Robinson, D.A. (1995) Weekly northern hemisphere snow cover. Global Data Sets for Land-Atmosphere Models, ISLSCP Initiative 1: 1987-1988, vol. 1. (CD-ROM dataset and discussion)

1. TITLE

1.1 Data Set Identification.

Weekly Northern Hemisphere Snow Cover

(Weekly ; NOAA/NESDIS)

1.2 Data Base Table Name.

Not applicable.

1.3 CD-ROM File Name.

\DATA\SN_ICSST\SNOW\NESDIS\YyyWww.sfx

Note: capital letters indicate fixed values that appear on the CD-ROM exactly as shown here, lower case indicates characters (values) that change for each path and file.

The format used for the snow cover filenames is: YyyWww.sfx, where yy is the last two digits of the year (e.g., Y87=1987), and ww is the week number, 01 to 53 (e.g. W52 or W53=the last week of the year). The filename extension (.sfx), identifies the data set content for the file (see Section 8.2) and is equal to .NSC for the snow cover data set.

1.4 Revision Date Of This Document.

April 5, 1995

2. INVESTIGATOR(S)

2.1 Investigator(s) Name And Title.

Dr. David A. Robinson
Department of Geography
Rutgers University

2.2 Title Of Investigation.

Kinematics of Northern Hemisphere Snow Cover

2.3 Contacts (For Data Production Information).

	Contact 1	Contact 2	Contact 3
2.3.1 Name	Mr. Michael Matson*	Dr. Chet Ropelewski*	Dr. David Robinson$
2.3.2 Address	Interactive Process.	Climate Analysis	Dept. Geography
	Branch, NOAA NESDIS	Center, NOAA	Rutgers University
City/St.	Washington, DC	Washington, DC	New Brunswick, NJ
Zip Code	20233	20233	08903

2.3.3 Tel.	301-763-8142	301-763-8227	908-932-4741
2.3.4 Email	not available	not available	drobins@gandalf.rutgers.edu

*Contacts for the original NOAA/NESDIS polar stereographic projection snow cover data set (see section 6.1 for explanation).
$Contact for the 1 X 1 degree equal angle snow cover data set on this CD-ROM (see section 6.1 for explanation).
For general information contact the data archive (see section 13.1).

2.4 Requested Form of Acknowledgment.

NOAA Weekly Snow and Ice Cover Charts are produced and digitized by NOAA personnel. Quality control of the data set, including limited adjustments to the files for standardization purposes, has subsequently been conducted at Rutgers University by Dr. David A. Robinson.

3. INTRODUCTION

3.1 Objective/Purpose.

To gain a better understanding of the kinematics of Northern Hemisphere snow cover. Snow cover is a sensitive indicator of climate dynamics and climate change, and an integrator of basic climate elements. Due in large part to its spatial and temporal impact on surface albedo, snow plays a critical role in the earth-atmosphere energy budget, and is the dictating factor in a major climatic feedback. Serial files of this critical land surface variable are needed in direct support of climate and global change studies.

3.2 Summary of Parameters.

Coverage of snow over Northern Hemisphere lands.

3.3 Discussion.

NOAA began mapping snow cover over Northern Hemisphere lands in 1966, using meteorological satellite images. The weekly charts resulting from this effort continue to be generated operationally and remain the only such hemispheric product. They comprise the longest satellite-based environmental record available.

NOAA charts are based on a visual interpretation of photographic copies of visible satellite imagery by trained meteorologists. The subpoint resolution of the meteorological satellites used prior to 1972 was about 4 km. The Very High Resolution Radiometer (VHRR) launched in 1972 provided imagery with a spatial resolution of 1.0 km. Since November 1978, the Advanced Very High Resolution Radiometer (AVHRR) has provided 1.1-km resolution data. Imagery is examined daily and charts show snow boundaries on the last day of the chart week that the surface in a region is seen.

