Utility of the United States National Ice Center's Interactive Multi-Sensor Snow and Ice Mapping System Data to View Arctic Variability

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The mission of the United States National Ice Center (USNIC) is to provide global to tactical scale ice and snow products, ice forecasting, and related environmental intelligence services for the United States government. To achieve its mission for gridded operational ice and snow maps, the USNIC applies the Interactive Multisensor Snow and Ice Mapping System (IMS). This system provides analysts with the ability to interpretively and semi-automatically demarcate the location, depth, and concentration of snow and ice using satellite, in situ, and assimilated data daily.

The National Oceanic and Atmospheric Administration's National Environmental Satellite Data and Information Service (NOAA NESDIS) has an extensive history of operational snow and ice monitoring in the northern hemisphere with IMS. IMS has been used to analyze ice and snow in the Northern Hemisphere since 1997, operational since October 1998. From 1997 to 2008, the analysis was conducted at the Satellite Analysis Branch (SAB). It transitioned to the National Ice Center in 2008. The initial spatial resolution of the analysis data was only 24km grid (1997-2006). Improved technology allowed SAB to begin investigation of incorporating a higher resolution dataset in 2004, with a 4km dataset becoming operational in 2006. 2014 saw further updates with 1km gridded resolution data added.

Since 2006, the National Snow and Ice Data Center (NSIDC), in cooperation with the USNIC, has produced a Multisensor Analyzed Sea ice Extent (MASIE) product, which uses the most recent full day of 4km data from the IMS to determine the amount of sea ice present. They also collect the 1km resolution IMS data to calculate sea ice extent. Analysts at the USNIC use a 3-day mean of this 4km MASIE data to create a graph showing the trends in sea ice extent from March 1 through October 1 to determine the melt seasons. A longer climatology of sea ice cover can be created with a more coarse resolution of 24km, encompassing a 20 year time period (February 1997 - present). Until sufficient 1km and 4km temporal coverage is created, the 24km coverage can serve as a proxy for climatological purposes. Yearly variation of Arctic sea ice can be seen by comparing a various combination of Arctic ice extent images and the trends.