DATA AVAILABILITY AT NCAR
(Selected Datasets)

This report briefly summarizes the datasets that are available from the Data Support Section (Scientific Computing Division) of NCAR. The data can be copied on tape at cost. It can be used on-line at NCAR by those who have an NCAR computing project number. For use on-line there is usually a simple access program that accomplishes the data unpacking tasks. NCAR TN/IA-111 (1975) has much more explanation about the data than given here. This listing is very brief; other more recent papers about data are also available (see below).

We try to update this document approximately once per year.

Table of Contents

<table>
<thead>
<tr>
<th>Section</th>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Daily Grid Point Analysis Data</td>
<td>4</td>
</tr>
<tr>
<td>B</td>
<td>Year-Month Grids</td>
<td></td>
</tr>
<tr>
<td>BB</td>
<td>Selected Datasets for Long-period Climate Change</td>
<td>10</td>
</tr>
<tr>
<td>C</td>
<td>Time Series of Daily Grids</td>
<td></td>
</tr>
<tr>
<td>D</td>
<td>Availability of Global Analyses from NMC</td>
<td></td>
</tr>
<tr>
<td>E</td>
<td>Vertical Motion Data</td>
<td></td>
</tr>
<tr>
<td>F</td>
<td>Time Series Raobs at NCAR</td>
<td>15</td>
</tr>
<tr>
<td>G</td>
<td>Selected Raob Counts</td>
<td></td>
</tr>
<tr>
<td>H</td>
<td>Observed Data Summary (Mostly from telecom, GTS)</td>
<td></td>
</tr>
<tr>
<td>HH</td>
<td>Selected Data for US Mesoscale Research</td>
<td>20</td>
</tr>
<tr>
<td>I</td>
<td>FGGE Data (Dec 78 - Nov 79)</td>
<td></td>
</tr>
<tr>
<td>J</td>
<td>Selected Precipitation and Water Data</td>
<td></td>
</tr>
<tr>
<td>K</td>
<td>Selected Data for Oceanographic Research</td>
<td>25</td>
</tr>
<tr>
<td>L</td>
<td>Stratospheric Data (Primary sets), and Ozone</td>
<td></td>
</tr>
<tr>
<td>M</td>
<td>Upper Atmosphere (mostly 80 - 1000 km)</td>
<td></td>
</tr>
<tr>
<td>N</td>
<td>Climatology and Circulation Statistics</td>
<td>35</td>
</tr>
<tr>
<td>NN</td>
<td>Climate Model Data (CO$_2$ runs)</td>
<td></td>
</tr>
<tr>
<td>O</td>
<td>Geophysical Data (elevation, depth, land use, etc.)</td>
<td></td>
</tr>
<tr>
<td>P</td>
<td>Satellite Data at NCAR</td>
<td>39</td>
</tr>
<tr>
<td>PP</td>
<td>Paleoclimate Data</td>
<td></td>
</tr>
<tr>
<td>Q</td>
<td>Clouds</td>
<td></td>
</tr>
<tr>
<td>R</td>
<td>Other Selected Data at NCAR (ice &amp; snow, etc.)</td>
<td>43</td>
</tr>
<tr>
<td>RR</td>
<td>Datasets Received by the USA from the USSR</td>
<td></td>
</tr>
<tr>
<td>S</td>
<td>Data From Selected Experiments</td>
<td></td>
</tr>
</tbody>
</table>

For additional information about data available at NCAR and elsewhere see:


3. NASA, 1979: "Candidate NASA Datasets Applicable to the Climate Program." Goddard Space Flight Center, Greenbelt, MD. (Unpublished?)

4. Reph, Mary G., 1984: "NASA Climate Data Catalog." NASA TM 86085 Goddard Space Flight Center, Greenbelt, MD 20771. 9 mm thick.

5. Ropelewski, C., M. Predoehl, M. Platto, 1980: "The Interim Climate Data Inventory," NOAA-EDIS, Washington, D.C. (Has selected information from #1 above and other information.)


Definitions and keys:

— yr-mo; A time series in which each year is represented by 12 individual monthly averages.

— clim; Long time averages intended to estimate smooth climatology.

— n° x n°; Specifies the latitude and longitude grid resolution.

— DS nnn; NCAR Data Support Section dataset reference number.
NCAR Data Services

This Data Availability text briefly describes most of the datasets available at NCAR. Some other data services are:

1. Consulting
   A discussion is often useful to help find data appropriate to a given research goal. Data handling methods and problem solving are other key areas of expertise.

2. On-line Info that Anyone Can Access
   An on-line information system is not yet sufficiently developed to open it up to all users. This step is a minimum of four months away. The system permits searching of datasets by key words; it will give access to generalized inventories, etc.

   There will be an open login that anyone can access by Internet (NSFNET), Span, or long-distance dial-up.

3. Send Data to Users
   Data can be copied to tape and sent to users at cost. Small amounts of data can be put on floppy disk. Where communication links are available, small data files can be delivered by communication lines.

4. Access to data on-line at NCAR
   Only people with approved computing projects can do calculations at NCAR. This includes many users. The numbers of different users of Scientific Computing Division (SCD) computers in all of 1988 were:

<table>
<thead>
<tr>
<th>Any SCD Computer</th>
<th>Cray Computers</th>
</tr>
</thead>
<tbody>
<tr>
<td>NCAR Users</td>
<td>477</td>
</tr>
<tr>
<td>University Users</td>
<td>675</td>
</tr>
</tbody>
</table>

   Any of these users can access the data archives at NCAR. Some users do; some only run models or use their own data.

5. Generalized Data Inventories
   Some datasets include data for 100s or 1000s of stations. Other sets have satellite data for many years. For station data, the generalized inventories show the data available for each station, each year, for 50 or 100 years, usually on one line.

   For satellite data, the inventories usually show the orbits (or scenes) available each day, for each sensor.

6. Available Texts
   A list of texts is available. These include: (1) Info about NMC analyses, FGGE data, Navy data, etc.; (2) Data availability in USSR and other areas; (3) Info about data handling, data planning, data management, computing, etc.

7. CDROMs
   A number of CDROMs have been made in the community (starting June 1987) that are useful or atmospheric and oceanic research. A selected list is available.

8. NCAR's Role
   NCAR's main role is to help the research community obtain access to data. People in the general public who need small amounts of data should typically use other data centers.
Section A

DAILY GRID POINT ANALYSIS DATA (usually 2 per day)
(Tape counts are 1600 bpi, unless stated otherwise)


B. Selected NMC Analysis Data 1973 – Current. (See TN-111, pp 22-27)

1. DS 066.0: NMC 47x51 N. Hem. octagonal grids. From about 15° N-Pole. 1973 – 31 Dec 88. Also includes: N. Hem forecast grids and tropical grids – 111 tapes (38 at 6250 bpi)

2. DS 066.0: NMC 47x51 H, T, SLP, sfc T. 1973 – Dec 1988. Surface -10 mb. Subset of #1; starting Feb 1981, the 70 -10 mb data are in a separate set with higher data. Subsets are: HT, forecasts, and all else. 30 tapes (or 10 at 6250 bpi)

3. DS 066.0: NMC 47x51 N. Hem. winds 1000 - 100 mb (10 levels). Also, humidity, snow cover, Tropical T, U, V for 1000 - 200 mb. Subset of #1 Jan 1973 – Dec 1988. 50 tapes (17 tapes, 6250 bpi)

Note: 12 tapes (1600 bpi) have tropical data (DS 75), winds are still in the combined set. No temps after 7 Apr 81. From Jan 82 tropical has winds only (U, V; 2x/day). Tropical data only thru Jan 83, then use global grids. (Some more recent tropicals are on tape, haven’t been separated, and are merely interpolated from globals.)


5. DS 066.0: NMC 65x65 N. Hem. grids. These are the basic full hemispheric grids from which the grids in items #1,2,3,4 were extracted for 1 Dec 74 – 31 Dec 88 (not produced prior to Dec 1974). Sfc -10 mb. Includes vertical motion. 2 tapes/mon. 258 tapes (72 at 6250 bpi).

6. DS 082.0: NMC global 2.5 degree grids. 1 July 1976 – present. SLP, sfc T, boundary layer grids; U, V, T, H for 1000 - 50 mb; humidity at levels 1000 - 300 mb. There are about 45 days, or 13,000 hemispheric grids per tape. Volume: 10,750 MB through 1986, then 90 MB per month.
7. DS 082.1: Surface Subset

    A surface subset includes SLP, sfc T, 1000 mb U, V, T, H, RH and the boundary layer. The SLP starts 8 Dec 77, sfc P starts 21 Sept 78, SST starts 16 May 79.