In early years the snow extent was underestimated on the NOAA charts, especially during fall. Charting improved considerably in 1972 with the deployment of the VHRR sensor and the increased experience among analysts in recognizing snow-covered ground. Since then the charts are considered suitable for continental-scale climate studies.

The NOAA charts are digitized weekly using the National Meteorological Center's primitive equation grid. This is an 89 X 89 cell Northern Hemisphere grid having a polar sterographic projection. The version of this data set which is archived at Rutgers University is adjusted to a standard land mask. The Rutgers data set has been converted to a 1 X 1 degree equal angle grid, by Dr. David Robinson at Rutgers University, for use on the ISLSCP Initiative 1 CD-ROM.

4. THEORY OF MEASUREMENTS

Continental coverage of snow extent can be provided from analyses of visible environmental satellite imagery at a relatively high spatial resolution (one to several kilometers). Snow is identified by recognizing characteristic textured surface features and brightnesses of snow covered land. Information on surface albedo and percent snow cover (patchiness) is also gleaned from the data. Temporal resolution of coverage is potentially as often as every several hours when a polar-orbiting environmental satellite passes over a region, or in the middle and lower high latitudes as frequent as an hourly basis from geostationary satellite. Clouds and darkness are the major obstacles in obtaining data on a timely basis.

5. EQUIPMENT

5.1 Instrument Description.

The Advanced Very High Resolution Radiometer (AVHRR) is a cross-track scanning system featuring two visible, one middle infrared, and two thermal channels.

5.1.1 Platform.

NOAA-9, NOAA-10, and NOAA-11 polar orbiting platforms, for the period 1987 and 1988.

5.1.2 Mission Objectives.

The AVHRR is designed for multispectral analysis of meteorologic, oceanographic, and hydrologic parameters. The objective of the instrument is to provide radiance data for investigation of clouds, land-water boundaries, snow and ice extent, ice or snow melt inception, day and night cloud distribution, temperatures of radiating surfaces, and sea surface temperature. It is an integral member of the payload on the advanced TIROS-N spacecraft and its successors in the NOAA series, and as such contributes data required to meet a number of operational and research-oriented meteorological objectives.

5.1.3 Key Variables.

Emitted radiation, reflected radiation.

5.1.4 Principles of Operation.

The AVHRR is a four-channel or five-channel scanning radiometer which detects emitted and reflected radiation from the Earth in the visible, near-infrared and far-infrared regions of the spectrum. A fifth channel has been added to the follow-on instrument designated AVHRR/2 and flown on NOAA-7, NOAA-9, NOAA-11 (and subsequent odd-numbered missions) to improve the correction for atmospheric vapor. Scanning is provided by an elliptical beryllium mirror rotating at 360 rpm about an axis parallel to the Earth. A two-stage radiant cooler is used to maintain a constant temperature for the IR detectors of 95 degrees K. The operating temperature is selectable at either 105 or 110 degrees K. The telescope is an 8-inch afocal, all-reflective Cassegrain system. Polarization is less than 10 percent. Instrument operation is controlled by 26 commands and monitored by 20 analog housekeeping parameters.

5.1.5 Instrument Measurement Geometry.

The AVHRR is a cross-track scanning system. The instantaneous field-of-view (IFOV) of each sensor is approximately 1.4 milliradians giving a resolution of 1.1 km at the satellite subpoint. There is about a 36 percent overlap between IFOVs (1.362 samples per IFOV). The scanning rate of the AVHRR is six scans per second, and each scan spans an angle of +/- 55.4 degrees from the nadir.

5.1.6 Manufacturer of Instrument.

Not available at this revision.

5.2 Calibration.

The Thermal infrared channels are calibrated in-flight using a view of a stable blackbody and space as a reference. No in-flight visible channel calibration is performed.

5.2.1 Specifications.

IFOV	1.4 mRad
RESOLUTION	1.1 km
ALTITUDE	833 km
SCAN RATE	360 scans/min
	1.362 samples per IFOV
SCAN RANGE	-55.4 to 55.4 degrees
SAMPLES/SCAN	2048 samples per channel per earth scan

5.2.1.1 Tolerance.

Not applicable.

