

Routinely Available Snow and Ice Products

Snow and sea/lake ice information are extremely important in a number of operational weather and climate applications. For example, accurate snow cover information ingested into Numerical Weather Prediction (NWP) models has been shown to improve the forecast track of storm systems affecting the United States. Also, proper charting of lake and ocean ice improves maritime commerce and transportation of goods. Over the western United States, the extent and water content of the snow pack is crucial for water resource management. Finally, long-term records of the global snow and ice pack contribute to our understanding of climatic trends, an extremely newsworthy item over the past few years. This article describes some of the more readily available snow and ice products that are generated by various agencies in the U.S.

The Satellite Analysis Branch (SAB) of the Satellite Services Division (SSD) of NOAA's Satellite and Information Service prepares a Daily Northern Hemisphere snow and ice chart. This chart, prepared by satellite analysts on a polar stereographic projection through an interactive processing system, provides information on the areal coverage of snow and ice. Visible imagery from NOAA's Polar-orbiting Operational Environmental Satellites (POES) and Geostationary Operational Environmental Satellites (GOES) are the primary data used for the analysis of this snow and ice cover product. Low resolution visible data from POES are used and whenever possible, are augmented by POES visible high resolution imagery and visible GOES, Geostationary Meteorological Satellite (GMS), and Meteosat data.

In addition, ground weather observations and various Defense Meteorological Satellite Program (DMSP) microwave products are incorporated into the daily snow and ice chart. The product can be found at <http://www.ssd.noaa.gov/PS/SNOW/>, and an example is provided in Figure 1. The SAB originally produced a weekly snow cover chart as early as the 1960's and as such, it's one of the longest standing satellite products. These data have proven to be useful in climatic studies.

The National Operational Hydrologic Remote Sensing Center (NOHRSC) of NOAA's National Weather Service provides comprehensive snow observations, analyses, data sets and map products for the Nation. These are generated from a combination of satellite, aircraft, in-situ and model analyses. The focus of the NOHRSC products is for hydrological applications. More information can be found at <http://www.nohrsc.noaa.gov/>. See images attached to Ken's email.

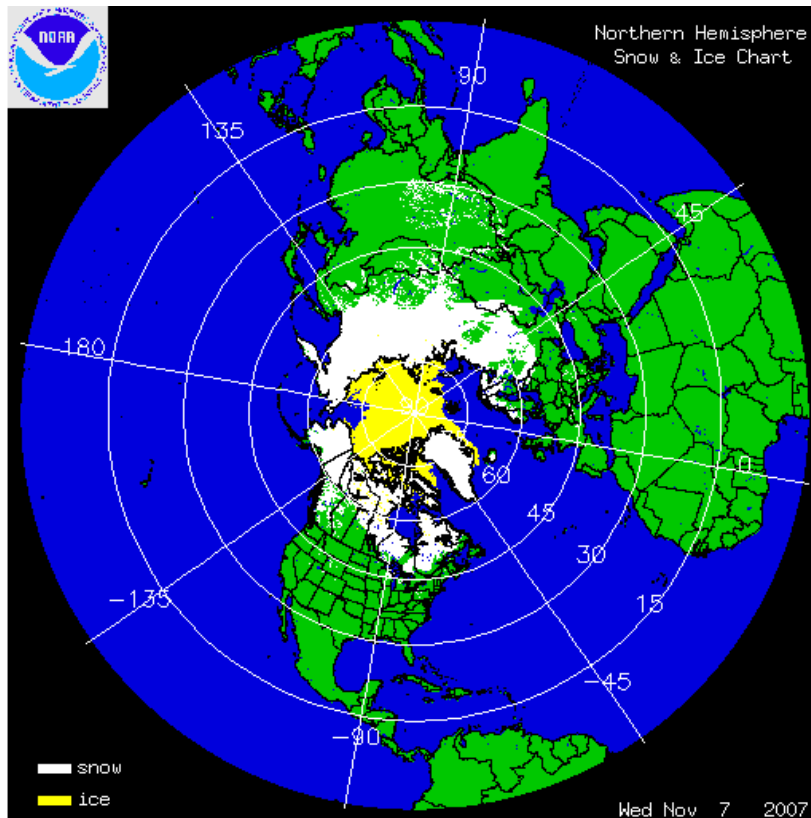


Figure 1 - SAB Northern Hemisphere snow and ice chart for 7 November 2007.

The National Ice Center (NIC) is a U.S. Government agency that brings together the Navy, NOAA, and the U.S. Coast Guard (USCG) to support coastal and marine sea ice operations and research. The NIC provides specialized strategic and tactical ice products to support operational needs of the U.S. government. NIC is the only national operational ice service in the world that monitors sea ice in both the Arctic and Antarctic, as well as in other bodies of water, such as the Great Lakes. The Center uses multiple sources of satellite and *in-situ* observations as well as NWP and ocean-sea ice model forecasts to produce sea ice analyses. Parameters of interest include sea and lake ice extent, concentration and thickness, along with calving icebergs and ice shelves monitoring. Figure 2 shows an example of NIC's eastern Great Lakes ice analysis product. More details about NIC products can be found at <http://www.natice.noaa.gov/>.

