National Climatic Data Center

DATA DOCUMENTATION

FOR

DATA SET TD-6141A

Eta Data Assimilation System (EDAS) Archive Information

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1. **Data Set ID:**

TD-6141A

2. **Data Set Name:**

Eta Data Assimilation System (EDAS) Archive Information

3. **Data Set Aliases:**

EDAS

4. **Access Method and Sort for Archived Data:**

DATA DESCRIPTION

The archive data file contains the data in synoptic time sequence, without any missing records (missing data is represented by nulls and the forecast hour is set to negative 1). Therefore it is possible to position randomly to any point within a data file. Each file contains data for approximately two weeks: days one through 15, and 16 through the end of the month. At each time period, an index record is always the first record, followed by surface data, and then all data in each pressure level from the ground up.

Cartridge Specifications (beginning January 1, 1997)

Two files, containing data for one month, are archived on a 3480 cartridge and sent to NCDC. Files are copied to cartridge with the UNIX "dd" command.

TYPE	3480 cartridge, ASCII*
RECORD LENGTH	4395
BLOCK SIZE	30765

* Note that each data record is composed of a 50-character header in ASCII, followed by the binary packed data. Therefore, an ASCII-EBCDIC conversion on the entire data record or cartridge file is not possible.

Data Grid

The data are on a 79 by 55 Lambert Conformal grid (Fig. 1). In Table 1, the data grid is identified by the model that produced the data, a grid identification number, the number of X and Y grid points, the Pole position (latitude and longitude) of the grid projection, a reference latitude and longitude, the grid spacing (km) which is true at the reference point, the orientation with respect to the reference longitude, the angle between the axis and the cone, and a point on the grid in grid units and latitude and longitude . The given pole position results in the lowest left grid point to have a value of (1,1).

Table 1. Data Grid Specifications

Model Type	ID #	X Max	Y Max	Pole Lat.	Pole Lon.	Ref. Lat.	Ref. Lon.	Ref. Grid	Orient	Cone Ang.	Sync X	Sync Y	Sync Lat.	Sync Lon.
EDAS	38	79	55	90N	0W	35N	95W	80	0	25	39.0	25.0	35N	95W

Missing Data

Missing data are written as an array of nulls (' ') with a forecast hour of -1 in the header label. The associated field label is defined as "NULL".

Definition File

The definition file given in EDAS.CFG summarizes the grid specifications and data fields. The format is such that the first 20 characters are the dummy ID field followed by the data. Much of the information is written into the index record of each time period.

Definition File - EDAS.CFG

```
MODEL TYPE:     EDAS
GRID NUMB:      38
VERT COORD:      2
POLE LAT:       90.
POLE LON:        0.
REF LAT:        35.
REF LON:       -95.
REF GRID:       80.0
ORIENTATION:     0.
CONE ANGLE:     25.
SYNC X:         39.0
SYNC Y:         25.0
SYNC LAT:       35.
SYNC LON:      -95.
SPECIAL:         0.
NUMB X:         79
NUMB Y:         55
NUMB LEVELS:    23
LEVEL 1:         0.   21 MSLP TMPS TPP3 CPP3 SOLW T02M
                         RH2M U10M V10M PRSS CSNO CRAI
                         LHTF SHTF UMOF VMOF LCLD MCLD
                         HCLD TCLD DSWF
LEVEL 2:      1000.   06 UWND VWND HGTS TEMP WWND RELH
LEVEL 3:       975.   06 UWND VWND HGTS TEMP WWND RELH
LEVEL 4:       950.   06 UWND VWND HGTS TEMP WWND RELH
LEVEL 5:       925.   06 UWND VWND HGTS TEMP WWND RELH
LEVEL 6:       900.   06 UWND VWND HGTS TEMP WWND RELH
LEVEL 7:       875.   06 UWND VWND HGTS TEMP WWND RELH
LEVEL 8:       850.   06 UWND VWND HGTS TEMP WWND RELH
LEVEL 9:       825.   06 UWND VWND HGTS TEMP WWND RELH
LEVEL 10:      800.   06 UWND VWND HGTS TEMP WWND RELH
LEVEL 11:      750.   06 UWND VWND HGTS TEMP WWND RELH
LEVEL 12:      700.   06 UWND VWND HGTS TEMP WWND RELH
LEVEL 13:      650.   06 UWND VWND HGTS TEMP WWND RELH
LEVEL 14:      600.   06 UWND VWND HGTS TEMP WWND RELH
LEVEL 15:      550.   06 UWND VWND HGTS TEMP WWND RELH
LEVEL 16:      500.   06 UWND VWND HGTS TEMP WWND RELH
LEVEL 17:      400.   06 UWND VWND HGTS TEMP WWND RELH
LEVEL 18:      300.   06 UWND VWND HGTS TEMP WWND RELH
LEVEL 19:      250.   06 UWND VWND HGTS TEMP WWND RELH
LEVEL 20:      200.   06 UWND VWND HGTS TEMP WWND RELH
LEVEL 21:      150.   06 UWND VWND HGTS TEMP WWND RELH
LEVEL 22:      100.   06 UWND VWND HGTS TEMP WWND RELH
LEVEL 23:       50.   06 UWND VWND HGTS TEMP WWND RELH
```

