Contents of NARR output AWIPS GRIB files

Sea Level
  a) analysis and first guess
  Mean sea level pressure (ETA model) [Pa]
  Pressure reduced to MSL [Pa]

Surface
  a) analysis and first guess
  * Downward shortwave radiation flux [W/m^2]
  * Downward longwave radiation flux [W/m^2]
  * Upward short wave radiation flux [W/m^2]
  * Upward long wave radiation flux [W/m^2]
  * Plant canopy surface water [kg/m^2]
  * Accum. snow [kg/m^2]
  * Snow cover [%]
  * Snow depth [m]
  * Surface friction velocity [m/s]
  * Surface drag coefficient [non-dim]
  * Zonal momentum flux [N/m^2]
  * Meridional momentum flux [N/m^2]
  * Sensible heat flux [W/m^2]
  * Latent heat flux [W/m^2]
  * Exchange coefficient [(kg/m^3)(m/s)]
  * Vegetation [%]
  * Ground Heat Flux [W/m^2]
  * Canopy conductance [m/s]
  * Temperature parameter in canopy conductance [fraction]
  * Solar parameter in canopy conductance [fraction]
  * Soil moisture parameter in canopy conductance [fraction]
  * Humidity parameter in canopy conductance [fraction]
  * Albedo [%]
  * Visibility [m]
  * Planetary boundary layer height [m]
  * Pressure [Pa]
  * Pressure (nearest grid point) [Pa]
  * Temp. [K]
  * Potential temp. [K]
  * Precipitation rate [kg/m^2/s]
  * Categorical snow [yes=1;no=0]
  * Categorical ice pellets [yes=1;no=0]
  * Categorical freezing rain [yes=1;no=0]
  * Categorical rain [yes=1;no=0]

b) first guess only
  ave * Latent heat flux [W/m^2]
  ave * Sensible heat flux [W/m^2]
  ave * Ground Heat Flux [W/m^2]
  ave * Snow phase-change heat flux [W/m^2]
  accum * Evaporation [kg/m^2]
  accum * Potential evaporation [kg/m^2]
  ave * Downward shortwave radiation flux [W/m^2]
ave * Downward longwave radiation flux [W/m²]
ave * Upward short wave radiation flux [W/m²]
ave * Upward long wave radiation flux [W/m²]
accum Total precipitation [kg/m²]
accum * Total precipitation (nearest grid point) [kg/m²]
accum Convective precipitation [kg/m²]
accum * Snow melt [kg/m²]
accum * Surface runoff (non-infiltrating) [kg/m²]
accum * Subsurface runoff (baseflow) [kg/m²]

Pressure levels (1000, 975, 950, 925, 900, 875, 850, 825, 800, 775, 750, 725, 700, 650, 600, 550, 500, 450, 400, 350, 300, 275, 250, 225, 200, 175, 150, 125, 100)

a) analysis and first guess
   Geopotential height [gpm]
   Temp. [K]
   Specific humidity [kg/kg]
   Pressure vertical velocity [Pa/s]
   u wind [m/s]
   v wind [m/s]
   Cloud water [kg/kg]
   Ice mixing ratio [kg/kg]
   Turbulent Kinetic Energy [J/kg] (up to 600 mb)

Height above ground
a) analysis and first guess
   * Temp. [K] (2m,10m,30m)
   * Potential temp. [K] (10m,30m)
   * Specific humidity [kg/kg] (2m,10m,30m)
   * Dew point temp. [K] (2m)
   * Relative humidity [%] (2m)
   * Pressure [Pa] (2m,10m,30m)
   * u wind [m/s] (10m,30m)
   * v wind [m/s] (10m,30m)

Hybrid level
a) analysis and first guess
   * Pressure [Pa]
   * Geopotential height [gpm]
   * Temp. [K]
   * Potential temp. [K]
   * Relative humidity [%]
   * Specific humidity [kg/kg]
   * Horizontal moisture divergence [kg/kg/s]
   * u wind [m/s]
   * v wind [m/s]
   * Pressure vertical velocity [Pa/s]
   * Turbulent Kinetic Energy [J/kg]
   Blackdars mixing length scale [m]
   Richardson number [non-dim]
Below surface
a) analysis and first guess
* Soil temp. [K] (0-10, 10-40, 40-100, 100-200 cm)
* Volumetric soil moisture (frozen + liquid) [fraction] (0-10, 10-40, 40-100, 100-200 cm)
* Liquid volumetric soil moisture (non-frozen) [fraction] (0-10, 10-40, 40-100, 100-200 cm)
* Moisture availability [%] (0-100 cm )
* Soil moisture content [kg/m²] (0-200 cm )