5.2.2 Frequency of Calibration.

Not applicable.

5.2.3 Other Calibration Information.

Not applicable.

6. PROCEDURE

6.1 Data Acquisition Methods.

NOAA charts are based on a visual interpretation of photographic copies of visible imagery by trained meteorologists. The subpoint resolution of the meteorological satellites used prior to 1972 was about 4 km. The Very High Resolution Radiometer (VHRR) launched in 1972 provided imagery with a spatial resolution of 1.0 km. Since November 1978, the Advanced Very High Resolution Radiometer AVHRR has provided 1.1-km resolution data. Imagery is examined daily and charts show snow boundaries on the last day of the chart week that the surface in a region is seen. These charts are subsequently digitized weekly using the National Meteorological Center's primitive equation grid. This is an 89 x 89 cell northern hemisphere grid having a polar stereographic projection. Cell resolution ranges from 16,000 to 42,000 square kilometers. Only cells interpreted to be at least 50% snow covered are considered snow covered.

The Snow Cover data on the ISLSCP Initiative 1 CD-ROM was converted from the 89 x 89 polar stereographic projection to a 1 x 1 degree equal angle grid (see section 9.3.1 for details), by Dr. David Robinson at the Department of Geography, Rutgers University. This data set has also been adjusted to a standard land mask (see section 9.2.1).

6.2 Spatial Characteristics.

6.2.1 Spatial Coverage.

The NOAA/NESDIS Snow Cover data only covers land in the Northern Hemisphere. Data in file are ordered from North to South and from West to East beginning at 180 degrees West and 90 degrees North. Point (1,1) represents the grid cell centered at 89.5 N and 179.5 W (see section 8.4).

6.2.2 Spatial Resolution.

The data are given in an equal-angle lat/long grid that has a spatial resolution of 1 X 1 degree lat/long.

6.3 Temporal Characteristics.

6.3.1 Temporal Coverage.

Charts have been produced from 1966 to present. In early years the snow extent was underestimated on the NOAA charts, especially during fall. This was a result of the meteorological satellites having a 4 km resolution during this period. Charting improved considerably in 1972 with the deployment of the VHRR sensor and the increased experience among analysts in recognizing snow-covered ground.

The snow cover data on the ISLSCP CD-ROM covers the period from December 29, 1986 to January 1, 1989.

The number of days in a year (365 1/4) is not exactly divisible by 7; consequently, the dates for each weekly chart vary from year to year, and a 53rd week occurs approximately every five years. Below is a listing of the week number along with their corresponding dates for 1987 and 1988:

1987		1988	
01 DEC 29-JAN 4	28 JUL 06-12	01 JAN 04-10	27 JUL 04-10
02 JAN 05-11	29 JUL 13-19	02 JAN 11-17	28 JUL 11-17
03 JAN 12-18	30 JUL 20-26	03 JAN 18-24	29 JUL 18-24
04 JAN 19-25	31 JUL 27-AUG 02	04 JAN 25-31	30 JUL 25-31
05 JAN 26-FEB 01	32 AUG 03-09	05 FEB 01-07	31 AUG 01-07
06 FEB 02-08	33 AUG 10-16	06 FEB 08-14	32 AUG 08-14
07 FEB 09-15	34 AUG 17-23	07 FEB 15-21	33 AUG 15-21
08 FEB 16-22	35 AUG 24-30	08 FEB 22-28	34 AUG 22-28
09 FEB 23-MAR 01	36 AUG 31-SEP 06	09 FEB 29-MAR 06	35 AUG 29-SEP 04
10 MAR 02-08	37 SEP 07-13	10 MAR 07-13	36 SEP 05-11
11 MAR 09-15	38 SEP 14-20	11 MAR 14-20	37 SEP 12-18
12 MAR 16-22	39 SEP 21-27	12 MAR 21-27	38 SEP 19-25
13 MAR 23-29	40 SEP 28-OCT 04	13 MAR 28-APR 03	39 SEP 26-OCT 02
14 MAR 30-APR 05	41 OCT 05-11	14 APR 04-10	40 OCT 03-09
15 APR 06-12	42 OCT 12-18	15 APR 11-17	41 OCT 10-16
16 APR 13-19	43 OCT 19-25	16 APR 18-24	42 OCT 17-23
17 APR 20-26	44 OCT 26-NOV 01	17 APR 25-MAY 01	43 OCT 24-30
18 APR 27-MAY 03	45 NOV 02-08	18 MAY 02-08	44 OCT 31-NOV 06
19 MAY 04-10	46 NOV 09-15	19 MAY 09-15	45 NOV 07-13
20 MAY 11-17	47 NOV 16-22	20 MAY 16-22	46 NOV 14-20
21 MAY 18-24	48 NOV 23-29	21 MAY 23-29	47 NOV 21-27
22 MAY 25-31	49 NOV 30-DEC 06	22 MAY 30-JUN 05	48 NOV 28-DEC 04
23 JUN 01-07	50 DEC 07-13	23 JUN 06-12	49 DEC 05-11
24 JUN 08-14	51 DEC 14-20	24 JUN 13-19	50 DEC 12-18
25 JUN 15-21	52 DEC 21-27	25 JUN 20-26	51 DEC 19-25
26 JUN 22-28	53 DEC 28-JAN 03	26 JUN 27-JUL 03	52 DEC 26-JAN 01
27 JUN 29-JUL 05			

6.3.2 Temporal Resolution.

Weekly.

7. OBSERVATIONS

7.1 Field Notes.

Not applicable.

8. DATA DESCRIPTION

8.1 Table Definition With Comments.

Not applicable.

8.2 Type of Data.

8.2.1 NOAA Weekly Northern Hemisphere Snow Cover Charts

8.2.2 Parameter/Variable	Description	8.2.3 Range	8.2.4 Units	8.2.5 Source
SNOW_COVER	Snow cover extent over northern hemisphere lands from visible environmental satellite imagery.	min =0 \$ max =1 \$	[Unitless]	visible sensor on-board satellite

\$The snow cover data set contains two possible data values, the minimum data value (0) indicates no snow and the maximum data value (1) indicates snow cover.

8.3 Sample Data Base Data Record.

Not applicable.

8.4 Data Format.

All data on the ISLSCP Initiative 1 CD-ROM are files in ASCII format. The CD-ROM file format consists of numerical fields of varying length, which are space delimited and arranged in columns and rows. Each column contains 90 numerical values, and each row contains 360 numerical values.

Grid arrangement

```
ARRAY(I,J)
I = 1 IS CENTERED AT 179.5W
I INCREASES EASTWARD BY 1 DEGREE
J = 1 IS CENTERED AT 89.5N
J INCREASES SOUTHWARD BY 1 DEGREE

90N - | - - - | - - - | - - - | - -
      | (1,1) | (2,1) | (3,1) |
89N - | - - - | - - - | - - - | - -
      | (1,2) | (2,2) | (3,2) |
88N - | - - - | - - - | - - - | - -
      | (1,3) | (2,3) | (3,3) |
87N - | - - - | - - - | - - - |
    180W   179W   178W   177W
```

ARRAY(360,90)

8.5 Related Data Sets.

USAF-ETAC Snow Depth data (on this CD-ROM).
WMO-GTC Snow Depth data.

9. DATA MANIPULATIONS

9.1 Formulas.

9.1.1 Derivation Techniques/Algorithms.

Not applicable.