    The boundary layer (U, V, RH, theta) starts 6 June 80. Until Apr 85, the boundary layer was 50 mb thick. Winds, etc were valid at the midpoint, or about 200 m elevation. Then, the MRF model started with 18 layers, not 12. The boundary became 10 mb thick with winds, etc valid at about 40 m, volume: 1,500 MB through June 86, then 16 MB per month.

8. DS 081.0: NMC Hough Function global (IBM format). Describes the H, T, winds, sfc to 50 mb, global. These are very difficult and costly to use. Format info still not adequate. Dec 74 – June 76, 2 tapes.

9. DS 69.0: Limited area fine mesh (LFM) analyses and forecasts for N. America from TDL; H,T,U,V,W,RH; 31 Oct 1971 – present. 186 tapes; volume: 9,050 MB through January 1988, then 830 MB per year.

10. DS 69.5: Limited area NGM grids from NMC. Analyses and 6 hrly forecasts (to 48 hr) made each 12 hours. For N. America. Same grid as for LFM. Dates 24 Sept 1984 to present. Volume: 2,830 MB through January 1988, then 880 MB per year.

C. Navy Analyses

1. DS 240.5: Navy S. Hem. analyses Aug 74 – Jan 83. 63x63 grids sfc to 100 mb, no winds. 20 tapes (6250 bpi)

2. DS 242.0: Global band (40°S – 60°N), 2.5°, Aug 73 – July 84, sfc to 200 mb and sfc is full global. Has winds, on 37 tapes (6250 bpi)

3. DS 018.0: Navy SLP. 63x63 N. Hem. Jan 1946 – June 1988, 5 tapes

4. DS 018.0: Navy sea level pressure (NMC octagon) extracted from item #3. Jan 1946 – June 1988. 1 tape (6250 bpi)

5. DS 240.1: Navy surface 63x63 N. Hem. SLP,T,E,SST, Winds (Direction, speed), Sept 69 – Dec 88. Volume: 684 MB

    NOTE: UA winds are not available in the Navy hemispheric analyses for 1974 – Jan 83. They are available in the global band for some levels. These band winds could be used with geostrophic winds at high latitudes to make global winds.

D. ECMWF Analyses

1. DS 110: 2.5° global anal., 2/day, 1980 – Dec 87. 1000 - 100 mb, 7 levels. 7 tapes 00Z and 7 for 12Z (6250 bpi).

2. Also see FGGE section for Dec 78 – Nov 79.
E. Selected Tropical Analyses (from Krishnamurti, FSU)

<table>
<thead>
<tr>
<th>Levels</th>
<th>VRBL</th>
<th>Grid</th>
</tr>
</thead>
<tbody>
<tr>
<td>DS 302</td>
<td>200</td>
<td>U,V</td>
</tr>
<tr>
<td></td>
<td></td>
<td>June-Aug 1967</td>
</tr>
<tr>
<td></td>
<td></td>
<td>June-Aug 1972</td>
</tr>
<tr>
<td>DS 302.1</td>
<td>300,250,200</td>
<td>U,V</td>
</tr>
<tr>
<td>DS 302.2</td>
<td>850,700,200</td>
<td>U,V</td>
</tr>
<tr>
<td>DS 302.3</td>
<td>850,200</td>
<td>U,V</td>
</tr>
<tr>
<td>DS 302.4</td>
<td>sfc</td>
<td>Precip</td>
</tr>
<tr>
<td></td>
<td></td>
<td>May-July 1979</td>
</tr>
</tbody>
</table>

F. Other Analyses


2. DS 108.0: Australian. Analyses for whole S. Hem. Has SLP; has H, T, U, V 1000 - 100 mb. 250 mb starts Nov 75. Mixing ratio 1000 - 500 mb. 47x47 grid; 2x/day, 24 Apr 72 - 9 June 84. 49 tapes (13 at 6250 bpi). Through June 86 is at NCAR.


8. DS 106: IGY SLP. June 1957 - Dec 1958. Tropical analyses (72x11 points) by Germany

9. DS 188.0: German stratospheric analyses Nov 1964 -on. For N. Hem. See Stratospheric Section.

10. DS 061.1: Fourier wave analyses for N. Hem, Z, T, 5° lat x 6 waves. 20°N - 85°N, Jan 64 - Mar 82, 3 tapes. SLP from Jan 1946 - 1980, 500mb from Jan 46 - Jan 81, 2 tapes; S. Hem. Jan 64 - Mar 82.

G. Notes

1. There are separate texts about NMC and Navy analyses. These include information about methods and changes.
2. NMC Analyses: The Hough Function analysis method became operational at NMC about 10 Sept 1974. First guess problems 1 Dec 74 – 4 Feb 75 (minor problems for most uses). Problems in low level analyses in some high elevation areas about Feb 1976 – 1 Apr 1976.

3. Use of NMC optimal analysis methods became routine for final analyses (NCAR archives) on 22 Sept 1978. It was used for tropical analyses starting later.

4. NMC Tropical analysis problems:
   — Signs OK prior to 2 Dec 1974. The data source was Bedient analysis method?
   — The Flattery Hough analysis method started for the Tropical grids on 2 Dec 1974.
   — 2 Dec 74 – 28 May 75, 00Z. Wind V component has reversed sign for latitudes south of the equator. (OK at Equator.)
   — 2 Dec 74 – 17 Dec 74. U and V winds have incorrect orientation. The winds were taken from a lat-long grid and rotated to be true on a 65x65 grid. But they didn’t need rotation for this lat-long grid.
   — 13 July 77 – 15 July 77. All levels of U, V, T are incorrect north of and including 33°N.

5. NMC temperature analyses: In recent years NMC has not used reported temperature data (sfc or UA) to make analyses. The temperature data are derived from thickness temperatures. Surface temperature analysis discontinued 7 Apr 1981.
Section B

YEAR – MONTH GRIDS

(All data for the Northern Hemisphere, unless stated otherwise. See chart of daily grids used for calculations on p 9 of TN-111.)

1. Sea level pressure
   * Jan 1899 – June 1988. This has Trenberth corrected version through 1977, plus later data (See July 80, MWR). Lat-long grid. 1 tape.

2. 700 mb heights and temperatures.

3. 500 mb heights.

4. 300 mb heights.

5. Tropospheric grids from NMC, USAF and ESSPO. Octagonal grids. 1 tape.
   * For Apr 1955 – Jan 1963, except for the continuous periods indicated, some of the above levels only occur approximately four months out of each year.
   * Beginning in Jan 1973, sea level pressure, and stratospheric heights and temperatures are included, but stratospheric grids only through Feb 1981.

6. Winds, all available levels, 1000 - 100 mb.
7. Stratospheric height and temperatures. Octagonal grids. 1 tape.

8. DS 86.0: NMC Global Analyses; yr-mo summaries by CAC; period: Oct 1978 –
   June 1987.

   These were prepared by CAC from NMC daily analyses (only selected levels).
   Resolution 2.5° lat-long. Levels: 1000, 850, 700, 500, 300, 250, 200, 100, 50 mb,
   values, IBM VBS record format. Volume 7 tapes.

9. DS 210.1: Monthly grids are also available from German analyses, see p 79, TN-
   111. It should be noted that analyses in the stratosphere are particularly
   sensitive to changes in instrumentation and analysis methods. The German
   methods have been quite stable. Data for July 1957 – 1972 and later.


11. DS 208.1: Tropical Pacific yr-mo 250 mb wind grids from Sadler (Hawaii). Jan 66
    - Dec 73.


    Rasmusson, Carpenter. See MWR paper May 1982.

14. DS 718: GOES precip. (radiance histograms) 2.5°, ½ month, Dec 81 – Nov 87, 1
    tape.

    DS 718.5: OLR (long-wave radiation) 2.5°, ½ month, June 74 – Jun 87, 1 tape.
    OLR probably does not include 1984 calibr. Both precip and OLR from P. Arkin
    at CAC. Re daily global OLR see DS 676 in Satellite Section.

15. DS 719: Yr-mo tropical strip wind and OLR Mar 68 – Feb 85. OLR is the 1985
    revised calibration, 5° grid approx. (48° S - 48° N). Levels 1000 – 200 mb, but
    700 – 200 in early years. These tropical winds are ok in the 1974–78 period,
    unlike global
Section BB

SELECTED DATASETS FOR LONG-PERIOD CLIMATE CHANGE

1. DS 215: World land yr-mo temps from UK 1851 - 1984 (10° x 5° lat grid). 1 tape. This will be updated in 1989.

2. DS 283.0: Yr-mo world surface temperature (Hansen and Lebedeff) Time: Jan 1880 thru Dec 1987.

Based on land and island reports. The world is divided into eight zones from North to South, having 80 equal area boxes. Each of these is divided into 100 sub boxes. See their paper in Geophys Res. Letters, Vol 15, 323-326, 1988. Volume: 1 tape, 42.4 MB, 4 files.


