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PNSWSH

TECHNICAL IMPLEMENTATION NOTICE 07-96
NATIONAL WEATHER SERVICE HEADQUARTERS WASHINGTON DC
1010 AM EST THU DEC 6 2007

TO: FAMILY OF SERVICES /FOS/ SUBSCRIBERS...NOAA WEATHER
WIRE SERVICE /NWS/SUBSCRIBERS...EMERGENCY MANAGERS
WEATHER INFORMATION NETWORK /EMWIN/ SUBSCRIBERS...
NOAAPORT SUBSCRIBERS...OTHER NATIONAL WEATHER SERVICE
/NWS/ PARTNERS AND USERS...NWS EMPLOYEES

FROM: PAUL HIRSCHBERG
SCIENCE PLANS BRANCH CHIEF
OFFICE OF SCIENCE AND TECHNOLOGY /OST/

SUBJECT: NORTH AMERICAN MESOSCALE MODEL CHANGES:
EFFECTIVE FEBRUARY 19 2008

EFFECTIVE TUESDAY 19 FEBRUARY 2008...BEGINNING WITH THE 1200
COORDINATED UNIVERSAL TIME /UTC/ RUN...SEVERAL CHANGES WILL BE
MADE TO:

- WEATHER RESEARCH FORECAST NON-HYDROSTATIC MESOSCALE MODEL
/WRF-NMM/ RUNNING IN THE NORTH AMERICAN MESOSCALE MODEL /NAM/
- NAM DATA ASSIMILATION SYSTEM /NDAS/
- DOWNSCALED GLOBAL FORECAST SYSTEM /GFS/ WITH ETA EXTENSION
/DGEX/.
- GRIDPOINT STATISTICAL INTERPOLATION /GSI/ ANALYSIS WHICH
PROVIDES INITIAL CONDITIONS TO THE NDAS AND NAM FORECASTS.

THESE CHANGES ARE BEING MADE TO IMPROVE MODEL PERFORMANCE.
THE MODEL CHANGES INCLUDE:

1. THE COMPUTATIONAL DOMAIN OF THE NAM WILL BE INCREASED BY
18 PERCENT. TO SEE A COMPARISON OF THE CURRENT OPERATIONAL AND
EXPANDED NAM DOMAINS, GO TO /USE LOWERCASE LETTERS/:

[HTTP://WWW.EMC.NCEP.NOAA.GOV/MB/MBPLL/PARALOG/OVERLAY_ETA12_
EXPANDED.JPG](http://www.emc.ncep.noaa.gov/mb/mbpll/paralog/overlay_eta12_expanded.jpg)

BECAUSE THE NAM MODEL DOMAIN IS BEING ENLARGED BY 18 PERCENT
...THE BIT DEFINITION SECTION /BIT-MAP/ OF NAM OUTPUT GRIDS...
WHICH OVERLAP THE NAM INTEGRATION DOMAIN... WILL BE REDUCED OR
ELIMINATED. THIS CHANGE IS OCCURRING BECAUSE VALID MODEL DATA
WILL BE AVAILABLE OVER A LARGER AREA. WHEN NCEP CENTRAL
OPERATIONS BEGINS RUNNING THE PARALLEL NAM.... SAMPLE NAM GRIB
OUTPUT WITH THE MODIFIED BIT-MAP REPRESENTATION WILL BE AVAILABLE
ON THE NCEP FTP SERVER. THIS NOTICE WILL BE UPDATED AT THAT TIME
TO REFLECT THE LOCATION OF THE DATA.

2. TWO MINOR CHANGES WILL BE MADE TO THE WRF-NMM MODEL RADIATION
PARAMETERIZATION.

3. CHANGES WILL BE MADE TO THE WRF-NMM OROGRAPHY AND LAND-SEA MASK INCLUDING A MORE REALISTIC DEPICTION OF THE GREAT SALT LAKE AND THE CHANNEL ISLANDS OFF THE CALIFORNIA COAST...SMOOTHER NAM SURFACE HEIGHT AND REMOVAL OF SPURIOUS ELEVATED WATER POINTS.

4. DURING THE NDAS FORECAST...THE 12-36 HOUR FORECAST PRECIPITATION FROM THE 00Z OPS NAM RUN WILL BE USED TO FILL IN FOR THE CONUS-BASED STAGE II/IV ANALYSIS AS A DRIVER FOR NDAS SOIL MOISTURE OUTSIDE OF THE CONUS /OCONUS/.

5. THE NEW /UNIFIED/ LAND-SURFACE PHYSICS MODULE WILL BE USED.

6. A MODIFIED HORIZONTAL ADVECTION ALGORITHM FOR CLOUD WATER...SPECIFIC HUMIDITY...AND TURBULENT KINETIC ENERGY WILL BE USED.

7. THE WRF-NMM MODEL DYNAMICS WILL BE MODIFIED TO INCLUDE THE EFFECTS OF GRAVITY-WAVE DRAG AND MOUNTAIN BLOCKING.

THE ANALYSIS CHANGES INCLUDE:

1. ASSIMILATION OF NEW OBSERVATION TYPES...INCLUDING AIRS AND GOES 1X1 RADIANCE DATA...ADDITIONAL SATELLITE WIND DATA...AND SURFACE MESONET WIND DATA.

