AVHRR Polar Pathfinder Twice-Daily 25 km EASE-Grid Composites

Summary

This data set is no longer available due to errors in the data. Please see the Error Sources section of this document for details. If you have further questions, please contact NSIDC User Services.

The AVHRR Polar Pathfinder Twice-Daily 25 km EASE-Grid Composites are a collection of products for both poles, consisting of twice-daily gridded and calibrated satellite channel data and derived parameters. Data include five Advanced Very High Resolution Radiometer (AVHRR) channels, clear sky surface broadband albedo and skin temperature, average albedo and temperature, valid fraction file, solar zenith angle, satellite elevation angle, sun-satellite relative azimuth angle, surface type mask, cloud mask, cloud fraction files, and Universal Coordinated Time (UTC) of acquisition. The 25 km data are derived from the AVHRR Polar Pathfinder Twice-Daily 5 km EASE-Grid Composites, and extend poleward from 48.4 degrees north and 53.2 degrees south latitudes, spanning July 1981 through December 2000. Data are in 1-byte and 2-byte integer grid format and are available by FTP.

Note: NSIDC recommends the use of the Extended AVHRR Polar Pathfinder (APP-x) Product instead of our AVHRR Polar Pathfinder Twice-Daily 25 km EASE-Grid Composites. The APP-x 25 km product has albedo and temperature calculations for all sky conditions. Cloud properties are modeled to estimate the albedo and temperature under the clouds. An improved cloud detection algorithm is also used in the APP-x product.

Additional Information

For parameters other than the cloud mask, data characteristics are the same as for the corresponding 5 km product. Please refer to the AVHRR Polar Pathfinder Twice-Daily 5 km EASE-Grid Composites documentation for more details. The 25 km grid values are generated by subsampling the 5 km grids. Each 25 km cell is copied from the center cell of a corresponding 5 x 5 cell region in the 5 km parameter. The grid projection is based on a Lambert Azimuthal Equal-Area projection (the NSIDC EASE-Grid). Dimensions of the 25 km grids are 361 pixels wide by 361 pixels high for the Northern Hemisphere grid, and 321 pixels wide by 321 pixels high for the Southern Hemisphere grid. File sizes for the Northern Hemisphere grids are 230,642 bytes (two-byte grid) and 130,321 bytes (one-byte grid). File sizes for the Southern Hemisphere grids are 206,082 bytes (two-byte grid) and 103,041 bytes (one-byte grid).

Each of the 25 km parameters that have the same name as a corresponding 5 km parameter have been resampled using a nearest-neighbor algorithm from the 5 km grid to the 25 km grid.

Bit values of the 25 km cloud mask are the same as those in the 5 km cloud mask, except that bit 7 represents missing data. The following are additional parameter files provided with the 25 km product:

- Average albedo and surface temperature:
    - **alba**
        - Average albedo
        - 2 bytes per cell
        - Range: 0 - 1000+
    - **tema**
        - Average surface temperature
        - 2 bytes per cell
        - Range: ~1800 - 3000+
    - Averaging involves summing the non-missing 5 km cells in each 5 cell x 5 cell block, then dividing by the number of non-missing 5 km cells in the block to yield the value for a single corresponding 25 km cell.
    - If all cells in the block are missing, the alba or tema value is 0.
- Valid fraction file:
    - **vfrc**
        - Valid fraction
        - One byte per cell
        - Range: 0 - 100
    - Represents the number of non-missing cells in each 5 km 5 x 5 cell block divided by the number of cells in the block (25) times 100.
    - If all cells in the block are missing, the vfrc value is 0.
- Cloud fraction files:
    - **cfr0**: Cloud fraction for cmsk bit 0
    - **cfr1**: Cloud fraction for cmsk bit 1
    - **cfr2**: Cloud fraction for cmsk bit 2 (1981 - 1993 data; version 1 and 2 only)
    - Each cloud fraction file is one byte per cell, nominally in the range 0 - 100.
    - Represents the number of cloudy cells in each 5 km 5 x 5 cell block divided by the number of non-missing cells in the block times 100.
    - If all cells in the block are missing, the cloud fraction value is 128.

Error Sources

Sensor Calibration Errors

Graphs spanning the entire temporal coverage of the data indicate that sensor calibration errors have occurred. Albedo measurements in areas where only small variances are expected consistently show a substantial dip in 1995 and again in 2001-2005. This unusual pattern is most

likely resulting from incorrect sensor calibration during those periods. Figures 1 through 3 show the albedo dip patterns at Summit, South Dome, and Humboldt glaciers in Greenland.
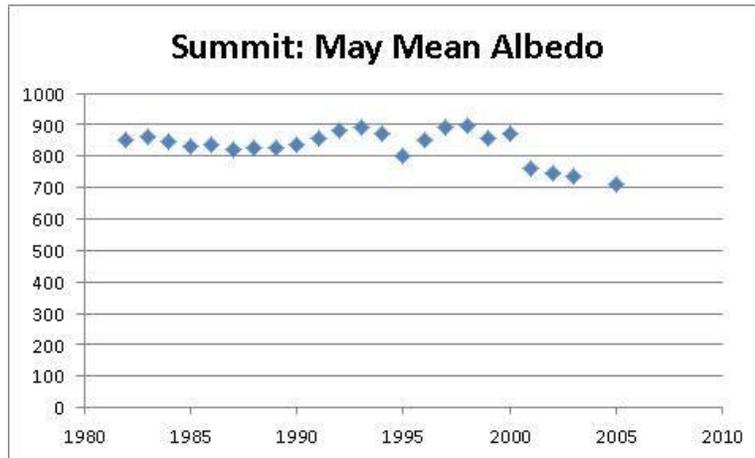