4. Selected long-period sets of height/pressure data:
   * SLP from 1899 (N. Hem), above
   * SLP from 1891 (N. Hem), Also see USSR Section
   * 700 mb heights, temps from 1947 (N. Hem)
   * 500 mb heights from 1946 (N. Hem)
   * 300 mb heights from 1950
   * 50,30,10 mb heights from Germany, from 1957 (N. Hem), see above
   * S. Hem 500 mb heights for 1957-58, and Aug 1968 — on
   * S. Hem sfc-100 mb analyses from 1972 — on
   * Global stratosphere 70-0.4 mb from Oct 1978, see Stratosphere Section
   * Satellite channel radiances from Dec 1972 for the stratosphere
   * Note: most automated temperature analyses have not been stable enough for trends, especially near the surface. Use thickness temperature instead.

Selected Station Observed Data

1. DS 565.0: Has 1219 best US stations with year-monthly data. Max/min temp, precip, from 1900. Prepared by NCDC. From CO₂ Info Center.

2. DS 570: Monthly world surface stations, many years. See Precipitation Section.

3. DS 571: Monthly precip for 1087 African stations from 1900. See Precipitation Section.

4. DS 512: World daily station max/min temperature, station precip, etc. from 1979. Has 7500 stations. See Precipitation Section.

Other: Daily station data over US, China, India etc. See Precipitation Section.

Upper air observation: Monthly and daily rawinsondes are available.

Note: The sets of global monthly and daily observed data for the world still require big efforts to make the records more complete, and to clean the data.
Section C

TIME SERIES OF DAILY GRIDS

(All data are for the N. Hemisphere unless stated. "Daily" means once or twice per day.) Most of these data are also in the sets of daily grid data previously discussed.

Note: The octagonal grid has 1977 points (resolution 381 km at 60° N), and goes down to 10 to 15° N.

1. Sea level pressure
   * 1880 – 1979. Daily 36x16 N. Hem. Lat-long grid from USSR.

2. Surface temperature

   Note: In recent years these NMC grids are derived from thickness temperatures.

3. 700 mb height and temperature.

4. 500 mb height and temperature.

5. 500 and 300 mb u and v component grids.

6. 300 mb height and temperature.
   * Apr 1955 – Dec 1963. 47x51 octagonal grid. 1 tape.

7. 850 mb.

8. 200 mb heights.

9. 100 mb heights and temperatures.

10. Australian. S. Hemisphere. (All 2x/daily)
    * Apr 1972 – June 1984. 100 mb height and temperature. 1 tape.


Note: To permit quicker access, the above data have been extracted from datasets that are generally more comprehensive.
Section D

AVAILABILITY OF GLOBAL ANALYSES FROM NMC

The following analyses are for sea level thru 50 mb. They are all from NMC:

   DS 81: NCAR has the Flattery Hough Analyses in the NCAR 2.5° lat-long format. Most of the grids were reconstructed from Hough functions using "HUFFPUFF", others were received in analyzed gridded form and repacked.

   No analyses available in either function or gridded form.

   DS 66: Hough function records are available in the NMC 65x65 dataset but the grids have not been reconstructed. Not sure if this is possible to do.

4. 1 July 1976 to present in gridded form.
   DS 82: NCAR has the Global Analyses in NMC 0N 84 format, a 2.5° lat-long grid. See Section A.

Notes:

a. The optimal analysis method at NMC started about September 1978. The quality of stratospheric global analysis are then very poor until about mid-1980, but better grids are available in another set.

b. The Flattery analysis method (Sept 74 – Sept 78 at NMC) forces a relationship between heights and winds which causes the zonal mean meridional wind at every level to be zero. The relationship also causes other problems with winds in equatorial areas.
Section E

VERTICAL MOTION DATA
(From NMC unless specified)

1. 500 mb W: Oct 1958 – 18 Jan 1962 for 00Z.


4. 1 Jan 1973 – 17 Sept 1975 W: Data NOT AVAILABLE. Grids still are often there but are empty. We will delete them. There is data in the 36-hr forecast; not very helpful.


6. NMC global grids. 1976 –on. No vertical motion, but it could be calculated from available winds.

7. ECMWF global grids, 1980 – 88. 7 levels, 1,000 - 100 mb. These have vertical motion data.
Section F

TIME SERIES RAOBS AT NCAR
(Definition: $K = 1,000$ reports)

Inventory: A compact, generalized inventory shows what years of data are available for each station. It includes the raobs in all of the following datasets. It is available on-line or on paper.

1. United States plus Canada, Caribbean, Mexico, Pacific Islands, Chile Antarctica, etc. Includes significant levels. Most US stations start in 1948 – 1950.
   - Canada is in only thru Sept 1971. See below for extended set.
   - No US ships thru June 1970; then available until they quit in about 1973.
   - Data order is station time series within batches. The first is 1948 – June 1970. Then July 1970 – 1979 (includes selected permanent ships).
     Volume: (Tape sequences 201-233). 33 tapes thru June 1970, 3052 K.
   - United States plus Caribbean, Mexico, Canada, etc. (These should duplicate the above.) Mandatory levels only. 1961 - 1971.
     Volume: 22 tapes.

   Volume: (Tape sequence 89). 1 tape.

3. Mostly Tropical and United States stations. From NCDC (TD-54), Task force 8, Easter Island and Galapagos. These do not have data for recent years.
   Volume: (Tape sequences 1-19). 19 tapes, 617 K.


   Volume: (Tape sequences 94-100). 2 tapes raobs; 5 tapes winds, 338 K rawins.
   (New tapes thru about 1987 are at NCAR.)

The National Center for Atmospheric Research is operated by the University Corporation for Atmospheric Research under sponsorship of the National Science Foundation. An Equal Opportunity/Affirmative Action Employer.
   Volume: (Tape sequences 87-88). 2 tapes, 68 K raobs, 202 K winds

8. United Kingdom (UK). Rawins for UK proper and various overseas stations, 
   mostly through 1970. 
   Volume: (Tape sequences 90-93). 4 tapes, 528 K rawins.

9. United Kingdom Tropical. Rawins (may be included in above). 
   Volume: 1 tape, 39 K.

   Volume: (Tape sequence 50). 1 tape, 16 K.

11. French Raobs, Island and Africa. Polynesia updates through 1973 or 1974. Seven 
    African stations, mostly 1951 or 1952 thru 1965. Aseena at Dakar, Senegal has 
    later data from the African stations. 
    Volume: 1 tape, 31 K.

    Volume: (Tape sequence 26). 1 tape, 6 K.

13. Ascension Island 
    Data for late 1953 – mid-1970 and 1983 – 87. Obs were taken the whole period, 
    but aren’t easily available.

14. Argentina. 1 tape, 29 K.


17. India. Raobs and winds 1950s – June 1978

18. Antarctica. Our various datasets include data for several Antarctica stations, 
    some from about 1956 thru recent dates.

We are trying to obtain data for:

— Brazil raobs, all years. Brazil expects to have these prepared by Jan 1984.
— China raobs. The US and China signed agreements Mar 1988 under which the US 
    will receive daily data from about 30 stations from 1950 –on.
— USSR raobs. The US and USSR have exchanged a small amount of these data and 
    have plans to exchange more.

Note: Raobs for worldwide stations are also in the Observed Data Summary Section, 
but those are in a "synoptic" sort (all the world together at one time).
Section G

SELECTED RAOB COUNTS
(As of Apr 1989)

<table>
<thead>
<tr>
<th>Tapes</th>
<th>Raobs</th>
<th>Area</th>
</tr>
</thead>
<tbody>
<tr>
<td>53</td>
<td>4,648,934</td>
<td>All U.S. Control 1948 thru 1987</td>
</tr>
<tr>
<td>4</td>
<td>528,513</td>
<td>United Kingdom</td>
</tr>
<tr>
<td>5</td>
<td>669,699</td>
<td>Canada (thru Dec 87)</td>
</tr>
<tr>
<td>2</td>
<td>337,850</td>
<td>Australian</td>
</tr>
<tr>
<td>1</td>
<td>68,150</td>
<td>New Zealand</td>
</tr>
<tr>
<td>1</td>
<td>15,896</td>
<td>French Isles</td>
</tr>
<tr>
<td>2</td>
<td>262,189</td>
<td>India</td>
</tr>
</tbody>
</table>

Note: To calculate month statistics in 1974 on seq 1-49 (1,655,736 soundings), it took 10152 CPU sec, 8055 PP sec, 1575 CRU. (CDC-7600)
Section H

OBSERVED DATA SUMMARY ( Mostly from telecom, GTS)

Summary: Much upper air data are available from May 1958. The time series raobs from national sources often have earlier data.

