SMEX02 QuikSCAT/SeaWinds Backscatter Data, Iowa, Version 1

USER GUIDE

How to Cite These Data

As a condition of using these data, you must include a citation:

Nghiem, S. V. 2004. SMEX02 QuikSCAT/SeaWinds Backscatter Data, Iowa, Version 1. [Indicate subset used]. Boulder, Colorado USA. NASA National Snow and Ice Data Center Distributed Active Archive Center. https://doi.org/10.5067/2ZWKUTKFY6II. [Date Accessed].

FOR QUESTIONS ABOUT THESE DATA, CONTACT NSIDC@NSIDC.ORG

FOR CURRENT INFORMATION, VISIT https://nsidc.org/data/NSIDC-0233

National Snow and Ice Data Center

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1 DETAILED DATA DESCRIPTION

1.1 Format

Data are binary arrays, browse image files, and video files.

- Binary - binary files are stored as 4 byte, big-endian, floating point (real) values. Data are 46 column x 31 (row) arrays in row major order on a .2 degree grid.
- Image - image files are in .GIF format, and include four browse images per day
- Video - video files are in .AVI format, and are compilations of the daily images

1.2 File and Directory Structure

The following table shows the directories and contents of the directories.

Directory/Subdirectory	Files
data	All binary data files
images/polarization and direction directories	Four browse images per day, with names that indicate polarization and direction
movies	AVI movies made from the images in the images directory
reader	Fortran reader to read data files

1.3 File Naming Convention

1.3.1 Binary Files

The fields in the binary file names are as follows:

- YYYY - four-digit year
- MM - two-digit month
- DD - two-digit day
- H or V - horizontal or vertical polarization
- c5 - indicates that the data are gridded at 1/5 of a degree in latitude and longitude, derived from cell sigma0 data (rather than slice sigma0 data).
- asc or des - ascending or descending
- bin - the file extension, indicating binary format

For example, the data in the file "20020828Hc5des.bin" were obtained 28 August 2002 at a horizontal polarization and a descending pass.

1.3.2 Image Files

The browse image files have a complex naming convention, explained by the following table. The field descriptions use examples from the file "20020609_1602Hc5des.gif."

- YYYY MM DD - the date in yar, month, day format
- Number of revisions (16) - is the number of revisions from which any data are included
- Check (02) - an internal check.
- The fourth field (Hc5des) has several components:
    - H - data are from the inner beam (H polarization).
    - V - indicates that data are from the outer beam (V polarization)
    - c5 indicates that the data gridded at 1/5 of a degree in latitude and longitude, and derived from cell sigma0 data (rather than slice sigma0 data).
    - asc - indicates an ascending pass.
    - des - indicates a descending pass
- Extension (gif) - indicates the image format

1.3.3 Video Files

The video files follow this convention:

- qscat - indicates the file is from QuikSCAT
- v_pol or h_pol - vertical or horizontal polarization
- ascending or descending
- extension - identifies the file as .avi format

For example, "qscat_v_pol_ascending.avi."

1.4 Spatial Coverage

Southernmost Latitude: 39° N

Northernmost Latitude: 45° N

Westernmost Longitude: -98° W

Easternmost Longitude: -89° W

1.4.1 Spatial Resolution

Measurements are in 25 km resolution.

1.4.2 Projection and Grid Description

Data are gridded in 0.2 degrees in latitude/longitude projection.

1.5 Temporal Coverage

Data cover the period of 1 June through 21 August 2002.

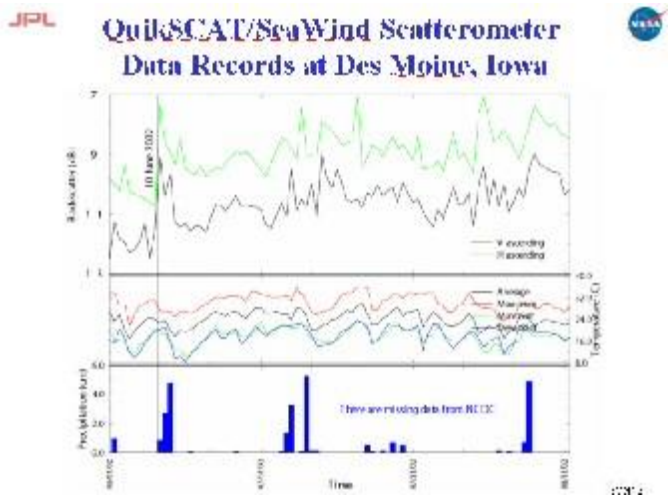
1.5.1 Temporal Resolution

Daily coverage includes four browse images per day. Images include ascending and descending images for both horizontal (H) and vertical (V) polarizations.

1.6 Parameter or Variable

1.6.1 Parameter Description

The parameter for this data set is microwave backscatter. The following chart shows the backscatter data for the SMEX02 study period. (Click on the image to see a larger version of the chart.)