Record 1 consists of a four character string that identifies the source of the meteorological data. Record 2 is the integer identification of the meteorological data grid (Table 1).

Record 3 is an integer number that identifies the vertical coordinate system. Only four coordinate types are recognized: 1-pressure sigma; 2-pressure absolute; 3-terrain sigma; 4-hybrid sigma.

Records 4 & 5 identifies the pole position of the grid projection. Most projections will either be defined at +90 or -90 depending upon the hemisphere. The longitude would be the point 180 degrees from which the projection is cut.

Records 6 & 7 is the reference position at which the grid spacing is defined.

Record 8 is the grid spacing in km at the reference position.

Record 9 is the grid orientation or the longitude of the meridian which is parallel to the up-down direction of the grid.

Record 10 is the angle between the axis and the surface of the cone. For regular projections it is equal to the latitude at which the grid is tangent to the earth's surface. A polar stereographic grid would be tangent at either 90 or -90, while a Mercator projection is tangent at 0 latitude. A Lambert Conformal projection would be in between the two limits. An oblique stereographic projection would have a cone angle of 90.

Records 11 & 12 are used to equate a position on the grid with a position on the earth as given in Records 13 & 14. Any position is acceptable. It need not even be on the grid.

Record 15 is not currently used.

Records 16 & 17 identify the number of grid points in each direction.

Record 18 is the number of levels in the vertical, including the surface level.

Record 19, through the number of levels, identifies the height of each level in appropriate units according the definition of the vertical coordinate, the number of variables at that level, and the four character identification string for each variable. The height coordinate is as follows for each type of vertical coordinate: 1-sigma (fraction); 2-pressure (mb); 3-terrain (fraction); 4-hybrid (mb-offset.fraction)

Index (INDX) record - first record of each time period

The key to reading the meteorological files is decoding the ASCII index record, the first record of each time period. The first 50 characters of the index record contain the same "header" information as do the other records in the given time period. The four-character label is "INDX". The format for this record is given below. Complete descriptions are similar to the variables in the discussion above of the Definition File.

Format of the Index Record

A4 Data Source

```
I3  Forecast hour
I2  Minutes associated with data time
12F7.    1) Pole Lat
         2) Pole Long
         3) Tangent Lat
         4) Tangent Long
         5) Grid Size,
         6) Orientation
         7) Cone Angle
         8) X-Synch pnt
         9) Y-Synch pnt
        10) Synch pnt lat
        11) Synch pnt long
        12) Reserved
3I3      1) Numb x pnts
         2) Numb y pnts
         3) Numb levels
I2  Vertical coordinate system flag
I4  Length in bytes of the index record, excluding the first 50 bytes

  LOOP ===> number of data levels

  F6.  height of the first level
  I2  number of variables at that level

     LOOP ===> number of variables

     A4  variable identification
     I3  rotating checksum of the packed data
     1X  Reserved space for future use

  END LEVEL AND VARIABLE LOOPS
```

Data Grid Unpacking

NCEP typically saves their model output in GRIB format. However, at ARL the data are stored in a more compact form and can be directly used on a variety of computing platforms with direct access I/O.