A. Observed Data from GTS (real time data, global)

\begin{align*}
\text{(T = Tapes) } & \text{ (MS = Mass Store Files)} \\
\text{Primary} & \\
\end{align*}

1. DS 353.0: 1962 - 1972. NMC. All UA

\begin{align*}
\text{116 MS} & \\
\end{align*}


- Raob and Pibal
- Aircraft
- Satellite Soundings thru Apr 1979
- Satellite Winds
- Bogus Reports (was 17 MS to Dec 84)

(Available through Mar 1989, not subsets yet)

\begin{align*}
\text{275 MS} & \\
\text{69 MS} & \\
\text{37 MS} & \\
\text{64 MS} & \\
\text{54 MS} & \\
\end{align*}


\begin{align*}
1978 - 15 \text{ Feb 1987. NMC. Surface ADP (8000 stns)} & \\
& \text{(volume 11.12 yrs., 2502 MBytes)} \\
& \text{(at NCAR thru Mar 1989)} \\
\end{align*}

\begin{align*}
\text{109 T} & \\
\text{1174 MS} & \\
\end{align*}


(Navy has no rainfall)

\begin{align*}
\text{118 T} & \\
\end{align*}

5. Oct 66 - Sept 85 Navy Surface and UA (includes #4)

Subsets with all data, July 1971 - on (sfc 38 tapes, UA 25 tapes), Data at NCAR thru June 88

\begin{align*}
\text{(sfc 2.5 tapes/yr. - UA 1/yr, all 6250 bpi)} & \\
\text{57 T (6250 bpi)} & \\
\end{align*}

B. Other


228.5 Mbytes

2. Selected aircraft and balloon data:

- DS 353: NMC aircraft from 1962. See above

\text{The National Center for Atmospheric Research is Operated by the University Corporation for Atmospheric Research under sponsorship of the National Science Foundation. An Equal Opportunity/Affirmative Action Employer.}
DS 361: Aircraft from Australia, Dec 1971 – Feb 1986 (volume 50 MBytes)
DS 365: Global aircraft, 1960 – 73, from Sadler, Univ. of Hawaii
DS 602.1: Line Island aircraft, 1967
DS 875: Atlantic aircraft, GATE, June 74 – Sept 74
DS 880: Atlantic commercial aircraft, GATE, June 74 – Sept 74
DS 615: S. Hem. TWERLE balloon, June 75 – Aug 76
DS 800: S. Hem. EOLE balloon, Aug 71 – Dec 72, from France

Surface observations:
— See Navy above (global), Oct 1966 –on
— See NMC GTS above (global), Jan 1976 –on

Section III

SELECTED DATA FOR US MESOSCALE RESEARCH

Most of the following datasets are also listed elsewhere. Only short listings are given here.

A. Analyses (later dates are available)

1. LFM analyses and forecasts (to 48 hrs), Oct 1971 – present
   Volume 77.6 Gbits (1 tape, 6250 bpi = 1 Gbit)

2. NGM analyses and forecasts, Oct 1984 – present

3. NMC Global 2.5° analyses, July 76 – present (12.5 yrs.), 12 levels
   Volume 102.4 Gbits

4. ECMWF global 2.5° analyses, 7 levels, 1980 – 88 (9 yrs.)
   Volume 21.5 Gbits

B. Observations (later dates are available)

1. Hourly airways over US, Canada, 1,000 stns., Dec 76 – present
   Volume: 3711 MB through 1987, then 30 MB per month.

2. Hourly airways for 303 US stations (from NCDC), 1948 – 83
   Volume 15.6 Gbits.

3. Global 3-hour surface data from NMC, July 76 – present
   Volume 223 Gbits (12.5 yrs.)

4. All raobs over US, 1948 – 87, binary
   Volume 14.3 Gbits (40 yrs.)

5. Global raobs and pibals, April 1962 – present
   Volume ~80 Gbits (26 yrs.)

C. Precipitation Data

1. Daily precip for 9,000 US stations, 1900 – 86 (from NCDC)
   Volume 20 Gbits

2. Hourly precip for 3,000 US stations, 1948 – 87
   Volume 9.5 Gbits (40 years)

3. US radar, manually digitized, 40 and 20 nmi, 1973 – 86 (from TDL)
   40 nmi Nov 73 – Dec 88, 2.45 Gbits (15.2 yrs.)
   20 nmi Mar 78 – Dec 88, 3.49 Gbits (10.75 yrs.)

4. GOES data, 3 hr/8 km, one satellite, July 1983 – Mar 87 (and later)
   Volume 240 Gbits (from CSU)
Section I

FGGE DATA (Dec 78 – Nov 79)

The world had enhanced observing systems during the FGGE year. FGGE IIIb datasets were enhanced collections of the observed data. The IIIb datasets are delayed analyses using the IIb data.

1. DS 307.0: ECMWF 1.875° x 1.875° grids, 15 levels, H,T,U,V,RH (1980 version)
   1 Dec 78 – 30 Nov 79, 82 tapes.

2. DS 307.5: 3.75° x 3.75° version of 1 above. Derived at NCAR by selecting every other grid point from every other row, 18 tapes. (1980 version)


   Uninitialized grids. Z, U, V, & SLP. 15 levels. Volume 1250 MB.

4. DS 308.0: GFDL grids. 1 Dec 1978 – 30 Nov 1979, 41 tapes (6250 bpi)

5. DS 302.5: Vertical motion calc from ECMWF grids by Krishnamurti. On 1.875° grid, 3 tapes (6250 bpi).

6. DS 312.0: NMC FGGE analyses for 1 Jan 79 – 5 Mar 79 and 28 May 79 – 30 June 79 includes initialized and non-initialized analyses and diagnostics. 19 tapes (6250 bpi).

7. DS 309.0: FGGE IIIb grids from W. Baker, Goddard (5 Jan – 5 Mar (SOP-1) and 1 May – 31 July 1979 (SOP-2). 5° lon, 4° lat (72x46)

8. Discussed before in attachment A (daily analyses).

   NMC Grids (surface to 0.4 mb in several datasets)
   Australian Grids
   South African Grids
   German Stratospheric Grids

9. DS 354.0-A: FGGE IIb observations 27 Nov 78 – 1 Dec 79.
   a. Upper Air Profiles (Raob, Pibal, Aircraft, Dropwinsondes, Twos, Lims Soundings). 45 Tapes (or 15 at 6250 bpi).

The National Center for Atmospheric Research is operated by the University Corporation for Atmospheric Research under sponsorship of the National Science Foundation. An Equal Opportunity/Affirmative Action Employer.
c. Land Surface Data (Synop). 25 tapes


10. DS 354.0-B: FGGE IIb (1985 version). Errors were corrected in the first set of surface and upper air data above. NCAR has this resulting set, not separated into subsets. Also does not have the satellite profiles, (as of 1989, this is latest set).

11. FGGE year observations for the surface and upper air are also contained in datasets from NMC and the Navy, discussed in Section H.

12. DS 686.0: TIROS TOVS soundings. Basic NESS format (compact), not FGGE format. Both basic radiances and a retrieval sounding in each report, each 250 km. 1 Jan 79 – 5 Jan 80, 35 Tapes. Data from 2 satellites started 16 Oct 1979.

13. DS 700.0: Basic TOVS satellite sounder data.

NCAR has all this data for the FGGE year and later.

Note: There is a short NCAR text (Jan 1987) about the status of FGGE reanalysis efforts and data, and of Final FGGE IIb (1985 version). There is also a FGGE data catalog prepared by NCDC, Asheville.
Section J

SELECTED PRECIPITATION AND WATER DATA

1. Other


DS 510: US Summary of the Day. Precip, max/min temperature, etc. About 10,000 stations, includes Co-ops. 1890 – 1987, on 85 tapes, 1600 bpi.


DS 522: Subset of 370 stations (daily max/min temp/precip) in the US and Canada with long records.


DS 565.0: Has 1219 US monthly stations. Max/min temp, precip, from 1900.


DS 718: GOES precip (2.5°), ½ month, Dec 81 –on, and OLR. See Section B.

2. DS 480: Daily station rainfall data for India. Time: Jan 1901 – Dec 1970. There were 1632 stations in 1901, 2536 in 1970. Note that 1473 stations have 67 or more years of data. Total daily observations: 76.4 million. P.K. Das permitted NCAR to obtain these data. Volume: 4 tapes, 6250 bpi.