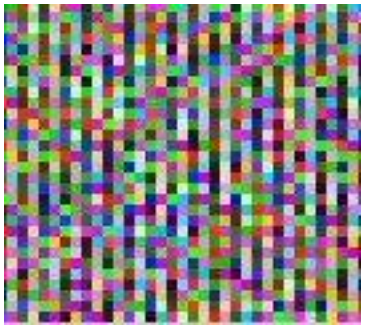


1.6.2 Unit of Measurement

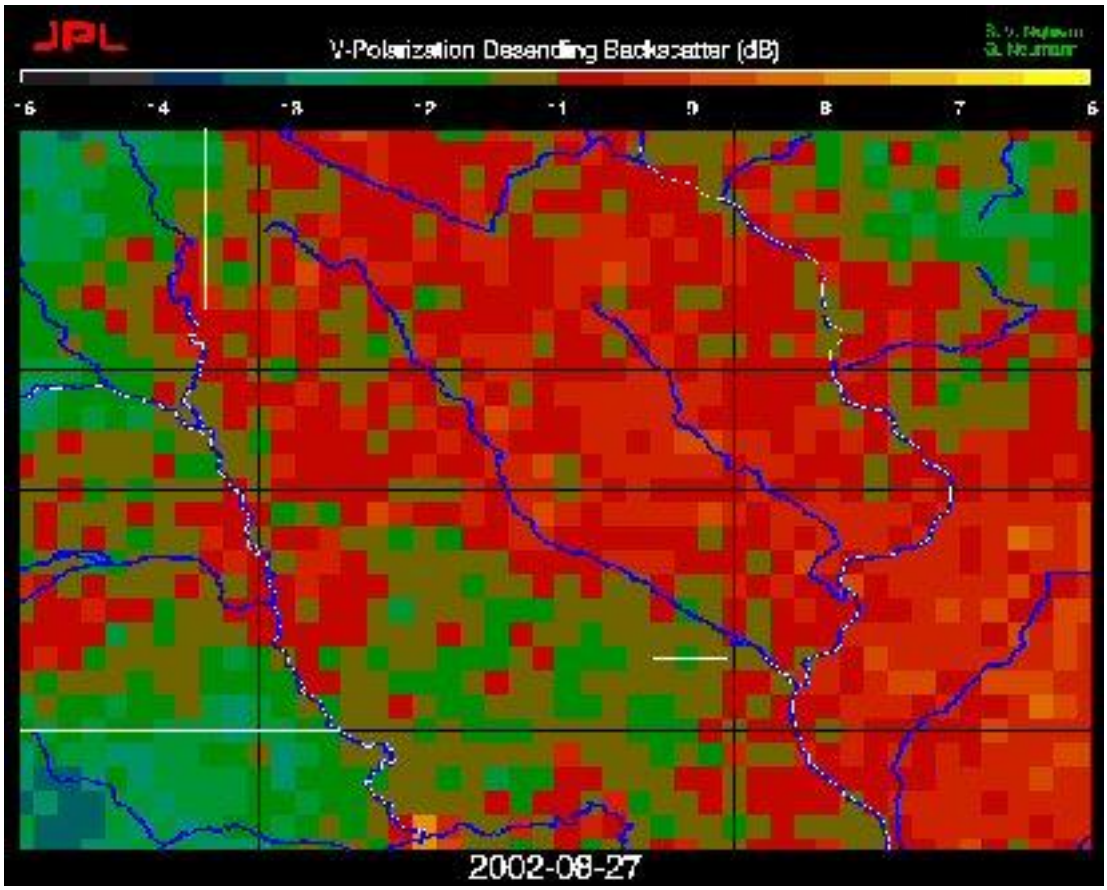
Backscatter measurements are given in decibels (dB).

1.6.3 Sample Data Record

The following image is a portion of the binary data file "20020831_Vc5des.bin."



The next image is a small version of the image file "20020827_1502Vc5des.gif."



2 SOFTWARE AND TOOLS

A Fortran reader is available for download with the binary data files. The Fortran code was written in Fortran77 and tested using a Sun compiler. You can also view the data with other appropriate applications.

3 DATA ACQUISITION AND PROCESSING

3.1 Derivation Techniques and Algorithms

3.1.1 Processing Steps

The cell sigma0 data were grouped by day, local time of day, beam, and geographic location. Data quality flags were checked. Only data passing the quality check were used. The average sigma0 was calculated for each group using natural numbers, not dB.

3.2 Sensor or Instrument Description

The QuikSCAT satellite was successfully launched at 7:15 p.m. Pacific Daylight Time on 19 June 1999 from the Vandenberg Air Force Base in California. The satellite carries the SeaWinds scatterometer for ocean wind measurements. SeaWinds uses a rotating dish antenna with two spot beams that sweep in a circular pattern. The antenna radiates microwave pulses at a frequency of 13.4 GHz across broad regions on Earth's surface. The scatterometer collects data at 13.4 GHz on both ocean and land. Backscatter data, at a radiometric resolution of 7 km x 25 km, are acquired with the vertical polarization at a constant incidence angle of 54° over a conical-scanning swath of 1800 km, and with the horizontal polarization at 46° over a 1400-km swath. The large swath can cover almost the entire globe in two days even at low latitudes and equatorial regions.

4 REFERENCES AND RELATED PUBLICATIONS

S. V. Nghiem and G. Neumann. 2004. "QuikSCAT/SeaWinds Data Package for SMEX 2002." JPL CL 04-0432, Jet Propulsion Laboratory, California Institute of Technology, Pasadena, California.

SeaWinds at JPL

5 CONTACTS AND ACKNOWLEDGMENTS

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6 DOCUMENT INFORMATION

6.1 Publication Date

May 2004

6.2 Date Last Updated

22 March 2021