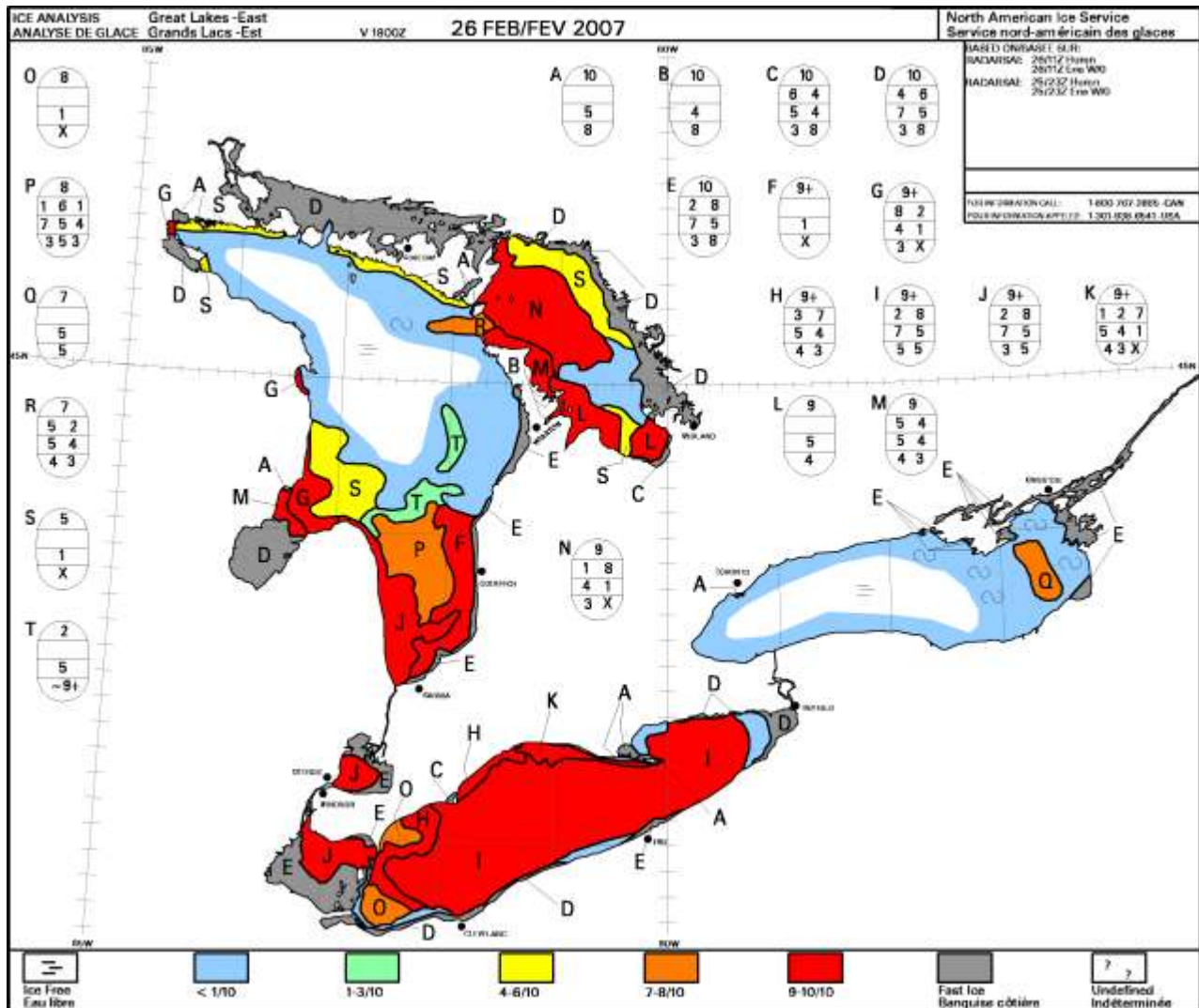


Figure 2 - NIC's Eastern Great Lakes ice analysis for 26 February 2007. The various colors represent the fractional coverage of ice (in tenths) in that portion of the lake. The National Snow and Ice Data Center (NSIDC), jointly funded by several U.S. agencies, supports research into the world's snow, ice, glacier, frozen ground, and climate interactions that make up Earth's cryosphere. NSIDC researchers use both satellite and ground measurements as the foundation for their scientific work. NSIDC manages and distributes scientific data, creates tools for data access, supports data users, performs scientific research, and educates the public about the cryosphere. NSIDC has led the field of cryospheric data management since 1976. They are part of the Cooperative Institute for Research in Environmental Sciences (CIRES) at the University of Colorado at Boulder. More detail on the excellent research and data available at NSIDC can be found at www.nsidc.org. Recently, NSIDC's monitoring of the shrinking Arctic sea ice, a major concern in our present global climate change scenario, indicates that although the annual cycle of sea-ice remains fairly consistent, the magnitude of the areal extent of ice appears to be diminishing, apparently due to warming Arctic Ocean temperatures, which delays the onset of freezing in the fall.

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