The data array is packed and stored into one-byte characters. To preserve as much data precision as possible, the difference between adjacent grid point's values is saved and packed rather than the actual values. The grid is then reconstructed by adding the differences between grid values starting with the first value, which is stored in unpacked ASCII form in the header record at grid point (1,1). To illustrate the process, assume that a grid of real data, R, of dimensions i,j is given by the below example.

```
1,j     2,j     ....   i-1,j    i,j
1,j-1   2,j-1   ....   i-1,j-1  i,j-1
....    ....    ....   ....     ....
1,2     2,2     ....   i-1,2    i,2
1,1     2,1     ....   i-1,1    i,1
```

The packed value, P, is then given by

```
Pi,j = (Ri,j - Ri-1,j)* (2**(7-N)),
```

where the scaling exponent

$$N = \ln dRmax / \ln 2 .$$

The value of dRmax is the maximum difference between any two adjacent grid points for the entire array. It is computed from the differences along each i index holding j constant. The difference at index (1,j) is computed from index (1,j-1), and at 1,1 the difference is always zero. The packed values are one byte unsigned integers, where values from 0 to 126 represent -127 to -1, 127 represents zero, and values of 128 to 254 represent 1 to 127. Each record length is then equal in bytes to the number of array elements plus 50 bytes for the header label information. The 50 byte label field precedes each packed data field and contains the following ASCII data:

Field	Format	Description
Year	I2	Greenwich date for which data valid
Month	I2	"
Day	I2	"
Hour	I2	"
Forecast*	I2	Hours forecast, zero for analysis
Level	I2	Level from the surface up (see Table 3)
Grid	I2	Grid identification (see Table 1)
Variable	A4	Variable label (see Table 2)
Exponent	I4	Scaling exponent needed for unpacking
Precision	E14.7	Precision of unpacked data
Value 1,1	E14.7	Unpacked data value at grid point 1,1