PBL 30mb averages (30-0 mb, 60-30 mb, 90-60 mb, 120-90 mb, 150-120 mb, 180-150 mb)
a) analysis and first guess
* Temp. [K]
* Specific humidity [kg/kg]
* Horizontal moisture divergence [kg/kg/s]
* u wind [m/s]
* v wind [m/s]
* Pressure vertical velocity [Pa/s]

Maximum wind level
a) analysis and first guess
Pressure [Pa]
Geopotential height [gpm]
u wind [m/s]
v wind [m/s]

Tropopause
a) analysis and first guess
Pressure [Pa]
Geopotential height [gpm]
Temp. [K]
u wind [m/s]
v wind [m/s]
Vertical speed shear [1/s]

Atmospheric column
a) analysis and first guess
Precipitable water [kg/m²]
b) first guess only

Cloud related
a) analysis and first guess
Low level cloud cover [%]
Mid level cloud cover [%]
High level cloud cover [%]
Total cloud cover [%]
* Pressure [Pa] (cloud top, cloud base)
* Geopotential height [gpm] (cloud top, cloud base)
* Temp. [K] (cloud top)

b) first guess only
ave Total cloud cover [%]
ave Non-convective cloud [%]
ave Convective cloud cover [%]

Misc
a) analysis and first guess
   Storm relative helicity [m^2/s^2] 3000-0 m above gnd
   u-component of storm motion [m/s] 6000-0 m above gnd
   v-component of storm motion [m/s] 6000-0 m above gnd
   Geopotential height [gpm] 0C isotherm
   Relative humidity [%] 0C isotherm
   Best (4-layer) lifted index [K] 180-0 mb above gnd
   Convective available potential energy [J/kg] 180-0 mb above gnd
   Convective inhibition [J/kg] 180-0 mb above gnd
   Pressure [Pa] cond level
   Surface lifted index [K]
   Convective available potential energy [J/kg]
   Convective inhibition [J/kg]
   Horizontal moisture divergence [kg/kg/s] 850 mb
b) first guess only
ave Upward short wave radiation flux [W/m^2] TOA
ave Upward long wave radiation flux [W/m^2] TOA

*) asterisk indicates field interpolated using nearest neighbor

averages 13 variables
accumulates 24 variables
nearest n. 92 variables

number of variables in first guess file 433
number of variables in analysis file 396 (433-13-24)
Contents of NARR output AWIPS GRIB fixed fields file

Geopotential height [gpm]
* Surface roughness [m]
* Vegetation type [Index]
* Soil type [Index]
* Surface slope type [Index]
Land cover (land=1;sea=0) [fraction]
* Land cover (land=1;sea=0) [fraction]
Latitude (-90 to +90) [deg]
* Latitude (-90 to +90) [deg]
East longitude (0-360) [deg]
* East longitude (0-360) [deg]
* Soil temp. [K] (300 cm down)
* Maximum snow albedo [%]
* Direct evaporation cease (soil moisture) [fraction]
* Soil porosity [fraction]
* Minimal stomatal resistance [s/m]
* Number of soil layers in root zone [non-dim]
* Wilting point [fraction]
* Transpiration stress-onset (soil moisture) [fraction]
* Geopotential Height (nearest grid point) [gpm]
* Snow-free albedo [%]
Estimate of the volume of various NARR output files

1. EDAS

**AWIPS Grid 221**  \(\text{E-GRID}\)

a) analysis files

- 52 Mb single file
- 420 Mb daily (8 times per day, every 3 hr)
- 12.6 Gb monthly
- 151 Gb yearly
- 3.7 Tb entire RR period (25 years)

b) 3-hour first-guess forecast files

- 58 Mb single file
- 464 Mb daily (8 times per day, every 3 hr)
- 14 Gb monthly
- 168 Gb yearly
- 4.1 Tb entire RR period (25 years)

**Restart file**

- 265 Mb single file \((277756860 \text{ bytes exactly})\)
- 4.1 Gb daily (16 files per day; 8 analysis and 8 first-guess files, every 3 hr)
- 130 Gb monthly
- 1.5 Tb yearly
- 37 Tb entire RR period (25 years)

2. Free forecast

**AWIPS Grid 221**  \(\text{E-GRID}\)

(same as first-guess files, saved every 2.5 days up to 72 hr every 3 hr.)

- 25 file * 58 Mb = 1.4 Gb per run
- 205 Gb yearly \((365/2.5=146 \text{ free forecasts per year})\)
- 5 Tb entire RR period (25 years)

- Terminology used for NARR output files

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**MOLTS (1438 station location)**

**EDAS**
- 2.5 Mb single file
- 20 Mb daily (8 times per day, every 3 hr)
- 620 Mb monthly
- 7.3 Gb yearly
- 180 Gb entire RR period (25 years)

**Free forecast**
- 30 Mb per run
- 4.3 Gb yearly (365/2.5=146 free forecasts per year)
- 106 Gb entire RR period (25 years)