5. US radar, manually digitized.
   — 40 nmi resolution Nov 1973 – Dec 1988, 2.45 Gbits (15.2 yrs.)
   — 20 nmi resolution Mar 1978 – Dec 1988, 3.49 Gbits (10.75 yrs.)

6. DS 552.0: Global monthly stream discharge rates. Period of record about
   1800 – 1969 (few sites in 1800s). Data thru 1972. Keyed at NCAR from
   UNESCO publ. Presently does not include Canada and US.

7. DS 740: HRC highly reflective clouds, tropical daily (for tropical
   precipitation). From Garcia, NOAA. Has daily occurrence of HRC for
   1° squares 25°S - 25°N. Daily grids Jan 1971 – Jan 1988, also monthly grids
   have been calculated. NOAA atlas available. 1 tape.

8. DS 865: Long period monthly mean precip (from Jaeger), temperature, and
   derived fields of evapotranspiration, soil moisture, storage, etc., from J.
   Limpert (1981, Goddard). Global 4° lat by 5° long grid (42 x 72 points).

9. DS 235: N. Hem. sfc precip, yr-mo, 1873 – 1979, 2.5° grid. From USSR.
Section K

SELECTED DATA FOR OCEANOGRAPHIC RESEARCH

A. Ship Observations

1. DS 540: COADS (Comprehensive Ocean-Atmosphere Data Set), global ocean dataset based on surface ocean and atmospheric observations take 1850-1988, approx. 19 different data products are available.
   - Compressed Marine Reports (CMR), 72 million observ. 29 most used parameters, 16.8 Gbits, 17 tapes.
   - Monthly Summary Trimmed (MST), outlier reports statistically trimmed, 2° x 2°, yr-mo, 19 variables and 14 statistics, 16.7 Gbits, 17 tapes, 1850-1979.
   - Monthly Summary Trimmed Groups (MSTG), popular subsets of 4 variables and 8 statistics have been grouped together, 2° x 2°, yr-mo, each group is 1.9 Gbits, 2 tapes.
   - The 1980's data is presented in several products in interim form, final processing of the 1980's period is forthcoming.
   - Brief and detailed documentation, and reprint articles (See Bul. Am. Met. Soc., Oct. 1987) describing aspects of the COADS are available upon request.

2. DS 535: Time Series from Permanent Weather Ships, ocean and met. data at 14 locations, 1945 - 1987, 125 MBytes and smaller (3 ship) groups.

3. DS 542: Global ocean NODC archive, holdings current through 1988, XBT, MBT, oceanographic station data (SD), and compressed STD/CTD data (C022), 44 tapes.

4. DS 543: Ocean stations selected by Joseph L. Reid from NODC archive and other sources. All stations (7000) have measurements to near bottom, 1 tape, 18 MBytes.

6. DS 285.1: Southern Ocean Atlas Data, quality controlled observed stations (6000), 30°S - 80°S, variables (temp., salinity, oxygen, sigma-t, silicate, phosphate, nitrate), based on 1900-1975 data, 11 MBytes, from Gordon.

B. Sea Surface Temperature

1. DS 277: NMC yr-mo SST grids, 40°S -60°N, Jan 1970 - Sep 1984, based on ships. Also a global blend of ship and satellite yr-mo SST for Jan 1982 - Dec 1988, 2° x 2°, SST anomaly grids (relative to 1950-1979 climatology) are also available, 39 MBytes, from Reynolds.

2. DS 275: Pacific Ocean yr-mo SST, 20°S - 60°N, 1949-1962, equal area grid (63 x 61), from O. Sette.

3. DS 271: Global yr-mo SST anomalies, 1905-1979, 1° x 1°, based on 2° x 2° COADS. Also monthly SST clim for 1950-1979, from Oort and Yi, GFDL, 393 MBytes, 4 tapes.

4. DS 270: Global monthly SST clim, 2.5° x 5.0°, based on digitized charts available prior to 1970, from Washington and Thiel, .7 MBytes.

5. DS 276: Northern Hemisphere yr-mo SST, 5° x 5°, 1854-1968, from UK Meteorological Office, 6.4 MBytes.

6. DS 274: Tropical Pacific Ocean (30°S - 30°N), yr-mo and monthly SST clim, 1946-1976, 2° x 2°, from Rasmussen and Carpenter, CAC, 204 MBytes.

C. Surface Wind/Stress

1. DS 209: Global monthly clim surface stress, based on 1850-1974 data, 5° x 5°, from Han and Lee, 8.6 MBytes.


5. DS 274: Tropical Pacific Ocean (30°S - 30°N), yr-mo and monthly wind speed and direction clim, 1946-1976, 2° x 2°, from Rasmussen and Carpenter, CAC, 204 MBytes.

6. DS 200, 205: Southern and Northern Hemisphere monthly surface wind, air temp, etc., 5° x 5°, based on atlas data prior to 1969, from Taljaard, van Loon, Crutcher and Jenne, 17 MBytes.
7. DS 726: SEASAT scatterometer derived wind speed and direction, global coverage, July-October 1978, approx. 50 km resolution, objectively dealiased by Robert Atlas at GSFC, 2 tapes - 200 Mbytes.

D. Miscellaneous

1. DS 209: Global monthly clim surface heat budget parameters, 4° x 5°, from Esbensen and Kushnir, 8.6 MBytes.


3. DS 209.2: The Bunker Climate Atlas of the North Atlantic Ocean, 1° x 1°, monthly grids of all surface parameters (heat, wind stress, etc.), compiled by Isener and Hasse of Institut fur Meereskunde, 25 Mbytes.


5. DS 750.1: Global 1° x 1° depth and elevation dataset from Scripps, This version was modified and corrected by the RAND Corp., .5 MBytes.

6. DS 750.2: Global 5° x 5° depth and elevation (ETOPO5), from the National Geophysical Data Center in 1986, 57 MBytes or each hemisphere separately 29 MBytes.

7. DS 270.2: Monthly Average SST and Ice-Pack Limits, 1° x 1°, based on 1970's and pre-1970's data, 1.7 MBytes, from Alexander and Mobley of RAND Corp.

8. DS 270: Data Set Atlas for Oceanographic Modeling, 15 yr-mo datasets on a common 1° x 1° grid, from Samuels and Cox, GFDL, data description reference - Ocean Modeling, Nov. 1987, 165 MBytes, 2 tapes.

9. Comment: There are other numerous datasets embedded in the general ones given here, such as precipitation, air-sea temperature differences, and snow/ice cover. If interested please inquire.

E. Subsurface Climatology / Model Output

1. DS 285: Climatological Atlas of the World Ocean, monthly (temp.), seasonal (temp., salinity), annual(temp., salinity, O2, O2 saturation), 1° x 1°, multi-subsurface levels based on NODC archives current to 1978, from Levitus, 3 tapes, 203 MBytes.

2. DS 285.1: Southern Ocean Atlas Data, mean grids (30°S - 80°S), 1° x 2°, 47 levels, 0-9500 m, temp., salinity, oxygen, sigma-t, silicate, phosphate, nitrate, based on 1900-1975 data, 14 MBytes, from Gordon.

3. DS 278: Global ocean monthly clim, 0-150m, temp. and salinity, 1° x 1°, based on 1900-1981 data, from Baur and Robinson, 70 MBytes.
4. DS nnn: Community Model Experiment (NCAR 1988) of the North Atlantic, 15°S - 65°N, 100°W - 14°E, .33° x .4°, 30 levels, 5 years of data with samples every 3 days, variables (temp., salinity, U V W velocity, water age tracer, barotropic stream function), 123 Gbits, 125 tapes, subsets (regional, time, levels) are available, from Bryan and Holland. Monthly and annual average grids are in preparation.

F. Currents and Sea Level


2. DS 250: Pacific daily and monthly sea level heights, 1901-1985, 150 observing stations with various start and end dates (best coverage 1970-1985), from Wyrtki, 1.4 MBytes.

G. Operational Analyses

1. DS 082.1: National Meteorological Center (NMC) twice daily and yr-mo global grids, 2.5° x 2.5°, 1976 - present, a "near" surface subset is available, the definition of "near" and model variables have changed some through time (see below), twice daily dataset is 1.4 Gbits (13 tapes) and yr-mo dataset is 65 MBytes (1 tape).
   — beginning 00Z 1 July 1976, 1000mb (height, temperature, wind components, relative humidity) and surface air temperature
   — beginning 00Z 8 December 1977, sea level pressure
   — beginning 00Z 21 September 1978, surface pressure
   — beginning 12Z 16 May 1979, sea surface temperature (12Z only until 22 April 1986, then 00Z only through the present)
   — beginning 6 June 1980 model changes allow boundary layer estimates of wind components, relative humidity and potential temperature -- note this boundary layer was 50 mb thick with the parameter values applying to the mid-point - approx. 200 meters elevation.
   — beginning April 1985 the model boundary layer became 10mb thick making the wind components, etc, valid at approx. 40 meters elevation

2. DS 240, DS 240.1, DS 240.5, DS 240.6, DS 242.0, DS 018.0: U.S. Navy Fleet Numerical Oceanography Center twice daily grids, global and hemispheric, various resolutions, 1961-1986. Most grids are 63 x 63 uniformly spaced on a polar stereographic projection (approx. 380km at 60° lat).
   — Northern Hemisphere
     DS 018.0: 63 x 63 polar grid, sea level pressure, twice daily and yr-mo, 1946 - 1988.
DS 240.1: 63 x 63 polar grid, sea surface temperature, land surface temperature, vapor pressure, sea level pressure, wind speed and direction, twice daily, 1969 - 1988, 8 tapes.