*Forecast hour is -1 for missing data

Sample Program

In the sample FORTRAN program, the unpacking subroutine is used to read the first record after the index record. The value at grid point 1,1 from the header and the unpacked value are printed, along with the other header values. In the program the packed data array is in the variable QPACK and the unpacked real data array is returned in variable QVAR. NX and NY are the number of grid points in the horizontal and vertical directions, respectively. NXY is just the product of NX and NY. The variable NEXP and VAR1, are the packing exponent and value of the field at the 1,1 grid point. These values are obtained from the header label information.

```
**** This program will read ARL packed data, unpack the
**** first field and print out the I and J grid point,
**** the corresonding latitude and longitude, and the
**** data value at every other grid point.

**** To compile this program, the CMAP library is needed,
**** which can be obtained from:
**** http://www.arl.noaa.gov/ss/transport/cmapf.html

C*************************************
C    MAIN PROGRAM                    *
C*************************************

   PARAMETER (LX=299, LY=299, LXY=LY*LY)
   CHARACTER LABEL*50, MFILE*50, CPACK(LXY)*1
   REAL*4 CVAR(LX,LY)
```

```
   WRITE(6,*)'Enter the dataset filename within single quotes'
   READ(5,*)MFILE
 10 CALL SETGRD(MFILE,NXY,NX,NY)
   IF(NXY.GT.LXY)THEN
     WRITE(6,*)'Buffer dimension exceeding max',NXY,LXY
     STOP 777
   END IF
C
   CALL GETDAT(MFILE,LABEL,CPACK,CVAR,NX,NY,NXY)
C
   CLOSE(10)
 900 STOP
   END

C*****************************************************
C    DEFINE THE GRID BASED ON THE INDEX RECORD       *
C*****************************************************
   SUBROUTINE SETGRD(MFILE,NXY,NX,NY)

   LOGICAL FTEST
   REAL*4 GRIDS(12)
   CHARACTER MFILE*50, LABEL*50
   CHARACTER HEADER*3072,MDATA*10

   COMMON/LGRID1/GRID1(9)

C   open meteorological data file to determine grid type
   INQUIRE (FILE=MFILE,EXIST=FTEST)
   IF(.NOT.FTEST)THEN
     WRITE(6,*)'Data set chosen is not available',MFILE
     STOP
   END IF

   OPEN(10,FILE=MFILE,FORM='UNFORMATTED',RECL=158,ACCESS='DIRECT')
   READ(10,REC=1)LABEL,HEADER(1:108)
   CLOSE(10)
**** Extract the HEADER information
   READ(HEADER(1:108),'(A4,I3,I2,12F7.0,3I3,I2,I4)')MDATA,IC,JMN,
   :                 GRIDS,NX,NY,NL,KFLAG,LENH
**** Define the grid with CMAP routines
   CALL STLMBR(GRID1,GRIDS(7),GRIDS(4))
   CALL STCM1P(GRID1,GRIDS(8),GRIDS(9),GRIDS(10),GRIDS(11),
   :      GRIDS(3),GRIDS(4),GRIDS(5),GRIDS(6))
   LREC=NX*NY+50
   NXY=NX*NY

**** Read in all dataset information from the INDX record
   OPEN (10,FILE=MFILE,FORM='UNFORMATTED',RECL=LREC,ACCESS='DIRECT')
   READ(10,REC=1)LABEL, HEADER(1:LENH)
   CLOSE(10)

   RETURN

 300 WRITE(6,*)'SETGRD - Error reading meteo data'
   STOP
   END
```

```
C*****************************************************
C    READ PACKED ARCHIVE DATA AND PRINT LAT/LONS      *
C*****************************************************

   SUBROUTINE GETDAT(MFILE,LABEL,CPACK,CVAR,NX,NY,NXY)

   CHARACTER LABEL*50,CPACK(NXY)*1,MFILE*50,VARB*4
   REAL*4 CVAR(NX,NY)

   COMMON/LGRID1/GRID1(9)

   LREC=NXY+50
   OPEN(10,FILE=MFILE,FORM='UNFORMATTED',ACCESS='DIRECT',RECL=LREC)
   READ(10,ERR=990,REC=1)LABEL,CPACK
   READ(LABEL,50)IY,IM,ID,IH
  50 FORMAT(4I2)


**** Read the first data record and print out the lat/lon
**** for every other grid point

   IREC=2
   READ(10,ERR=990,REC=IREC,END=400)LABEL,CPACK
   READ(LABEL,300)IY,IM,ID,IH,IC,LL,KGRID,VARB,NEXP,PREC,VAR1
 300 FORMAT(7I2,A4,I4,2E14.7)

   WRITE(6,*)IY,IM,ID,IH,IC,VARB

**** Unpack the data
   CALL PAKINP(CVAR,CPACK,NX,NY,NXY,1,1,NX,NY,PREC,NEXP,VAR1,-1)
   DO J=1,NY,2
   DO I=1,NX,2
     XI=REAL(I)
     YJ=REAL(J)
     CALL CXY2LL(GRID1,XI,YJ,XLAT,YLON)
     WRITE(6,*)I,J,XLAT,YLON,CVAR(I,J)
   ENDDO
   ENDDO

 400 RETURN
 990 WRITE(6,*)'GETDAT - Error reading meteo data'
   STOP
   END

C****************************************
C    UNPACK A RECORD                     *
C****************************************

C$$$ SUBPROGRAM DOCUMENTATION BLOCK
C
C SUBPROGRAM: PAKINP      PAcK INPut converts char*1 to real
C  PRGMMR:  ROLAND DRAXLER  ORG: R/E/AR   DATE:96-06-01
C
C ABSTRACT: THIS CODE WRITTEN AT THE AIR RESOURCES LABORATORY ...
C  PACK INPUT DOES THE CONVERSION OF CHAR*1 PACKED ARRAY TO
C  A REAL*4 DATA ARRAY
C
```

```
C PROGRAM HISTORY LOG:
C  LAST REVISION: 14 Feb 1997 - RRD
C
C USAGE: CALL PAKINP(RVAR,CVAR,NX,NY,NXY,NX1,NY1,LX,LY,
C       PREC,NEXP,VAR1,KSUM)
C  INPUT ARGUMENT LIST:
C   CVAR   - char  packed char*1 input array of length NXY=NX*NY
C   NX1   - int   optional sub-grid left edge in NX units
C   NY1   - int   optional sub-grid lower edge in NY units
C   LX    - int   first dimension element length of sub-grid
C   LY    - int   second dimension element lenght of sub-grid
C   PREC   - real  precision of packed data array
C   NEXP   - int   packing scaling exponent
C   VAR1   - real  value of real array at position (1,1)
C  OUTPUT ARGUMENT LIST:
C   RVAR   - real  work array of dimensions LX,LY
C   KSUM   - int   rotating checksum of packed data array
C  INPUT FILES:
C   NONE
C  OUTPUT FILES:
C   NONE
C
C ATTRIBUTES:
C  LANGUAGE: FORTRAN 90
C  MACHINE: CRAY
C
C$$$

   SUBROUTINE PAKINP(RVAR,CVAR,NX,NY,NXY,NX1,NY1,LX,LY,
   :         PREC,NEXP,VAR1,KSUM)

   REAL    RVAR(LX,LY)
   CHARACTER CVAR(NXY)*1

C   scaling exponent
   SCALE=2.0**(7-NEXP)

C   unpack initial value for each row of column 1
   ROLD=VAR1
   DO J=1,NY
C    compute position in 1D packed array at column 1
     K=(J-1)*NX+1
C    new value from old value of previous row
     RNEW=((ICHAR(CVAR(K))-127.)/SCALE)+ROLD
     ROLD=RNEW
C    compute index in output sub-grid
     JJ=J-NY1+1
C    special case of sub-grid starting at left edge
     IF(JJ.GE.1.AND.JJ.LE.LY)RVAR(1,JJ)=RNEW
   END DO

C   only unpack within J-subgrid
   DO J=NY1,(NY1+LY-1)
C    sub-grid array element (1 to LY)
     JJ=J-NY1+1

     ROLD=RVAR(1,JJ)
```

```
C    unpack I from element 1 to I sub-grid max
     DO I=2,(NX1+LX-1)
      K=(J-1)*NX+I
      RNEW=((ICHAR(CVAR(K))-127.0)/SCALE)+ROLD
      ROLD=RNEW
C      sub-grid array element (1 to LX)
      II=I-NX1+1
C      check against precision for true zero
      IF(ABS(RNEW).LT.PREC)RNEW=0.0
      IF(II.GE.1.AND.II.LE.LX)RVAR(II,JJ)=RNEW
     END DO
   END DO

C   only do full-grid checksum when KSUM=0
   IF(KSUM.EQ.0)THEN
     DO K=1,NXY
      KSUM=KSUM+ICHAR(CVAR(K))
C      if sum carries over the eighth bit add one
      IF(KSUM.GE.256)KSUM=KSUM-255
     END DO
   END IF

   RETURN
   END
```

