

NCEP Observation Data Processing Procedure and Products

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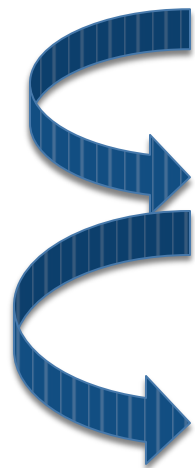
**Developmental Testbed Center

NCEP observation data processing and dataflow

Observation processing and dataflow at NCEP

- Managed jointly by NCEP Central Operations (NCO) and EMC
- Relies on NCEP BUFRLIB software
- Three stages:

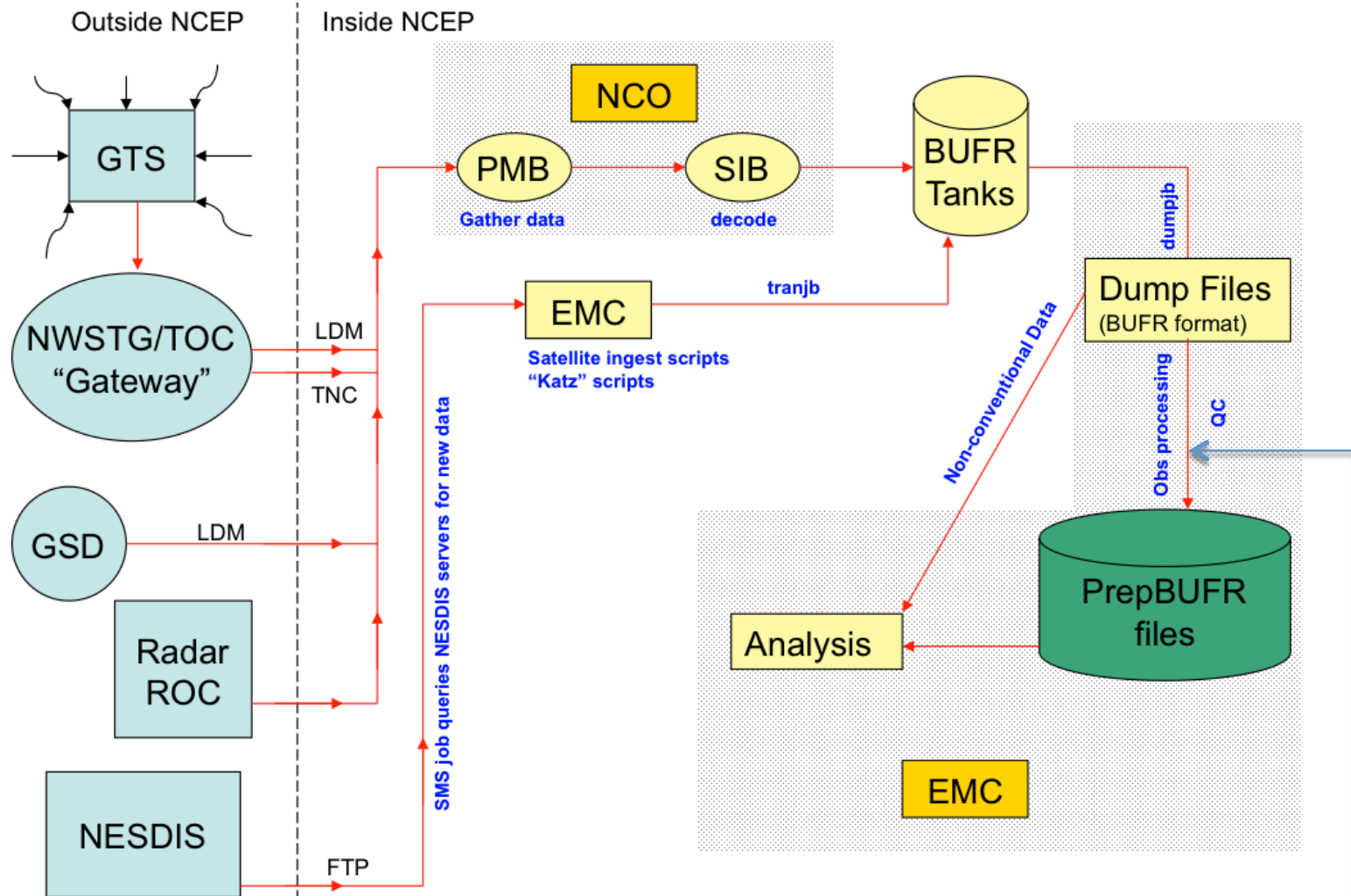
Tank files (large BUFR files holding 24h of data)