— Southern Hemisphere
DS 240.5: 63 x 63 polar grid, sea surface temperature, twice daily and yr-mo, 1974 - 1983.
DS 240.6: 63 x 63 polar grid, sea surface temperature, land surface temperature, vapor pressure, sea level pressure, wind speed and direction, (12 other atmospheric levels with height, wind components, and dew point depression), twice daily, 1974 - 1983, 20 tapes.

— Full Global and Global Band (40S - 60N), uniform grid 2.5° x 2.5°,
DS 242.0: surface parameters (include wind components) have global coverage, the global band has multiple levels up to 200mb, 1973 - 1984, presently on 37 tapes.

   — DS 110: complete dataset, 7 pressure levels, 22 Gbits, 22 tapes
   — DS 110: yr-mo dataset, 7 pressure levels, 150 MBytes, 2 tapes
   — DS 110: near surface (1000mb) subset of complete dataset, 560 MBytes, 5 tapes
   — DS 307: FGGE period (Dec. 1978 - Nov. 1979) dataset, 1.875° x 1.875°, 16 pressure levels without relative humidity, 24 tapes. The 1000mb wind data are also available separately, 72 MBytes.

4. DS 108: Australian National Meteorological Research Centre, twice daily and yr-mo southern hemisphere grids, (47 x 47 grid points on polar stereographic projection - 508 km at 60° lat.), 1972-1984, variables (height, U and V wind components, air temperature) on 8 pressure levels and sea level pressure, twice daily dataset 13 tapes, yr-mo dataset 1 tape.

   — DS nnn: Southern hemisphere twice daily surface parameters derived from Australian SLP, 2° x 5°, (SLP, surface air, T, stress components, curl, divergence, Ekman suction), 1975-1979 from Wearn.

H. Data to be Made Available in the Future

1. Smoothed FGGE drifting buoy dataset, hourly positions derived using spline interpolation, from Patterson.
2. Southern Hemisphere oceanographic station data, a collection of selected ocean stations from the Southern Ocean Atlas (Gordon), Joseph Reid's South Atlantic group, and miscellaneous groups from modern expeditions in the South Atlantic. This dataset contains sample values of temperature, salinity, oxygen, phosphate, nitrate, nitrite, silicate at as many as 60 observed and 50 standard levels at 7500 'good' stations. Each level also has the derived parameters, potential temperature, sigma 0, sigma 2, sigma 4, and dynamic height, from Worley.

3. Antarctic Circumpolar Current transport time series, 1 year - 1979, mass transport estimate series from direct measurements, from Whitworth.


5. GEOSAT derived wind/wave data

Note: A catalog of oceanographic data is available that has more details than this text.
Section L

STRATOSPHERIC DATA (Primary Sets), AND OZONE
(At NCAR)

1. DS 61 and other: Daily stratospheric grids, Z, T; N. Hem.; 100, 70, 50, 30, 10
   1969. 47x51 grids. 8 tapes, 1600 bpi. This set continues in DS 67.

2. DS 188: German stratospheric grids, daily, N. Hem., 50, 30, 10 mb, Ht, temp.
   Only few 10 mb in recent years. November 1964 – June 1981. 10 degree grid.
   2 tapes. (From K. Labitzke, Free Univ. Berlin) Now updated through Dec
   85.

   (NCAR now has these from October 1978). (Includes analyses of 3 SSU
   radiance channels.)

4. DS 67.1: Daily tropo and strato data from basic Gelman archive Global, 1000
   mb to .4 mb., (Oct 1978 – Dec 1987), 16 tapes (6250 bpi). Sfc through 100 mb
   is from Flattley method through 26 July 1984. Then it should be same as
   other NMC global archives. 70 to .4 mb is the same as in DS 67. The
   stratosphere analyses are stacked up using this 100 mb height and
   temperature.

5. Monthly adjusted stratospheric grids, global, from NMC. Time: Oct 78 –
   Dec 88, not corrected. Oct 78 – Dec 86, corrected. Based on daily analyses,
   70–.4 mb, with adjustments for temperature calibration at 5 mb and higher.
   From Mel Gelman, CAC. Separate text is available.

6. DS 191: Weekly stratospheric grids, N. Hem., 100, 10, 5, 2 mb; Z, T, Jan
   1972 – June 1973. 36x10 grid. NMC analyses. Uses rockets, etc. From
   Newell, MIT. 1 tape.

7. DS 190.3: Weekly stratospheric grids, N. Hem., '5, 2, 1, .4 mb, July 1976 –
   April 1980, 65x65 grids. 1 tape.

   March 1981. 29 tapes.

   (1 tape per year, could be fewer).
10. DS 679: Data along the orbits for five brightness channels, Nimbus-5 SCR. Dec 1972 – Dec 1974. 5 tapes. From C. Rodgers, UK. Also: daily global analyses of the channels, 1 tape.


13. DS 805.0: Daily total ozone from London station ozone data.
   — 1957 – 1975 in dataset
   — 1957 – 1979 with an unresolved error shown in work folder


Also: satellite soundings, grid sets surface to 100 mb. Tropopause analyses.
Section M

UPPER ATMOSPHERE (mostly 80–1000 km)

A detailed catalogue of these upper atmosphere data is available, which provides greater detail than this summary.

A. Ionospheric Incoherent-Scatter Radar Data

The radars can measure electron and ion densities, temperatures, and velocities between about 90 km and 1000 km altitude. From these measurements, neutral atmospheric temperatures and winds can be deduced. The datasets do not always include all altitudes or all parameters. Data are typically available for a one- to three-day period each month.

Current holdings:

Jicamarca, Peru  

Arecibo, Puerto Rico  

Millstone Hill, MA  

Chatanika, Alaska  
(65°N, 147°W) 1977 - 1982*

Sondre Stromfjord, Greenland  

St. Santin, France  
(45°N, 2°E) 1966 - 1982, 1984 - 1987**

EISCAT (Tromso, Norway)  
(70°N, 19°E) 1984 - 1988

*During 1982 the Chatanika radar was moved to establish Sondre Stromfjord.

**After 1987 St. Santin terminated incoherent scatter measurements.

B. Fabry-Perot Interferometer

Measures neutral gas temperature and velocity. The altitude of measurement may not be known precisely (but can be inferred with additional data), and can range from 90 to 500 km.

Current holding:

Sondre Stromfjord (67°N, 51°W) 1988 nominally 250 km.
C. MST Radar

Mesosphere - Stratosphere Doppler radars measure neutral wind velocity (and turbulence) over altitudes from 0 to 100 km.

Current holding:

Poker Flat, Alaska (65° N, 147° W) hourly averages, more or less continuous from 1979 - 1985.

D. Empirical Descriptions of Standard Conditions, 60 km - 1000 km

1. The Chiu Model will produce height profiles of electron density for specified location, time and sunspot number.

2. The International Reference Ionosphere, IRI, model produces electron density, neutral temperature, electron temperature, ion temperature and ion concentrations for five species (O⁺, H⁺, He⁺, O₂⁺, NO⁺) given location, time and sunspot number.

3. The Mass Spectrometer Incoherent Scatter, MSIS, model produces neutral atmosphere parameters (temperature, exospheric temperature and Ar, O₂, N₂, O, N, He, H concentrations) given a number of geophysical indices. The 1983 and 1986 versions are available.

E. Model Data Assimilation Analyses of the Ionosphere

Assimilative mapping of ionospheric electrodynamics: Provides electric potential patterns, electric fields, and height-integrated conductivities over the northern hemisphere above 50° magnetic latitude. Patterns are derived from a variety of data sources (magnetometers, IS radars, coherent radars, satellite measurements of electron precipitation) starting with statistical patterns applicable to the geophysical conditions.

