NESDIS Contributions to the International Polar Year (IPY)

NESDIS is contributing to the IPY by providing experimental and operational snow, ice, atmosphere, and space products, compiling an IPY bibliography, and performing research on new satellite products and data assimilation. NESDIS leads an effort to coordinate, evaluate, and enhance the global observing system for the cryosphere (snow and ice). This process is implemented as the Integrated Global Observing Strategy (IGOS) Cryosphere Theme, which has a near-term goal of providing a legacy of IPY observations and a long-term goal of a robust cryosphere observing system that will be part of the Global Earth Observation System of Systems (GEOSS).

NESDIS Satellite Products Relevant to IPY

NESDIS has many satellite products that are relevant to IPY. Some are being generated for IPY; others are "business as usual".

A. Polar-specific Products

1. Polar winds (http://stratus.ssec.wisc.edu/products/rtpolarwinds)
   a) Real-time: from MODIS and AVHRR, poles
   b) Historical: from AVHRR, 1982-2002, both poles

2. Cloud properties, surface temperature and albedo, radiative fluxes from AVHRR (http://stratus.ssec.wisc.edu/products/rtcaspr):
   a) Real-time: Once daily, both poles
   b) Extended AVHRR Polar Pathfinder (APP-x), both poles, twice daily, 1982-2004

3. MODIS direct broadcast products: Winds, cloud properties, temperature inversion characteristics, surface temperature and albedo generated in real-time at direct broadcast sites in Norway, Finland, Antarctica. Development of a similar system at Fairbanks, Alaska (Gilmore Creek) is underway and should be operational by the end of the year (2007). Direct broadcast products are available at http://stratus.ssec.wisc.edu/db.

4. NESDIS directs ice research activities and provides the Alaska Region with synthetic aperture radar (SAR) imagery and experimental derived products for safety of fisheries, marine transportation, and low-flying aircraft (http://www.orbit.nesdis.noaa.gov/sod/mecb/sar). These include:

   1) Ice imagery for arctic, coastal, and river ice analyses
   2) Storm imagery for mesoscale storm prediction
   3) High-resolution winds for coastal wind analyses and climate studies.

5. The National Ice Center (NIC) (http://www.natice.noaa.gov) produces operational hemispheric sea ice analyses for both Polar Regions using national and international satellite assets. The NIC participates in research and validation of radar altimetry observations over Arctic sea ice for the measurement of ice thickness. In collaboration with NASA/JPL, NIC is also developing experimental sea ice coverage charts for the Polar Regions from QuikSCAT scatterometer backscatter data. The NIC is also developing/updating Arctic and Antarctic sea ice chart climatologies, undertaking responsibility for the Operational Snow and Ice Analysis and Mapping System, and participating in the GMES Polar View IPY Activities (http://ipy-ice-portal.org).

B. Global Products

1. Hydrological Products (Snow cover/SWE; precipitation, water vapor, sea-ice, etc.):
   a) Daily snow and ice cover (http://www.ssd.noaa.gov/PS/SNOW/)
   b) Real-time from POES/AMSU (see http://www.orbit.nesdis.noaa.gov/corp/scsb/mspps/ and http://www.osdpd.noaa.gov/PSB/IMAGES/MSPPS_day2.html)
   c) Archived at CLASS (2000 to present); Pentad and monthly products (see http://www.orbit.nesdis.noaa.gov/corp/scsb/mspps/climate.html)
   d) Real-time from DMSP/SSMI (see http://www.osdpd.noaa.gov/PSB/SHARED_PROCESSING/SHARED_PROCESSING.html)
   e) Archived at CLASS (1997 - present); Monthly products (1987 - present) archived at NCDC (see http://lwf.ncdc.noaa.gov/oa/satellite/ssmi/ssmiproducts.html)
   f) Real-time from Aqua/AMSR-E (see http://www.orbit.nesdis.noaa.gov/corp/scsb/wchen/AMSR-E/)

2. Ocean products (SST, winds, etc.) at:
http://www.orbit.nesdis.noaa.gov/sod/sst/index.php
http://www.orbit.nesdis.noaa.gov/star/meb_index.php
http://www.orbit.nesdis.noaa.gov/star/opb_index.php

3. Measurements of auroral particle precipitation from the polar-orbiting POES satellites. NGDC is helping provide NOAA space weather data and analysis in collaborative research efforts with IPY scientists.

NESDIS Non-Satellite Products Relevant to IPY

The U.S. National Oceanographic Data Center is participating in the following activities for the International Polar Year (IPY):

A. Preparation of oceanographic atlas and database of the Sub-Arctic Seas by the Ocean Climate Laboratory Division (OC5): This Atlas and accompanying CD-ROM will contain oceanographic data collected for the Sub-Arctic seas. It is anticipated that there will be monthly data distribution plots for each year; monthly climatic maps of temperature and salinity at the sea surface and depth levels of 5 and 10 meters using objective analysis. The Atlas will also include, in electronic format, selected copies of rare books and articles about the history of the sub-arctic exploration and climate studies as well as photos, which provide information about the people and environment of this region.