9.2 Data Processing Sequence.

9.2.1 Processing Steps and Data Sets.

The NOAA charts are digitized weekly using the National Meteorological Center's primitive equation grid. This is an 89 x 89 cell northern hemisphere grid having a polar sterographic projection. Only cells interpreted to be at least 50% snow covered are considered snow covered. The preceding efforts are conducted by NOAA personnel. The version of this data set which is archived at Rutgers University is adjusted to a standard land mask. NOAA has not treated 53 cells (covering 1.8 million square kilometers) consistently over the charting history. In 1981 NOAA changed their land mask; 26 land cells were reclassified as water and 27 new land cells were added. Neither of the NOAA masks is accurate; both fail to accurately identify all land (greater than 50% land) and water cells. An accurate land mask was developed at Rutgers using digital map files analyzed on a geographic information system. The percentage of land in each of the 7921 National Meteorological Center grid cells was calculated using the National Geophysical Data Center's 5-minute resolution ETOPO5 file as the primary data source. As this file does not include large interior lakes, the Navy Fleet Numerical Oceanography Center's 10-min resolution Primary Terrain Cover Types file was used to account for these water bodies. Some 48 cells poleward of approximately 30 degrees N, which had been considered land in the pre-1981 NOAA or in the 1981-to-present NOAA mask, are actually predominantly water covered. Conversely, 54 land cells were considered water on one or both NOAA masks, and these required a first-time analysis to determine whether they might be snow covered. This was accomplished by selecting nearest representative land cells (cells that NOAA has continually charted as land) and assigning their snow status to the "new" land cells. Spot checks of a number of hard copy weekly charts prove this to be an adequate approach. The product on this CD-ROM is grided to the common land/sea mask used for all other data sets on the CD-ROMs.

9.2.2 Processing Changes.

Some information related to this is found in 9.2.1.

9.3 Calculations.

9.3.1 Special Corrections/Adjustments.

The Dept. of Geography (Dr. David Robinson) at Rutgers University converted the original 89 x 89 polar sterographic projection grid data to a 1 x 1 degree equal angle grid with an origin point of 90 latitude and -180 longitude. Their procedure was to create vector boxes for each grid cell in the original 89 x 89 cell NOAA matrix (the one laid over a polar stereo projection for digitization purposes). The next step was to create a raster file, with each raster cell having 1 x 1 degree dimensions. This was "laid" over the vector file, and the raster cell is assigned the value of the vector box in which the raster cell's center point lies. Thus there is no weighted averaging should a raster cell sit over more than one vector cell.

9.4 Graphs and Plots.

Examples of charts and plots can be found in: Matson, M., C.F. Ropelewski, and M.S. Varnadore, 1986, An Atlas of Satellite-Derived Northern Hemispheric Snow Cover Frequency, NOAA Atlas,75pp.; and in Robinson, D.A., K.F. Dewey, and R.R. Heim, Jr., 1993, Global snow cover monitoring: an update, Bulletin of the American Meteorological Society, vol. 74, no. 9, 1689-1696. See reference section for a fuller listing.

10. ERRORS

10.1 Sources of Error.

Snow cover is most difficult to identify (if at all possible) where 1) skies are frequently cloudy, 2) solar zenith angles are relatively high and illumination is low (or absent), 3) the snow cover is unstable or changes rapidly, and 4) pronounced local and regional signatures, such as the distribution of vegetation, lakes and rivers, are absent.

10.2 Quality Assessment.

10.2.1 Data Validation by Source.

Efforts to validate the data have included comparisons with satellite and station data. These have primarily been done on a regional basis for selected intervals. They include comparing snow boundaries on NOAA charts to boundaries derived from independent analyses of hard-copy visible satellite imagery conducted in a manner similar to that of NOAA personnel. Regional NOAA snow boundaries have also been compared with boundaries derived from analyses of dense networks of stations. Finally, preliminary comparisons of continental snow areas calculated from NOAA data have been compared with areas calculated from satellite microwave-derived snow cover charts. Pertinent references to these investigations include: Robinson, D.A. (1993) Monitoring Northern Hemisphere snow cover. Snow Watch '92. Glaciological Data Report, GD-25, 1-25. Robinson, D.A. & G. Kukla (1988) Comments on "Comparison of Northern Hemisphere Snow Cover Data Sets". Journal of Climate, 1, 435-440. Wiesnet, D. R., C.F. Ropelewski, G.J. Kukla & D.A. Robinson (1987) A discussion of the accuracy of NOAA satellite-derived global seasonal snow cover measurements. Large Scale Effects of Seasonal Snow Cover, International Association of Hydrological Sciences Publication 166, 291-304. Robinson, D.A. & G. Kukla (1982) Remotely sensed characteristics of snow covered lands. 1982 IEEE International Geoscience and Remote Sensing Symposium Digest, WA-1, 2.1-2.9.

