GFS-Single Column Model Forcing Data for VOCALS-Rex

Hua-Lu Pan/C. Roberto Mechoso
NCEP/EMC
5200 Auth Rd, rm207
Camp Springs, MD, 20746
Phone: 301-763-8000 ext 7234
Email: hualu.pan@noaa.gov

1. DATA SET OVERVIEW:

This data set contains forcing data for NCEP GFS Single Column Model (GFS-SCM) at 25 points in the VOCALS region from Oct 1st to Nov 30th 2008. The forcing data were extracted from GFS outputs twice a day at 00 UTC and 12 UTC and stored in individual files. The locations of the 25 points are listed below. Each file in the data set has forcing data of a particular time at all 25 points. For example, vocalsgfs.2008100100 has the forcing data of all 25 points at 00hr Oct 1st, 2008. Therefore, there are totally 122 (61 days * 2 times a day) files in the data set. The data set was used by GFS-SCM to provide VOCALS-Rex with real time forecasts.

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90041 20.00S  95.00W    VOCALS01
90042 20.00S  92.50W    VOCALS02
90043 20.00S  90.00W    VOCALS03
90044 20.00S  87.25W    VOCALS04
90045 20.00S  85.00W    VOCALS05
90046 20.00S  82.50W    VOCALS06
90047 20.00S  80.00W    VOCALS07
90048 20.00S  77.25W    VOCALS08
90049 20.00S  75.00W    VOCALS09
90050 20.00S  72.50W    VOCALS10
90051 20.00S  70.00W    VOCALS11
90052 20.00S  67.25W    VOCALS12
90053 20.00S  65.00W    VOCALS13
90054 20.00S  62.50W    VOCALS14
90055 10.00S  85.00W    VOCALS15
90056 12.00S  85.00W    VOCALS16
90057 14.00S  85.00W    VOCALS17
90058 16.00S  85.00W    VOCALS18
90059 18.00S  85.00W    VOCALS19
90060 22.00S  85.00W    VOCALS20
90061 24.00S  85.00W    VOCALS21
90062 26.00S  85.00W    VOCALS22
90063 28.00S  85.00W    VOCALS23
90064 30.00S  85.00W    VOCALS24
90064 23.50S  70.00W    VOCALS25
```

2. DATA FORMAT:

The data files in the data set are tarred into one file, NCEP_GFS_Single_Column_Model_Forcing_Data_for_VOCALS_Rex.tar. Data files are in binary format. The following is an example pseudocode showing how the forcing data can be read from each binary file.

record 1 ... 12 integers
hour (e.g.00)
month (e.g.11)
day (e.g.7)
year (e.g.2000)
nsfc # of surface variables (e.g. 50)
nflx # of flux variables (e.g.29)
nvar # of variables for each sounding (e.g.11)
levs # of vertical levels for each sounding (e.g.64)
npoint # of station points (e.g.25)
starting forecast hour (e.g.0)
ending forecast hour (e.g.48)
forecast output step (e.g.3)
record 2 ... vertical sounding levels (real*4)
sigi(levs+1), sigl(levs), ak5(lev+1), bk5(lev+1)
where sigi denotes the interface and sigl the model levels
All vertical level variables start from the near surface level
the following are looped over # of station points and forecast time
record 3 ... surface variables (real*4)
latitude of station (degree)
longitude of station (degree)
zsfc (model surface height for the station) (m)
psfc (model surface pressure for the station) (mPa)
dpsdt (surface pressure tendency) (Pa/sec)
tsfc (model surface temperature) (K)
soilm1 (first soil layer volumetric water content) ()
soilm2 (second soil layer volumetric water content) ()
snow (water equivalent snow depth) (m)
soilt1 (first soil layer temperature) (K)
soilt2 (second soil layer temperature) (K)
soilt3 (third soil layer temperature, fixed for time) (K)
z0 (model surface roughness length) (cm)
cv (model convective cloud fraction) ()
cvb (model convective cloud base pressure) (?)
cvt (model convective cloud top pressure) (?)
albedo1 (one of four albedo used in the model) ()
albedo2 (one of four albedo used in the model) ()
albedo3 (one of four albedo used in the model) ()
albedo4 (one of four albedo used in the model) ()
slimsk (sea(0) land(1) and ice(2) flag)
vegfrac (model vegetation fraction) ()
f10m (model 10-meter to sigma level1 similarity profile ratio) ()
canopy (canopy water content) (m)
vegtype (vegetation type 1-13) ()
soiltype (soil type 1-9) ()
vegfrac1 (vegfrac type 1 used in radiation)
vegfrac2 (vegfrac type 2 used in radiation)
N.B. record 4 should be skipped if the number nflx in the header record is zero
as this would be the case for GDAS files.
record 4 ... flux type variables (real*4)
lsmask (land(0) sea(1) mask)
ustress (stress in zonal direction) (N/m**2)
vstress (stress in meridional direction) (N/m**2)
shf (sensible heat flux) (W/m**2)
lhf (latent heat flux) (W/m**2)
dlws (downward long wave flux at surface) (W/M**2)
ulws (upward long wave flux at surface) (W/M**2)

ulwt (upward long wave flux at toa) (W/M**2)
uswt (upward short wave flux at toa) (W/M**2)
usws (upward short wave flux at surface) (W/M**2)
dsws (downward short wave flux at surface) (W/M**2)
cldh (high cloud fraction) ()
cldm (mid cloud fraction) ()
cldl (low cloud fraction) ()
precip (precipitation accumulated between outputs) (kg/m**2)
cnvprc (conv precipitation accumulated between outputs)(kg/m**2)
gflx (ground heat flux) (W/m**2)
u10 (model derived 10-meter zonal wind) (m/s)
v10 (model derived 10-meter meridional wind) (m/s)
t2 (model derived 2-meter temperature) (K)
q2 (model derived 2-meter specific humidity) (g/g)
psfc (surface pressure again) (hPa)
tmax (maximum temp between outputs) (K)
tmin (minimum temp between outputs) (K)
ugrw (zonal stress due to gravity wave drag) (W/m**2)
vgrw (meridional stress due to gravity wave drag) (W/m**2)
hpbl (model diagnosed planetary boundary layer depth) (m)
albedo (effective model albedo..derived) ()
cldpbl (pbl cloud fraction) ()

All records that follows are real*4
record 5 ... levs of model zonal wind velocity (m/s)
record 6 ... levs of model meridional wind velocity (m/s)
record 7 ... levs of model temperature (K)
record 8 ... levs of model specific humidity (g/g)
record 9 ... levs of model pressure (mPa)
if(nvar.gt.5)
record 10 ... levs of model derived omega (mPa/sec)
This is an inadvertant unit selection due to making two unit conversions. mPa is milli-Pascal.
record 11 ... levs of model derived dtdt (advection) (K/sec)
record 12 ... levs of model derived dqdt (advection) (g/g/sec)
if(nvar.gt.8)
record 13 ... levs of model cloud water/ice concentration (g/g)
record 14 ... levs of model derived cloud water tendency (advection) (g/g/sec)
record 15 ... levs of model cloud fraction
loop over npoint
loop over time