A. Preparation of a printed and online bibliography of NOAA library polar resources by the NOAA Central Library (OC4) - (http://docs.lib.noaa.gov/rescue/Bibliographies/IPY2007.pdf):

1. The bibliography "International Polar Year 2007-2008 Resources on Polar Research in the NOAA Central Library Network: A Selected Bibliography" has been prepared to support IPY activities during International Polar Years 2007 and 2008. It reflects the NOAA Library Network's unique printed and online resources on exploration and research in the Polar Regions from the 18th century to the present. The Bibliography is organized into four sections: 1. What is the International Polar Year? 2. Historical resources on Polar research in the NOAA Central Library Special Collections. 3. Current resources on Polar research in the NOAA Central Library Network. 4. Internet resources on Polar research. Over 1400 bibliographic entries are organized by title and contain all formats, including print, CD-ROM, online full-text documents, digital videos, and digital images, online cruise data, scientific data sets, and Web resources. This document provides full-text access to significant Polar documents in the NOAA Library collections. It links to over hundred and fifty historically unique, previously selected, cataloged, and

imaged documents. The Bibliography is also published online under LISD Current Reference Series 2006-1, updated as of April 2007, and is available to the international community via the NOAA Central Library's home page and its online catalog, NOAALINC. This Bibliography serves as an Internet locator for printed and online resources in Polar research. The publication is available online for downloading in Microsoft Word and in PDF formats at:
http://docs.lib.noaa.gov/rescue/Bibliographies/IPY2007.doc
http://docs.lib.noaa.gov/rescue/Bibliographies/IPY2007.pdf

2. Polar Resources in the NOAA Library Network home page has been prepared to support the Agency and NOAA Central Library (NCL) activities during International Polar Year 2007-2008. It displays the NCL network's unique online resources on exploration and research in Polar Regions. The collection includes selected library holdings from the 1st (1881-1883) through the 3rd (1957-1958) International Polar Years, Polar Photo Gallery selected from the NOAA Photo Library, and the NOAA IPY Posters. This Web site offers full-text access to unique historic polar documents in the NOAA Library collections. Over one hundred fifty of the listed documents are linked to previously scanned historically significant publications online. These documents are also accessible online via the Polar Bibliography: International Polar Year 2007-2008: Resources on Polar Research in the NOAA Central Library Network: a Selected Bibliography (Updated as of April 2007).

3. Polar Poster has been developed in the NOAA Central Library to provide a visual display of the unique historical and contemporary Polar Resources in the NOAA Library Network. The poster has been also requested and sent to the National Archive and Records Administration (NARA) to be kept for posterity. The Library's Polar Poster is available online in JPEG, TIFF, and in PDF format accompanied by the abstract:
http://docs.lib.noaa.gov/rescue/Bibliographies/IPY2007_poster.pdf (PDF with abstract)
http://docs.lib.noaa.gov/rescue/Bibliographies/IPY2007_poster.jpg (JPEG for easy access)
http://docs.lib.noaa.gov/rescue/Bibliographies/IPY2007_poster.tif (TIFF for archiving)

NOAA AON Non-Satellite Data Relevant to IPY Satellite Remote Sensing

Arctic Observing Network (AON): Program information is available at www.arctic.noaa.gov and links therein.

A. 100% International Arctic Observing Network (AON) goal:
- 21 ice-tethered buoys
- 60 ice buoys
- 21 ice mass balance buoys
- 68 oceanographic moorings (serviced once per year)
- 19 annual ship line and
- 6 coastal climate observatories (Barrow, Eureka, Tiksi, Summit, Ny Alesund, Alert).

B. 100% NOAA component of the AON goal:
- 54 Ice Buoys = 30 International Arctic Buoy Program + 12 IMB + 12 Tethered Platforms
- 40 Moorings = 10 pairs Pathway + 8 pairs Gateway + 8 Bering/Chukchi Seas + 4 Deep Western Boundary Current
- 12 Annual Ship Lines = 5 Pathway + 2 Gateway + 4 Bering/Chukchi Seas + 1 Deep Western Boundary Current to service the buoys & moorings and provide physical, chemical and biological data to describe changes in Arctic Ocean climate and impacts to ecosystems.
- 4 Coastal Observatories: Eureka, Tiksi, Summit, and Ny Alesund

Note on Coastal Observatories: A system of strategically located, long-term Atmospheric Observatories will be developed around the Arctic to carry out both routine measurements made at meteorological stations and intensive measurements at the surface and through the depth of the atmosphere. Among the quantities to be measured are solar radiation, aerosols, air chemistry, trace gases, cloud properties, water vapor, ozone, temperatures, winds, precipitation, surface albedo, and stratospheric properties. These measurements are essential to calibrate and validate satellite sensors and to improve the reliability of climate models. The Atmospheric Observatory partnership includes the United States, Canada, Russia, Norway, Finland, and China. NOAA's existing baseline observatories at Barrow, Alaska and South Pole will continue to focus on measurements of trace gases and aerosols. The flask-sampling program has 15 polar stations that collect atmospheric samples for trace gas measurement. In the Arctic, a new observatory at Eureka, Canada will operate during the IPY, and the observatory at Barrow will continue. The observatory at Tiksi, Russia will be partially operational. These three observatories will focus on measurements of clouds, radiation, and trace gases.