10.2.2 Confidence Level/Accuracy Judgment.

In general, the NOAA charts, while less than perfect, are considered to be the most accurate means of obtaining snow extent information on large regional to hemispheric scales.

Some of the shortcomings in using shortwave data to chart snow cover include:

1) the inability to detect snow cover when solar illumination is low or when skies are cloudy,

2) the underestimation of cover where dense forests mask the underlying snow,

3) difficulties in discriminating snow from clouds in mountainous regions and in uniform lightly-vegetated areas that have a high surface brightness when snow covered,

4) the lack of all but the most general information on snow depth (Kukla and Robinson, 1981; Dewey and Heim, 1982).

Despite the shortwave limitations, the NOAA charts are quite reliable at many times and in many regions. These include regions where:

1) skies are frequently clear, commonly in Spring near the snow line,

2) solar zenith angles are relatively low and illumination is high,

3) the snow cover is reasonable stable or changes slowly,

4) pronounced local and regional signatures are present owing to the distribution of vegetation, lakes and rivers.

Under these conditions, the satellite-derived product will be superior to charts of snow extent gleaned from station data, particularly in mountainous and sparsely inhabited regions. Another advantage of the NOAA snow charts is their portrayal of regionally-representative snow extent, whereas charts based on ground station reports may be biased due to the preferred position of weather stations in valleys and in places affected by urban heat islands, such as airports.

10.2.3 Measurement Error for Parameters and Variables.

No quantitative error estimates have been done on more than a regional level over selected time intervals.

10.2.4 Additional Quality Assessment Applied.

Efforts to validate the NOAA charts have been infrequent and on regional levels.

11. NOTES

11.1 Known Problems With The Data.

Problems with the land mask employed by NOAA are discussed in section 9.2.1. These have been corrected in the Rutgers version of the data set.

11.2 Usage Guidance.

Dependent on study goals. Some integration on spatial (multiple cells from the gridded version of the product) and/or temporal (multiple weeks) is recommended.

11.3 Other Relevant Information.

None.

12. REFERENCES

12.1 Satellite/Instrument/Data Processing Documentation.

Dewey, K.F., and R. Heim Jr, 1981. Satellite observations of variations in Northern Hemisphere seasonal snow cover, NOAA Tech. Report NESS 87, Washington, DC, 83pp.
Dewey, K.F., and R. Heim Jr, 1982. A digital archive of Northern Hemisphere snow cover, November 1966 through December 1980. Bull. Am. Met. Soc., 63:1132-1141.
Matson, M., C.F. Ropelewski, and M.S. Varnadore, 1986. An Atlas of Satellite-Derived Northern Hemispheric Snow Cover Frequency, NOAA, Washington, DC, 75pp.
Robinson, D.A. and G. Kukla, 1982. Remotely sensed characteristics of snow covered lands. 1982 IEEE International Geoscience and Remote Sensing Symposium Digest, WA-1, 2.1-2.9.
Robinson, D.A. and G.Kukla, 1988. Comments on "Comparison of Northern Hemisphere Snow Cover Data Sets". Journal of Climate, 1:435-440.
Robinson, D.A., 1993. Monitoring northern hemisphere snow cover. Snow

Watch '92. Glaciological Data Report, GD-25, 1-25.
Wiesnet, D.R., C.F. Ropelewski, G.J. Kukla and D.A. Robinson, 1987. A discussion of the accuracy of NOAA satellite-derived global seasonal snow cover measurements. Large Scale Effects of Seasonal Snow Cover, International Association of Hydrological Sciences Publication 166:291-304.

