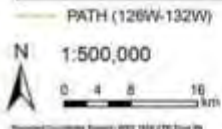
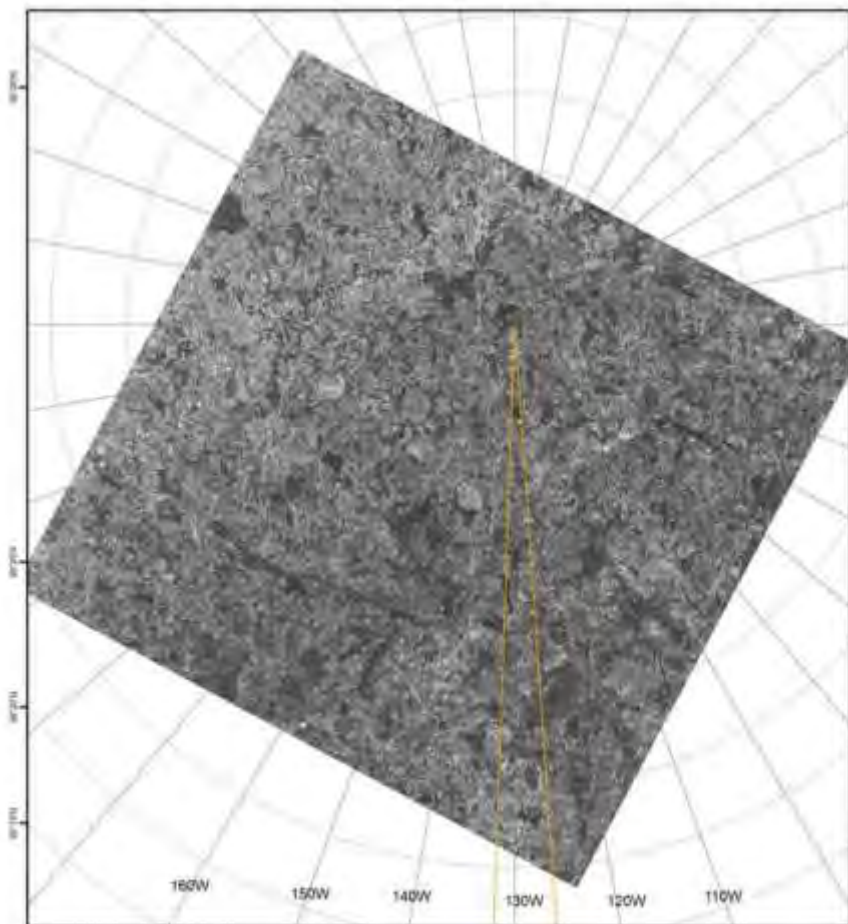


projection: Lambert Azimuthal
Equal Area
central meridian 0°

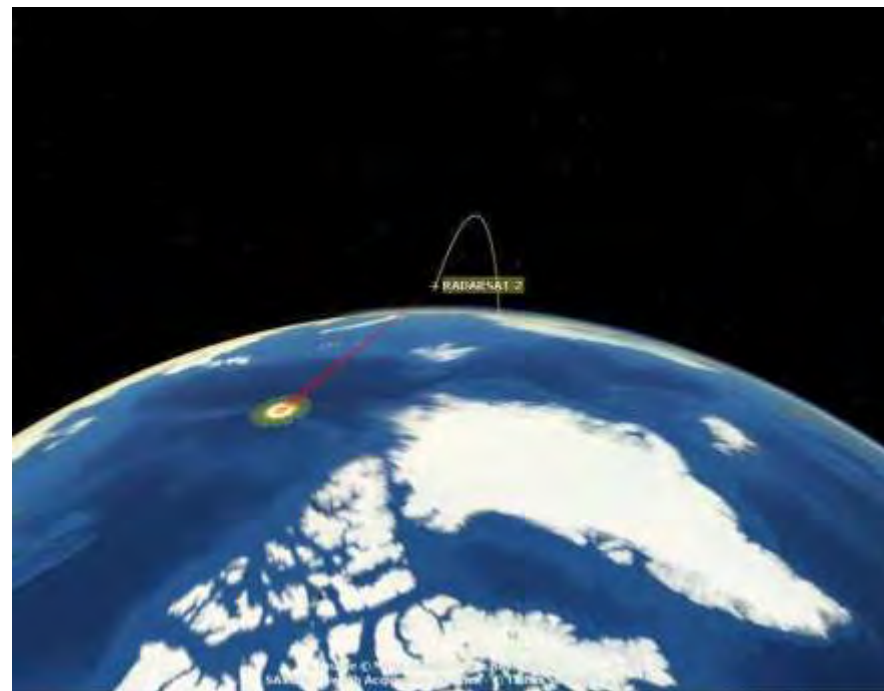


Covering the North Pole Region

North Pole IMAGERY
RADARSAT-2 Extended High EH4 (25m) 2009-02-27 16:32 UTC



Using RADARSAT-2
Extended High Mode





NIC IMS-Based MASIE Product at NSIDC

**National Snow and Ice Data Center**

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newice::development server

MASIE

Multisensor Analyzed Sea Ice Extent - Northern Hemisphere (MASIE-NH)

MASIE Home

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Where is Arctic sea ice NOW?

The **MASIE** (may-zee) project is produced in cooperation with the U.S. National Ice Center to give the best available Arctic-wide answer to that question.

MASIE lets you view and download:

- Northern hemisphere-wide sea ice coverage, for yesterday and the last four weeks
- Sea ice coverage by region
- A file of ice extent in sq km for the entire northern hemisphere and by region, updated daily

MASIE uses the most recent full day of data from the National Ice Center, obtained nightly. As is the rule with operational centers, gaps in production can occur without warning.

To obtain the last four weeks of data, see the product archive on the [FTP site](#). For details about this data set, see the [full documentation](#).

Download Daily Northern Hemisphere Sea Ice Extent:

[GeoTIFF \(All Surface Types\)](#) [GeoTIFF \(Ice/Not Ice\)](#) [PNG](#) [Shapefile](#)

Download Sea Ice Extent Values: [CSV](#)





MASIE Product Browse Subregions