Dump files (duplicate-checked data from tanks, contain 1, 3, 6h blocks of data)

PrepBUFR files (QC'd obs from dump files)

Data processing system at NCEP



Dennis Keyser's website on PREPBUFR PROCESSING AT NCEP:
http://www.emc.ncep.noaa.gov/mmb/data_processing/prepbufr.doc/document.htm

** Diagram originally developed by Shelley Melchior **



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BUFR/PrepBUFR types and data servers

Operation BUFR/PrepBUFR files

- File name convention

- gdas1.t00z.prepbufr.nr
- gfs.t00z.gpsro.tm00.bufr_d
- ndas.t18z.lbamub.tm03.bufr_d
- nam.t00z.aircar.tm00.bufr_d.nr

- Data coverage and cut off time

- GDAS (Global Data Assimilation System):
Covers global, latest 6 hours data
- GFS (Global Forecast System):
Covers global, 2:45 hours data
- NDAS (NAM Data Assimilation System):
Covers North America, longer cut off time than NAM
- NAM (North American Model):
Covers North America, shorter cut off time comparing to others

1st section: operation system

2st section: analysis time

3st section: data type

4st, 5st sections:

nr: non-restricted data

bufr_d: bufr format

tm*: indicate the catch up
cycle analysis time,

=0 analysis time = 2st section

>0 analysis time = 2st section - 4st section

For example:

ndas.t18z.lbamub.tm03.bufr_d
has analysis time=18z-03z=15z

Operation BUFR/PrepBUFR files

- NCEP BUFR/PrepBUFR files are available for community users
 - NCEP NOMADS Site:
 - BUFR/PrepBufr for GDAS (Global) - 1 month buffer:
<http://nomads.ncep.noaa.gov/pub/data/nccf/com/gfs/prod/>
 - BUFR/PrepBufr for NDAS (North America) - 1 month buffer:
<http://nomads.ncep.noaa.gov/pub/data/nccf/com/nam/prod/>
 - NCDC NOMADS Site:
 - BUFR/PrepBufr for GDAS (Global) - archive starting May 2007:
<http://nomads.ncdc.noaa.gov/data/gdas/>
 - NCAR/CISL Research Data Archive (RDA) Site:
 - DS337.0**: NCEP ADP Global Upper Air and Surface Observations (PrepBUFR and NetCDF PB2NC Output) - archive starting May 1997:
<http://dss.ucar.edu/datasets/ds337.0/>



PrepBUFR content inventory

Application tools: PrepBUFR Inventory

- Purpose: DTC provides a decoding tool to inventory inventory data types with coverage information included in a *prepbufr* file
- The application tool is available on line:

<http://www.dtcenter.org/com-GSI/BUFR/examples/download/convention/index.php>

prepbufr_inventory.f90

- Compile, link, and run

```
$ifort -c prepbufr_inventory.f90
$ifort -o prepbufr_inventory.exe prepbufr_inventory.o -L../lib -lbufr_i4r8
$prepbufr_inventory.exe
(read data from file "prepbufr" in the same directory)
```

Example: PrepBUFR inventory Result

```

number of data type =          40
data      obs data      obs message      Lon      Lon      Lat      Lat      Time      Time
type      number type      number      type      min      max      min      max      min      max
120         1 220         1  ADPUPA      245.60  245.60  32.85  32.85  -1.00  -1.00
123         0 223         22  PROF LR     215.32  272.95  30.09  65.50   0.00   0.00
126        30 226         0  RASSDA     236.93  283.12  29.39  48.28  -0.50   0.00
130       820 230        809  AIRCFT       0.00  350.00 -19.85  64.47  -1.00   0.40
131     1811 231     1805  AIRCFT       0.00  359.98 -19.98  66.70  -1.00   0.35
  
