ANALYSIS & FORECAST DATA FROM NCEP

Zoltan Toth

NCEP

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OUTLINE

- Real time analysis / forecast products

- Archived high resolution
  - Analysis
  - Forecast

- Generation & archival of high resolution tendencies

REAL TIME DATA ACCESS

- Global Forecast System (GFS)
  - T382L64 out to 7.5 days, T190L64 out to 16 days
  - 4 times per day
  - 0.5x0.5 degree lat/lon grid on pressure levels
  - Data access: http://nomads.ncep.noaa.gov/

- Global Ensemble Forecast System (GEFS)
  - T126L28 out to 16 days (T190L28 from Oct 2009)
  - 20 members 4 times per day
  - 1x1 degree grid
  - Info, images, etc: www.emc.ncep.noaa.gov/gmb/ens
  - Data access: http://nomads.ncep.noaa.gov

- North American Ensemble Forecast System (NAEFS)
  - GEFS plus Canadian ensemble
  - 1x1 degree grid
  - 40 members twice a day

Real time data access

http://nomads.ncep.noaa.gov/

* Keeps the last month of data online

Spatial / temporal subsetting options   Allows selecting particular fields

NCDC archives 0.5 degree resolution data of GFS (analysis and forecast)

http://nomads.ncdc.noaa.gov/data.php#hires_weather_datasets

NCEP High Resolution Global Forecast System (1 degree GFS), North American Mesoscale (12km NAM), and Rapid Update Cycle (20km RUC)

The table below lists the weather model datasets we have on-line or archived at NCDC. Each entry in the table below provides you links to access methods for that dataset. See the Section Above for descriptions of these access methods. Note: These data may be delayed up to one day. For real-time access go to the NCEP R/T NOMADS.

Hi-Res NCEP NWP Model Datasets in NCDC Repository

Model	Grid/scale	Runs/day	Fcst Proj	Plot | Ftp	Http	Data Server
High Resolution Analysis and Forecasts						
Historical						
Meso-ETA	218 Domain	4/day	0-60 hrs.	plot | ftp4u	---	---
GFS-AVN	003 Domain	4/day	0-240 hrs.	plot | ftp4u	---	---
Near Real-Time and Historical						
NAM (WRF-NMM)	218 Domain	4/day	0-60 hrs.	plot | ftp4u	http	gds tds
GFS	003 Domain	4/day	0-180 hrs.	plot | ftp4u	http	gds tds
GFS	004 Domain	4/day	0-180 hrs.	plot | ftp4u	http	tds
RUC	252 Domain	hourly	0-3,6,9,12 hrs.	plot | ftp4u	http	gds tds
RUC	130 Domain	hourly	0-3,6,9,12 hrs.	plot | ftp4u	http	tds
Analysis-Only, Period of Record (March 02, 2004 to latest full month)						
GFS-ANL	003 Domain	4/day	0,(3-6 pcp.)	plot | ftp4u	http	gds
NAM-ANL	218 Domain	4/day	0,(3,6 pcp.)	plot | ftp4u	http	gds

NAM (WRF-NMM) * North American Mesoscale model, As of 2006-Jun-20
(Weather Research & Forecasting - Nonhydrostatic Mesoscale Model)
Legacy versions and dates: ETA, Meso-ETA (Pre 2005-Feb-15), NAM (2005-Feb-15).
The analysis from all these are unified under NAM-ANL.

- Grid 004 for half-degree resolution
- Forecast lead time resolution: 3hrs
- Files are 48Mb per lead time.

File content

3D Variables	Levels (in mb)
HGT, TMP, RH, VVEL UGRD, VGRD, ABSV, CLWMR	10,20,30,50,70,100,150,200,250,300,350,400, 450,500,550,600,650,700,750,800,850,900, 925, 950, 975, 1000

2D Variables	
PRES:surface:anl:	CWAT:entire atmosphere (considered as a single layer):anl:
HGT:surface:anl:	RH:entire atmosphere (considered as a single layer):anl:
TMP:surface:anl:	TOZNE:entire atmosphere (considered as a single layer):anl:
TMP:0-0.1 m below ground:anl:	TCDC:convective cloud layer:anl:
SOILW:0-0.1 m below ground:anl:	PRES:tropopause:anl:
TMP:0.1-0.4 m below ground:anl:	HGT:tropopause:anl:
SOILW:0.1-0.4 m below ground:anl:	TMP:tropopause:anl:
TMP:0.4-1 m below ground:anl:	UGRD:tropopause:anl:
SOILW:0.4-1 m below ground:anl:	VGRD:tropopause:anl:
TMP:1-2 m below ground:anl:	VWSH:tropopause:anl:
SOILW:1-2 m below ground:anl:	PRES:max wind:anl:
WEASD:surface:anl:	HGT:max wind:anl:
TMP:2 m above ground:anl:	UGRD:max wind:anl:
SPFH:2 m above ground:anl:	VGRD:max wind:anl:
RH:2 m above ground:anl:	TMP:max wind:anl:
UGRD:10 m above ground:anl:	TMP:1829 m above mean sea level:anl:
VGRD:10 m above ground:anl:	UGRD:1829 m above mean sea level:anl:
WILT:surface:anl:	VGRD:1829 m above mean sea level:anl:
LFTX:surface:anl:	TMP:2743 m above mean sea level:anl:
CAPE:surface:anl:	
CIN:surface:anl:	
PWAT:entire atmosphere (considered as a single layer):anl:	