F. General Circulation Model Results

1. The Thermosphere (Ionosphere) General Circulation Model

Provides global coverage on a 5x5° grid between 67 km and 500-700 km of neutral and ionized thermospheric parameters, including neutral winds, neutral temperatures, neutral compositions (N₂, O₂, O), electron density, electron temperature, ion temperature and ion composition (O⁺, O₂⁺). Model inputs of ion velocity and auroral deposition parameters are also provided.

2. Semi-diurnal tidal model: Provides amplitudes and phases of the semi-diurnal tide in the horizontal neutral wind, neutral temperature and geopotential between 0 and 100 km as a function of latitude and season.
Section N

CLIMATOLOGY AND CIRCULATION STATISTICS


2. DS 205: (N. Hem.) Northern Hemisphere Climatology, sfc - 100 mb, 1 tape by Crutcher and Meserve with NCAR inputs. Note: Volume DS 200 plus DS 205 is 16.60 MB.

3. DS 207: Global Rand clim; sfc, 850 mb, 400 mb Z, T, RH, U, V, four seasons, 4x5° grid. Surface includes SST, clouds, precip, evap, albedo (sfc and planet), absorbed solar, long wave rad, rad balance, sensible heat flux, heat balance. Upper air clim interpolated from DS 200, 205 above. 1 tape, 1600 bpi.

4. DS 208: Tropical Wind Climate 300, 200 mb. From Sadler, 1 tape

5. DS 210: N. Hem. Stratosphere Climate 100 - 5 mb. German analyses, 14.6 MB.

6. DS 270.2: Global Rand clim of SST, ice (360x180 grid)


10. See Cloud Section also

11. See Precipitation Section for DS 865: monthly precip, evaporation, soil moisture, etc.

   Note: See Geophysical Data Section for land cover, soil types, etc.

12. New climatologies are starting to appear, based on about 10 years of NMC or ECMWF analyses. Please ask.
Section NN

CLIMATE MODEL DATA (CO₂ runs)

A data bank has been established at NCAR to help provide easy access to selected climate model data. The main thrust is to support assessments of the effects of climate change (on food, water, forests, economics, etc.). This effort has been sponsored by EPA, with much assistance from modeling groups. See Table 1 for info about the models. The text, "Data from Climate Models, the CO₂ Warming," is available. It is a brief description of the characteristics and output of selected models.

1. 1x and 2x carbon dioxide runs, slab ocean. Monthly averages over about 10 years.
   — About 10-20 variables such as temperature, humidity, precip, runoff, evaporation, surface wind, downward sfc radiation, etc.

2. Transient runs: Two long runs from GISS (one is 1958 – 2062). Only the average data each decade is in the standard format. The basic data has each year. A program interpolates annual values between the decade means for the user.

3. Data on tape: A tape has global data for all runs in items 1 and 2 above. Volume 35 MBytes.
   Note: Small amounts of data from selected sectors can be provided on floppy disk.

4. Data each yr-month from GFDL model (version Feb 1988): Data each yr-mo from 1x, 2x CO₂ model. GFDL model completed Feb 89.
   — Global data for nearly 19 variables as above, mostly for the surface.
     Volume: about 75 MBytes.

   — Global data for all 171 variables. Volume about 640 MBytes, five tapes.

5. Full basic data from 1x, 2x CO₂ runs above
   — GISS 1x, 2x run, 54 vrbl, has height levels to 30 mb, and two wind levels
   — GISS transients, 56 vrbl
   — GFDL 1x, 2x run (1985), 160 vrbl
   — GFDL 1x, 2x run (1988), 171 vrbl, described above
Table 1. Characteristics of Selected Climate Models

All models are global in extent. All Models have a smoothed topography that varies between models. All models have an annual cycle. The new GFDL run has been added for information. All models (except the transients) give data for the present climate (1x CO₂) and double CO₂ climate (2x CO₂). The EPA studies, based on these models, were made between October 1987 and April 1988.

<table>
<thead>
<tr>
<th>When Calculated</th>
<th>Model Resolution (lat x lon)</th>
<th>Model Levels**</th>
<th>Diurnal Cycle</th>
<th>Base 1x CO₂ (ppm)</th>
<th>ΔT for Double CO₂</th>
<th>Increase In Global Precip</th>
</tr>
</thead>
<tbody>
<tr>
<td>GISS</td>
<td>1982 7.83 x 10°</td>
<td>9</td>
<td>yes</td>
<td>315</td>
<td>4.2°C</td>
<td>11%</td>
</tr>
<tr>
<td>GFDL*</td>
<td>1984-85 4.44 x 7.5°</td>
<td>9</td>
<td>no</td>
<td>300</td>
<td>4.0°C</td>
<td>8.7%</td>
</tr>
<tr>
<td>OSU</td>
<td>1984-85 4.00 x 5.0°</td>
<td>2</td>
<td>no</td>
<td>326</td>
<td>2.84°C</td>
<td>7.8%</td>
</tr>
<tr>
<td>GISS Transients</td>
<td>1984-85 7.83 x 10° (in 1958)</td>
<td>9</td>
<td>yes</td>
<td>315</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>GFDL* (Better Ocean)</td>
<td>1987-2/88 4.44 x 7.5°</td>
<td>9</td>
<td>no</td>
<td>300</td>
<td>4.0°C</td>
<td>--</td>
</tr>
</tbody>
</table>

*This is a spectral model that has 15 waves
The other models are gridpoint models with resolution as given
**All models make calculations for surface conditions as well as at these upper-air levels.
Section O

GEOPHYSICAL DATA (elevation, depth, land use, etc.)

1. DS 750-780: Sfc Elevation and Ocean Depth Data, global. (1 tape each set) (1 degree, 10 minutes global, 1 km elev. USA, 5 minutes ocean depth).

2. DS 750.1: World elevation and ocean depth, one degree resolution. Data prepared by Scripps, Rand did some final cleaning. Each point gives ocean depth, and elevation, or lake surface elevation. Volume 0.43 MB, characters.

3. DS 759.0: World 5 min ocean depth; 50.49 MB.

4. DS 754: Elevation each 10 min lat-lon, water vs. land flag, land cover types, percent urban. No ocean depth. Prepared by Navy (FNOC) with data help by NCAR. Volume 18.7 MB binary; or 56.3 MB if characters.


6. DS 767: Soil and vegetation type data from Henderson-Sellers on 1° global grid. Information J of Clim, UK, about Mar or Apr 1985, Vol 5, P114. (Also called the "Wilson tape"). Volume 0.65 MB.

7. DS 769: World ecosystems by carbon in live vegetation by Olson, 0.5° grid. See Carbon Dioxide Info Center publ. NDP-017 (1985, at Oak Ridge) for info.


9. DS 860: AFCRL radiation spectral lines, 1 tape.

References:


— Chapter 18 of NCAR TN 111 (1975)

— There are more details about these datasets in "Selected Climatological Data" (at NCAR), R. Jenne, Rev. Apr 1989.
Section P

SATELLITE DATA AT NCAR

Inventories: There are short on-line and paper inventories for various satellite datasets below. These show the orbits of the data available each day. Also see Table 1 for a summary of selected data.

1. Summary of primary satellite sounder data (also listed below):
   * DS 685.0: NIMBUS SIRS Apr 69 – Apr 1971 (perhaps some later data at NASA)
   * DS 692.0: NOAA VTPR Nov 72 – 28 Feb 1979 (8 IR channels)
   * DS 700.0: NOAA TOVS 29 Oct 78 – 11 Apr 1985 (vis, IR, U wave, strato channels)
   * TOVS: more recent data are at NOAA SDSD (not at NCAR)

2. Stratospheric channels —see DS 679 and DS 67.1 in the Stratospheric Section.

3. DS 685: Atmospheric sounders, Apr 69 – Apr 1971, Sirs A and B (from Nimbus 3,4). tapes (1600 bpi). This is all of the basic data.


5. DS 700.0: TOVS: All basic NOAA satellite sounder data (has HIRS, MSU, SSU) for 29 Oct 1978 – 11 Apr 1985. NCAR data recovery from NOAA TBM tapes. A copy will be at Goddard and NOAA/SDSD. Avg 44 Mbytes per "tape," about 6200 "tapes" (261.8 Gbytes, 2094.4 Gbits actual count).

Note: There are subsets of MSU and SSU data that are much smaller.

Note: 1 tape, 6250 bpi equals one Gbit

6. DS 686: TOVS soundings, Tiros N, each 3.5°. Jan 79 – Jan 1980. (Similar data (different format) for Dec 78 is in Winter Monex archives at NCDC), 35 tapes. Volume: 20 Mbytes per 2 weeks for one satellite.


9. DS 676.1: 5-day IR average of NESS daily satellite data. June 74 – Sept 86 (928 grids, 5° grid), from K. Weickman, Boulder, 1 tape.