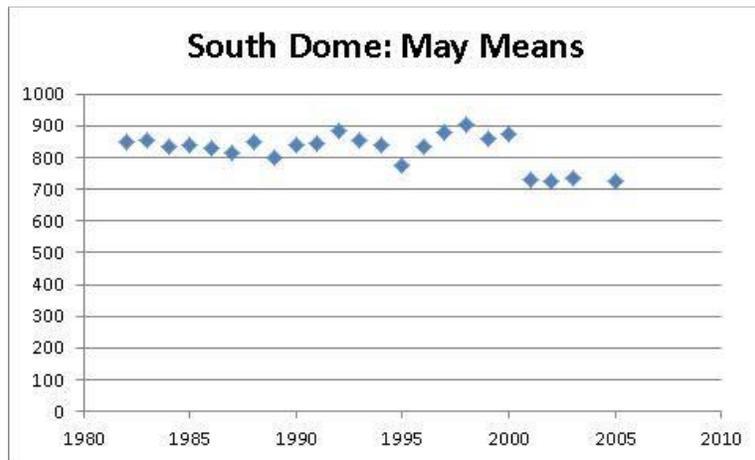Figure 1. Albedo Measurements at Summit Glacier
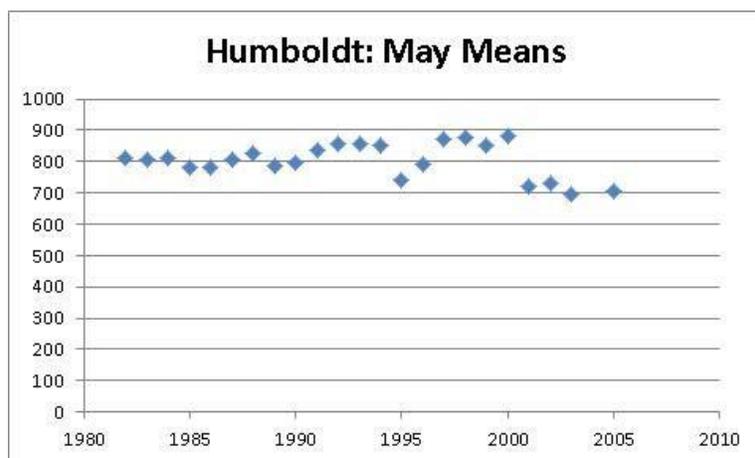

Figure 2. Albedo Measurements at South Dome Glacier

Figure 3. Albedo Measurements at Humboldt Glacier

National Snow and Ice Data Center
nsidc.org

Geolocation Errors

Projection inconsistencies were found between the CASPR processing Versions 2 and 3, resulting in slight geolocation variance. Instances in which the two processing versions are intermixed can cause animated images to appear to jitter.

Swath Composite Errors

The swath compositing seems to be in error between 26 July through 2 August, 1983.

Data Identifier Errors

Isolated instances of misidentified data parameters were found. In these cases, either the land masking or the IR/Vis channels is interchanged.

References

Key, J. 1999. The cloud and surface parameter retrieval (CASPR) system for polar AVHRR. Cooperative Institute for Meteorological Satellite Studies, University of Wisconsin, Madison.

Key, J., J. Collins, C. Fowler, and R.S. Stone. 1997. High-latitude surface temperature estimates from thermal satellite data. Remote Sensing of the Environment 61:302-309.

Kidwell, K.D. 1995. NOAA Polar Orbiter Data User's Guide, U.S. Dept. of Commerce, National Oceanic and Atmospheric Administration, NESDIS.

Maslanik, J., C. Fowler, J. Key, T. Scambos, T. Hutchinson, and W. Emery, 1998. AVHRR-based Polar Pathfinder products for modeling applications. Annals of Glaciology 25:388-392.

Rao, C.R.N. and J. Chen. 1999. Revised post-launch calibration of channels 1 and 2 of the Advanced Very High Resolution Radiometer on board the NOAA-14 spacecraft. on-line version .

Schweiger, A., C. Fowler, J. Key, J. Maslanik, J. Francis, R. Armstrong, M.J. Brodzik, T. Scambos, T. Haran, M. Ortmeyer, S. Khalsa, D. Rothrock, and R. Weaver. 1999. P-Cube: A multisensor data set for polar climate research. Proceedings on the 5th Conference on Polar Meteorology and Oceanography, American Meteorological Society, Dallas, TX, 15-20 January 1999, 136-141.

Document Information

Document Revision Date:

May 2012 - added note about data not being available.

September 2002

How to Cite this Data Set

As a condition of using these data, you must cite the use of this data set using the following citation. For more information, see our Use and Copyright Web page.

The following example shows how to cite the use of this data set in a publication. List the principal investigators, year of data set release, data set title and version number, dates of the data you used (for example, March to June 2004), publisher: NSIDC, and digital media.

Fowler, C., J. Maslanik, T. Haran, T. Scambos, J. Key, and W. Emery. 2002. *AVHRR Polar Pathfinder Twice-daily 25 km EASE-Grid Composites*. Boulder, Colorado USA: National Snow and Ice Data Center.