5. **Access Method and Sort for Supplied Data:**

See paragraph 4

6. **Element Names and Definitions:**

Table 2. Meteorological Fields contained in the EDAS Archive.

Field	Units	Label	Data Order
Pressure reduced to mean sea level	hPa	MSLP	S1
Temperature at surface	K	TMPS	S2
Accumulated precipitation (3 h accumulation)	m	TPP3	S3
Accumulated convective precipitation (3 h accumulation)	m	CPP3	S4
Volumetric soil moisture content	frac.	SOLW	S5
Temperature at 2m AGL	K	T02M	S6
Relative Humidity at 2m AGL	%	RH2M	S7
U-component of wind at 10 m AGL	m/s	U10M	S8
V-component of wind at 10 m AGL	m/s	V10M	S9
Pressure at surface	hPa	PRSS	S10
Categorial snow (yes=1, no=0)	-	CSNO	S11
Categorial rain (yes=1, no=0)	-	CRAI	S12
Latent heat net flux at surface	W/m2	LHTF	S13
Sensible heat net flux at surface	W/m2	SHTF	S14
Momentum flux, u-component at surface	N/m2	UMOF	S15
Momentum flux, v-component at surface	N/m2	VMOF	S16
Low cloud cover	%	LCLD	S17
Medium cloud cover	%	MCLD	S18
High cloud cover	%	HCLD	S19
Total cloud cover	%	TCLD	S20

Downward short wave radiation flux	W/m2	DSWF	S21
U-component of wind with respect to grid	m/s	UWND	U1
V-component of wind with respect to grid	m/s	VWND	U2
Geopotential height	gpm*	HGTS	U3
Temperature	K	TEMP	U4
Pressure vertical velocity	hPa/s	WWND	U5
Relative humidity	%	RELH	U6

* geopotential meters

Meteorological Fields and Vertical Structure

The archived data files contain only some of the fields normally produced by the model at NCEP. These were selected according to what is most relevant for transport and dispersion studies and disk space limitations. In Table 2, the fields are identified by a description, the units, and a unique four character identification label that is written to the header label (see Data Grid Unpacking Procedure in a later section) of each record. Data order in the file is given by a two digit code. The first digit indicates if it is a surface (or single) level variable (S) or an upper level variable (U). The second digit indicates the order in which that variable appears in the file. The upper level EDAS data are output on the following 22 pressure surfaces. Table 3 gives the level number corresponding to each data level, which is also written to each header label.