11. DS 730: Radiation Budget Climatology, top of atmosphere. CSU.

12. DS 732.0: Data from ERBE (Earth Radiation Budget)
    Time: Apr, July Oct 85, and Jan 86 at NCAR. Data are given for 2.5°, 5.0°, 10.0° regions and zonal averages. Separate data for the scanner and wide field instruments. From NASA. The data are:
    — Daily longwave radiation and albedo
    — Hourly longwave and albedo, average for the month
    — Monthly mean longwave and albedo

13. DS 725.0: GOES 8 km/3 hr archive of IR and VIS data from GOES West. (ISCCP B-1 data). From G. Campbell, CSU. Starts 1 July 1983 (25.5 megabytes/day). Still

The National Center for Atmospheric Research is operated by the University Corporation for Atmospheric Research under sponsorship of the National Science Foundation. An Equal Opportunity/Affirmative Action Employer.
going in 1988.

14. DS 716: INSAT India satellite radiances (IR, VIS samples each 23 km). Mar 1984 – on.
   Mar 1984 – Mar 1988, only 2 times a day, (Volume: 4290 images, each 512 x 512 bytes, total 1124.6 MBytes).
   (Volume 1773.8 MB Mar 84 – Oct 88, Total). Note: Oct 88 data received May 89.


Table 1. Satellite Data Status (Valid Jan 1989)

<table>
<thead>
<tr>
<th>Gbits</th>
</tr>
</thead>
<tbody>
<tr>
<td>2,075</td>
</tr>
<tr>
<td>8,174</td>
</tr>
<tr>
<td>1,459</td>
</tr>
<tr>
<td>209</td>
</tr>
<tr>
<td>11,917</td>
</tr>
</tbody>
</table>

5. Coakley has selections of 1981-82 GAC
   These 320 Gbits are on the mass store.

6. All basic VTPR sounding data. (Nov 1972 - 28 Feb 1979) 48 tapes (6250 BPI). Not on mass store.

7. GOES -West 8 km/3 hour data for ISCCP (1 Jul 1983 - Mar 1987). From G. Campbell (CSU). The volume is 25.5 MB/day when complete. Later data are available

8. GOES VIS and IR for GATE (Atlantic Ocean), 27 Jun - 30 Sep 1974 2 km resolution VIS, 8 km IR and .5° lat-long average (volume about 20.4 Gbits VIS and IR, and 2 Gbits of higher averages)

<table>
<thead>
<tr>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>12,547</td>
</tr>
</tbody>
</table>
Section PP

PALEOCLIMATE DATA

1. DS 861: Earth insolation for 1.1 million years, from Berger, 1 tape.

2. DS 862: Climatic boundary conditions (CLIMAP) for 18,000 years BP and present, water, soil, glacier & vegetation coverage, sea surface temperature & elevation included for February and August, on 2° grid cells.

3. DS 863: Atlantic Ocean core data, about 400K years, SPECMAP. This archive gives Paleoclimate data for a selection of Atlantic cores. It has O-18 data for about 16 cores covering about 400,000 years. Age models for the cores are given. Derived sea surface temperature estimates for 15 cores are given. Delta 13-C data is available for selected cores. Planktic foramin counts and factor loadings are given for the cores. Another file includes solar orbital data.

This is SPECMAP archive No. 1, 28 Mar 1989. See the documentation for more science and data details. From J. Imbrie and A. Duffy. Many contributors. Volume: 2.2 MB.

Inventory: The following book has much detailed inventory information about various paleoclimate datasets, and associated science.

Section Q

CLOUDS

1. DS 292.0: Data for clouds over the globe from surface observations
   Total long-period monthly cloud cover and cloud type amounts over land and ocean.
   Has all data from several cloud atlases and more. Some data for individual years is also given. Prepared 1988. Volume 69.75 MB

   Daily clouds at 165 km resolution along orbit swaths, and in 500 km fixed boxes. NCAR only has the 500 km data. Day and night data each day, sfc temp; low, mid, high cloud percent amounts. The input data are two THIR IR channels, USAF sfc temps, and the .38 micron UV channel on TOMS (for cloud discrimination). Volume: 7 tapes for the period.

3. DS 36: N. Hem, Daily Analyses, clouds, dew; Sept 63 – Apr 72, USAF

4. DS 38: USAF 3-D neph. All Jan, July 1979. (48 tapes, 6250 bpi)

5. DS 672: Tropical daily total clouds Feb 65 – July 73, 144x24 grid, from satellite neph maps, by Sadler, 1 tape.

6. DS 672.5: Daily clouds, N. Pacific, Feb 65 – Feb 1978 (36x72 points), by Sadler. (World clouds from 1976 [satellite]. See USSR Section)


   Samples of basic cloud radiance data (IR and VIS) have been collected for each 3-hours from geosynchronous satellites starting July 1983. Also, from polar orbiter. Samples taken each 8–10 km. Subsamples each 25–30 km are used to derive clouds.
   — The first year of cloud data is now available (June 89)
   — Two tapes/mo, clouds each 3 hours, each 250 km box
   — One tape/yr, monthly clouds
   — Data is at NCAR from NASA

9. Section on observations: Surface observations, including ship observations, have clouds.
Section R

OTHER SELECTED DATA AT NCAR
(ice and snow, etc.)

1. DS 233: Arctic Year-Monthly Ice. 1953 – 1977. by Walsh, 1 tape

2. DS 832: Sunspots, geomagnetic index 1932 – Jan 82.
   (Later data are at NCAR, on a CDROM from NGDC)


   NOTE: For more information about snow and ice, contact WDCA Glaciology (snow and ice), CIRES, U. of Colorado, Boulder, CO 80309.

4. DS 900-901: Station Library Data

There are now a total of over 300 datasets listed in our separate computer catalog. Some of these have several subsets. Many are on just one tape. A few involve hundreds of tapes. The total volume is about 12 trillion bits of satellite data and two trillion bits of everything else.
Section RR

DATASETS RECEIVED BY THE USA FROM THE USSR

1. Rawinsonde data for six USSR stations for ten years 1961–1970. (2 tapes) IBM VB blocking, EBCDIC characters, maximum block size 1704 bytes. (received April 1986)

2. Satellite data on the total cloud amount for the Northern and Southern hemispheres, 5° x 10° grid 1966–85, 2 tapes. (received Jan 1987)

3. Satellite data on the total cloud amount for the Northern and Southern hemisphere, 5° x 5° grid, 1976–85, 2 tapes. (received Jan 1987)


5. Daily data on height and temperature fields in the free atmosphere at standard pressure surfaces for the Northern hemisphere, 5° x 10° grid, for approximately 1948–1985. Levels SLP to 10 mb. Variable starting dates. No temps before 1969. This dataset will only be prepared through 1985; then objective analyses will begin. (10 tapes received Jan 1987, 7 received Oct 1987)
   — Data received Oct 1988 to add missing grids (one tape)


7. Monthly analyzed anomalies of the precipitation (in % of the norms) for the Northern hemisphere, 2.5° grid, 1891–1960 period. (one tape from Smirnov, Sept 1987, data for all months)

8. Daily and monthly atmospheric circulation indices, location and intensity of 8 atmospheric activity centers for 1891–1986 years in the first natural synoptic region of the Northern hemisphere, one tape. (from Smirnov, Sept 1987)

Section S

DATA FROM SELECTED EXPERIMENTS:

1. GATE Experiment (GARP Atlantic Tropical Experiment), 1974
   Time: Summer 1974
   Data included are ship observations (surface and UA) from an array of ships off
   the African coast. There are precip grids from ship radar. There are hourly
   satellite data. NCDC prepared a catalog. NCAR has a number of the datasets.

2. GALE Experiment (Genesis of Atlantic Lows), 1986
   Kreitzberg at Drexel gathered the many datasets. They are also on a CDROM
   made by U. Wash. It is hoped to make a better CDROM in 1989. See paper
   The data are not at NCAR.

3. EOLE Balloon Experiment (over S. Hemisphere), 1971
   The constant-level balloons drifted near 200 mb.
   Balloons: 50 in Sept 1971, 130 in early Oct, 280 in Nov 1981, about 40 balloons in
   July 1972.
   There were 155 days with more than 100 balloons. The French made a motion
   picture of balloon tracks. See paper about EOLE by Morel and Bandeen, Bul
   The data are at NCAR.

CCOPE (Cooperative Convective Precipitation Experiment)

Summer 1981, in Montana. Rawinsondes, radar, aircraft, photographs. Contact
the NCAR Mesoscale and Microscale Meteorology Division for more info about
these data. In Feb 1982, the Bureau of Reclamation and NCAR published an
extensive data inventory.