2D Fields (Continuation)

UGRD:2743 m above mean sea level:anl:
VGRD:2743 m above mean sea level:anl:
TMP:3658 m above mean sea level:anl:
UGRD:3658 m above mean sea level:anl:
VGRD:3658 m above mean sea level:anl:
HGT:0C isotherm:anl:
RH:0C isotherm:anl:
HGT:highest tropospheric freezing level:anl:
RH:highest tropospheric freezing level:anl:
TMP:30-0 mb above ground:anl: 2
RH:30-0 mb above ground:anl:
SPFH:30-0 mb above ground:anl:
UGRD:30-0 mb above ground:anl:
VGRD:30-0 mb above ground:anl:
4LFTX:surface:anl:
CAPE:180-0 mb above ground:anl:
CIN:180-0 mb above ground:anl:
HPBL:surface:anl:
RH:0.33-1 sigma layer:anl:
RH:0.44-1 sigma layer:anl:
RH:0.72-0.94 sigma layer:anl:
RH:0.44-0.72 sigma layer:anl:
TMP:0.995 sigma level:anl:

POT:0.995 sigma level:anl:
RH:0.995 sigma level:anl:
UGRD:0.995 sigma level:anl:
VGRD:0.995 sigma level:anl:
VVEL:0.995 sigma level:anl:
LAND:surface:anl:
ICEC:surface:anl:
UGRD:PV=2e-06 (Km^2/kg/s) surface:anl:
VGRD:PV=2e-06 (Km^2/kg/s) surface:anl:
PV=2e-06 (Km^2/kg/s) surface:anl:
HGT:PV=2e-06 (Km^2/kg/s) surface:anl:
PV=2e-06 (Km^2/kg/s) surface:anl:
VWSH:PV=2e-06 (Km^2/kg/s) surface:anl:
UGRD:PV=-2e-06 (Km^2/kg/s) surface:anl:
VGRD:PV=-2e-06 (Km^2/kg/s) surface:anl:
TMP:PV=-2e-06 (Km^2/kg/s) surface:anl:
HGT:PV=-2e-06 (Km^2/kg/s) surface:anl:
PRES:PV=-2e-06 (Km^2/kg/s) surface:anl:
VWSH:PV=-2e-06 (Km^2/kg/s) surface:anl:
PRMSL:mean sea level:anl:
5WAVH:500 mb:anl:
GPA:1000 mb:anl:
GPA:500 mb:anl:
5WAVA:500 mb:anl:

GFS time tendency and diagnostic variables

- Variables will be retrospectively generated for YOTC period

  - May 08 – Oct 09?

- The timing of data generation will be subject to arrangements with NCDC regarding disk space to archive the data

- Given that the dynamical time tendency variables are missing in the model, we need to decide on two options:

  - Generate the variables that are currently in the model (see list of variables below)

    - This could occur hopefully later this year

  - Wait until the dynamical tendency variables are coded & implemented in the model

    - This may happen in 2010

Variables currently in the model

Variables that need to be coded

Time tendency from shortwave	ozone tendency
Time tendency from longwave	ozone production from temperature term
Time tendency from vertical diffusion	zonal acceleration from vertical diffusion
Time tendency from deep convection x	zonal acceleration from gravity wave drag
Time tendency from shallow convection	zonal acceleration from convective momentum mixing
Time tendency from grid scale	meridional acceleration from vertical diffusion
moistening rate from vertical diffusion	meridional acceleration from gravity wave drag
moistening rate from deep convection	meridional acceleration from convective momentum mixing
moistening rate from shallow convection	
moistening rate from grid scale	Nonconvective cloud fraction
ozone vertical diffusion	Mass flux
	Upward and downward drafts
ozone production	Entrainment

U, V time tendencies

BACKGROUND

NCEP Data

Overview: The NCEP analysis and forecasts products are provided from the global and global ensemble forecast systems.

• **Real-time global forecast systems**

• The GFS is a global spectral numerical model based on the primitive dynamical equations that includes a suite of parameterizations for atmospheric physics. The model has been under constant development and evaluation The current resolution is T382L64 out to 7 days and T190L64 for leads beyond 7 days out to 16 days. T382 is approximately 34 km in horizontal resolution. Products are issued 4 times daily.

• GEFS generates 20-member ensemble forecasts out to 16 days every 6hr. The forecast model is a low resolution version (T126L28) of the current GFS. Ensemble initial perturbations are obtained using the Ensemble Transform method. The system upgrades at least once a year to allow the latest developments on both modeling improvements and ensemble methods. A new version is planed to be implemented by September 2009 with higher horizontal resolution (T190L28) and stochastic perturbation.

• NAEFS combines NCEP and CMC (and eventually FNMOC) ensemble forecasts to produce 40-member ensemble forecasts out to 16 days every 6hrs