12.2 Journal Articles and Study Reports.

Gutzler, D.S., and R.D. Rosen, 1992. Interannual variability of wintertime snow cover across the Northern Hemisphere. J. Clim., 5:1441-1447.
Iwasaki, T., 1991. Year-to-year variation of snow cover area in the Northern Hemisphere. J. Meteor. Soc. Japan, 69:209-217.
Kukla, G. and D.A. Robinson, 1981. Accuracy of snow and ice monitoring. Snow Watch 1980, Glaciological Data, Report GD-5:91-97.
Masuda, K., Y. Morinaga, A. Numaguti, and A. Abe-ouchi, 1993. The annual cycle of snow cover extent over the Northern Hemisphere as revealed by NOAA/NESDIS satellite data. Geographical Reports of Tokyo Metropolitan University, 28:113-132.
Robinson, D.A., and K.F. Dewey, 1990. Recent secular variations in the extent of Northern Hemisphere snow cover. Geophys. Res. Let., 17:1557-1560.
Robinson, D.A., K.F. Dewey, and R.R. Heim, Jr., 1993. Global snow cover monitoring: an update, Bulletin of the American Meteorological Society, 74:1689-1696.

12.3 Archive/DBMS Usage Documentation.

Contact the EOS Distributed Active Archive Center (DAAC) at NASA Goddard Space Flight Center (GSFC), Greenbelt Maryland (see Section 13 below). Documentation about using the archive or information about access to the on-line information system is available through the GSFC DAAC User Services Office.

13. DATA ACCESS

13.1 Contacts for Archive/Data Access Information.

GSFC DAAC User Services
NASA/Goddard Space Flight Center
Code 902.2
Greenbelt, MD 20771

Phone: (301) 286-3209
Fax: (301) 286-1775
Internet: daacuso@eosdata.gsfc.nasa.gov

13.2 Archive Identification.

Goddard Distributed Active Archive Center
NASA Goddard Space Flight Center
Code 902.2
Greenbelt, MD 20771

Telephone: (301) 286-3209
FAX: (301) 286-1775
Internet: daacuso@eosdata.gsfc.nasa.gov

13.3 Procedures for Obtaining Data.

Users may place requests by accessing the on-line system, by sending letters, electronic mail, FAX, telephone, or personal visit.

Accessing the GSFC DAAC Online System:

The GSFC DAAC Information Management System (IMS) allows users to ordering data sets stored on-line. The system is open to the public.

Access Instructions:

Node name: daac.gsfc.nasa.gov
Node number: 192.107.190.139
Login example: telnet daac.gsfc.nasa.gov
Username: daacims
password: gsfcdaac

You will be asked to register your name and address during your first session.

Ordering CD-ROMs:

To order CD-ROMs (available through the Goddard DAAC) users should contact the Goddard DAAC User Support Office (see section 13.2).

13.4 GSFC DAAC Status/Plans.

The ISLSCP Initiative I CD-ROM is available from the Goddard DAAC.

14. OUTPUT PRODUCTS AND AVAILABILITY

14.1 Tape Products.

None.

14.2 Film Products.

None.

14.3 Other Products.

None.

15. GLOSSARY OF ACRONYMS

AVHRR	Advanced Very High Resolution Radiometer
CD-ROM	Compact disc read only memory.
DAAC	Distributed Active Archive Center

EOS	Earth Observation System
GCM	Global Circulation Model.
GSFC	Goddard Space Flight Center
IMS	Information Management System
ISLSCP	International Satellite Land Surface Climatology Project
NASA	National Aeronautics and Space Administration
NESDIS	NOAA Environmental Satellite, Data and Information Service
NOAA	National Oceanic and Atmospheric Administration
VHRR	Very High Resolution Radiometer