```

More details on **data type** can be found in the following tables (2,3,4,5):

http://www.emc.ncep.noaa.gov/mmb/data_processing/prepbufr.doc/table_2.htm

MASS REPORTS			
Report Type	PREPBUFR Message Type	Description	Note
111	SYNDAT	SYNTHETIC (BOGUS) TROPICAL CYCLONE STORM CENTER (generated in SYNDAT_SYNDATA) - q, Pstn	Not created (switch not set in SYNDAT_SYNDATA parm cards)
112	n/a	PSEUDO MEAN SEA-LEVEL PRESSURE AT TROPICAL CYCLONE STORM CENTER (generated in GSI, does not appear in pre-analysis PREPBUFR files) - Pstn	Pstn used by assimilation When implemented, may appear in post-analysis PREPBUFR file
120	ADPUPA	RAWINSONDE - Tv, q, Pstn, sst	Tv, q, Pstn used by assimilation sst monitored by assimilation by switch in convinfo text file read by GBL-GSI
122	ADPUPA	CLASS SOUNDING - Tv, q, Pstn	Entire report tossed by switch in PREPOBS_PREPDATA parm cards
126	RASSDA	RASS [FROM NOAA PROFILER NETWORK (NPN) OR MULTI-AGENCY PROFILER (MAP) NETWORK] - Tv	Tv flagged for non-use by assimilation due to missing obs error Tv monitored by assimilation by switch in convinfo text file read by GBL-GSI
130	AIRCFT	AIREP AND PIREP AIRCRAFT - Ts	Ts used by assimilation
131	AIRCFT	ASDAR AIRCRAFT - Ts	Ts used by assimilation

Example: PrepBUFR inventory

```

number of data type =          40
data      obs data      obs message      Lon      Lon      Lat      Lat      Time      Time
type      number type      number      type      min      max      min      max      min      max
120         1   220         1   ADPUPA      245.60    245.60    32.85    32.85    -1.00    -1.00
123         0   223         22   PROFLR      215.32    272.95    30.09    65.50     0.00     0.00
124         0   224        276   VADWND      194.71    293.92    18.12    65.04    -0.93    -0.17
126        30   226         0   RASSDA      236.93    283.12    29.39    48.28    -0.50     0.00
127         0   227         68   PROFLR      225.44    292.92    17.98    58.36    -0.50     0.25
130       820   230        809   AIRCFT         0.00    350.00   -19.85    64.47    -1.00     0.40
131     1811   231       1805   AIRCFT         0.00    359.98   -19.98    66.70    -1.00     0.35
133    10424   233     10398   AIRCAR         0.01    359.98    -5.04    80.00    -1.00     0.37
134         36   234         23   AIRCFT      199.49    267.20    47.34    56.13    -0.30     0.12
135        343   235        343   AIRCFT      236.70    305.70    45.07    61.62    -1.00     0.33
142         0   242       3804   SATWND      138.50    182.00    23.50    56.50    -2.47    -0.47
145         0   245       8189   SATWND      169.47    339.65    -7.78    60.32    -2.25    -2.00
146         0   246       3810   SATWND      169.84    336.21    -6.50    61.18    -2.25    -2.00
147         0   247       2588   SATWND      169.54    338.42    -7.99    61.08    -2.25    -1.63
150         0   250       2131   SATWND      133.60    189.27    17.59    57.19    -2.47    -0.47
151    126698   251       3364   GOESND      180.00    290.98    -7.85    50.60    -2.00    -0.60
152         0   252      1469   SATWND      134.65    189.28    17.92    57.19    -2.47    -0.47
153        269   253         0   GPSIPW      197.29    307.32    19.54    71.32    -0.75    -0.75
156     40729   256         0   GOESND      233.38    290.59    11.61    49.81    -1.00    -0.29
158     32234   258         0   GOESND      194.74    291.13    11.61    48.15    -1.00    -0.26
164     40729   264         0   GOESND      233.38    290.59    11.61    49.81    -1.00    -0.29
174     32234   274         0   GOESND      194.74    291.13    11.61    48.15    -1.00    -0.26
180        395   280        280   SFCSHP         1.00    359.40     7.50    89.12    -0.50     0.17
181        785   281       777   ADPSFC         0.00    359.92    40.45    80.08    -0.17     0.00
182         0   282         5   SFCSHP         6.80    290.90    14.90    55.90    -0.17     0.00
183        255   283         0   SFCSHP      219.85    357.93    41.39    78.79    -0.50     0.00
184         0   284        248   SFCSHP      219.85    357.93    41.39    78.79    -0.50     0.00
187     4432   287      4397   ADPSFC         0.00    359.83     2.83    78.25    -0.50     0.37
188     47325   288     44572   MSONET         0.00    359.97     8.30    70.40    -0.50     0.08
  
```

Questions?

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