Table 3. Description of Vertical Levels

Level	Height
22	50 hPa
21	100 hPa
20	150 hPa
19	200 hPa
18	250 hPa
17	300 hPa
16	400 hPa
15	500 hPa
14	550 hPa
13	600 hPa
12	650 hPa
11	700 hPa
10	750 hPa
9	800 hPa
8	825 hPa
7	850 hPa
6	875 hPa
5	900 hPa
4	925 hPa
3	950 hPa
2	975 hPa
1	1000 hPa
0	surface

7. **Start Date:**

January 1, 1997

8. **Stop Date:**

current

9. **Coverage:**

a. Southernmost Latitude: 25N
b. Northernmost Latitude: 50N
c. Westernmost Longitude: 125W
d. Easternmost Longitude: 65W

10. **Location**

a. North America

11. **Keywords:**

a. Pressure
b. mean sea level
c. surface temperature
d. precipitation
e. soil moisture
f. Relative Humidity
g. U-component
h. V-component
i. snow
j. rain
k. Latent heat
l. Sensible heat
m. Momentum flux
n. Low cloud cover
o. Medium cloud cover
p. High cloud cover
q. Total cloud cover
u. radiation flux
v. U-component of wind
w. V-component of wind
x. Geopotential height
y. Pressure vertical velocity

12. **How to Order Data:**

Email: orders@ncdc.noaa.gov
Phone: 704-271-4800
Fax: 704-271-4876
ftp: ftp.ncdc.noaa.gov
www: http://www.ncdc.noaa.gov

13. **Archiving Data Center:**

Climate Services Branch
National Climatic Data Center
151 Patton Avenue
Asheville, NC 28801

14. **Technical Contact:**

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1315 East-West Highway
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15. **Known Uncorrected Problems:**

16. **Quality Statement:**

17. **Revision Date:**

March 17, 1999 – initial document

18. **Source Data Sets:**

ORIGIN OF THE DATA

The 3-hourly archive data come from NCEP's EDAS. The EDAS was implemented into the operational early Eta model runs during 1995. The EDAS is an intermittent assimilation system consisting of successive 3-h Eta model forecasts and Optimum Interpolation (OI) analyses for a pre-forecast period (12-h for the early Eta) on a 38 level, 48 km grid. A 6-h forecast from the GDAS is used to to start the assimilation at 12-h prior to model start time. The following is a schematic for the 12Z cycle

```
 6-h GDAS    | 3-h eta | 3-h eta | 3-h eta | 3-h eta | 48-h Eta
-----------> |-------->|-------->|-------->|-------->|-------------------.....-->
  Forecast   | fcst  | fcst  | fcst  | fcst  | forecast
            00Z     03Z     06Z     09Z     12Z
where;
   |
   | = Eta OI analysis
   |
```

The 3-h analysis updates allow for the use of high frequency observations, such as wind profiler, NEXRAD, and aircraft data. ARL saves the successive 3-hour analyses, twice each day to produce a continuous data archive. Some fields such as precipitation and surface fluxes are not available in the analysis files, therefore these are taken from the successive 3-hour forecast files. The 48 km data are interpolated to a 40 km, Lambert Conformal Grid, covering the continental United States.

ARL PROCESSING

The ARL archiving program extracts every other grid point of the 3 hourly, 40 km data to produce a 3 hourly, 80 km dataset on pressure surfaces. In addition, 14 gridpoints on the western end of the model domain and 10 gridpoints on the northern end of the domain are removed to reduce the size of the semi-monthly files (currently at about 84 Mbytes). The data are put into semi-monthly files and saved to tape for shipment to NCDC. About 6 months of EDAS data are also put online at ARL's web site http://www.arl.noaa.gov/ss/transport/archives.html for easy access via ftp.

19. **Essential Companion Data Sets:**

20. **Derived Data Sets:**

21. **References:**

Kanamitsu, M., 1989: Description of the NMC Global Data Assimilation and Forecast System, Weather and Forecasting, 4 (335-342).

Petersen, R.A. and J.D. Stackpole, 1989: Overview of the NMC Production Suite, Weather and Forecasting, 4 (313-322).

Sela, J.G., 1980: Spectral modeling at the National Meteorological Center, Mon. Wea. Rev., 108 (1279-1292).

22. **Summary:**

The National Weather Service's National Centers for Environmental Prediction (NCEP) runs a series of computer analyses and forecasts operationally (Petersen and Stackpole, 1989). One of the operational systems is the Global Data Assimilation System (GDAS, Kanamitsu, 1989), which uses the spectral Medium Range Forecast model (MRF) for the forecast (Sela, 1980). Another system is the EDAS (Eta Data Assimilation System), covering the U.S.

At NOAA's Air Resources Laboratory (ARL), NCEP model output are used for air quality transport and dispersion modeling. ARL archives both EDAS and GDAS data using a 1-byte packing method. Both archives contain basic fields such as the u- and v-wind components, temperature, and humidity. However, the archives differ from each other because of the horizontal and vertical resolution, as well as in the specific fields, provided by NCEP.