2. REVISED BACKGROUND ERROR COVARIANCES TO IMPROVE THE ANALYSIS FIT TO THE OBSERVATIONS.

ALL WRF-NMM MODEL CHANGES WILL BE SIMULTANEOUSLY IMPLEMENTED INTO THE DGEX.

IN ADDITION TO THE CHANGES TO THE NAM OUTPUT GRIDS BIT-DEFINITION SECTION...OTHER OUTPUT CHANGES INCLUDE:

1. ADDING FIVE NEW FIELDS TO THE NAM 32KM OUTPUT GRID #221 /AWIP32/ AND 12KM OUTPUT GRID #218 /AWIP12/: THE FIRST FOUR FIELDS ARE TOTAL COLUMN-INTEGRATED HEATING RATES: CONVECTIVE...GRID-SCALE... LONGWAVE...AND SHORTWAVE. THE FIFTH ADDED FIELD WILL BE TOTAL COLUMN-INTEGRATED MOISTURE DIVERGENCE.

2. THE NAM HOURLY PROFILE DATA IN BUFR FORMAT HAS GAINED 17 NEW STATIONS.

THE COMBINED IMPACT OF THESE CHANGES HAS LED TO:

1. IMPROVED NAM FORECAST PERFORMANCE BASED ON QUANTITATIVE SKILL SCORES FOR HEIGHTS AND TEMPERATURE /RMS ERROR AND BIAS/ OVER BOTH THE CONUS AND ALASKA...SPECIFICALLY IN REDUCING LOWER TROPOSPHERIC/850/700 MB/ COLD BIAS AND IMPROVED 10-M WIND FORECASTS.

2. IMPROVED NDAS/NAM SOIL MOISTURE STATES IN REGIONS OUTSIDE OF THE CONUS.

MORE DETAILS ABOUT THESE CHANGES CAN BE SEEN AT /USE LOWERCASE LETTERS/:

[HTTP://WWW.EMC.NCEP.NOAA.GOV/MB/MBPLL/PARALOG/PARALOG.NAMEEXP.HTML](http://www.emc.ncep.noaa.gov/mb/mbpll/paralog/paralog.nameexp.html)

WHEN IT BECOMES AVAILABLE...A COPY OF THE BRIEFING PACKAGE FOR THE NCEP DIRECTOR CAN BE FOUND AT /USE LOWERCASE LETTERS/:

[HTTP://WWW.EMC.NCEP.NOAA.GOV/MB/NAMCHANGES_WINTER2008/NAM_UPGRADES.2008.HTML](http://www.emc.ncep.noaa.gov/mb/namchanges_winter2008/nam_upgrades.2008.html)

DATA DELIVERY TIMING WILL NOT BE IMPACTED BY THIS IMPLEMENTATION. THE NAM DELIVERY TIME WILL NOT CHANGE.

DATA VOLUMES ARE EXPECTED TO CHANGE FOR SOME NAM OUTPUT GRIDS DUE TO GRIB BIT-MAP CHANGES CAUSED BY THE 18% INCREASE IN DOMAIN SIZE...SPECIFICALLY:

1. OUTPUT FILES ON THE NAM NATIVE E-GRID WILL BE 18% BIGGER
2. OUTPUT GRIDS THAT NO LONGER HAVE A BITMAP FROM THE EXPANDED NAM WILL BE 8-10 PERCENT SMALLER
3. OUTPUT GRIDS WITH SMALLER BITMAPS FROM THE EXPANDED NAM WILL BE 1-8 PERCENT BIGGER

SIGNIFICANT DATA CONTENT CHANGES ARE EXPECTED AS MENTIONED EARLIER. THESE CONTENT CHANGES WILL IMPACT ALL DISSEMINATION ROUTES WHICH INCLUDE NOAA PORT...THE NWS PUBLIC FTP SERVER AND THE NCEP PUBLIC FTP SERVER. A CONSISTENT PARALLEL FEED OF DATA WILL BECOME AVAILABLE ON THE NCEP FTP SERVER ONCE THE MODEL IS RUNNING IN PARALLEL ON THE NCEP CENTRAL COMPUTING SYSTEM. NCEP WILL SEND ANOTHER NOTICE ALERTING USERS TO THE LOCATION OF THESE DATA SETS ONCE THEY BECOME AVAILABLE.

NCEP ENCOURAGES ALL USERS TO ENSURE THEIR DECODERS ARE FLEXIBLE AND ARE ABLE TO ADEQUATELY HANDLE CHANGES IN CONTENT ORDER...PARAMETER FIELDS CHANGING ORDER...CHANGES IN THE SCALING FACTOR COMPONENT WITHIN THE PDS OF THE GRIB FILES AND ALSO ANY VOLUME CHANGES WHICH MAY BE FORTHCOMING. THESE ELEMENTS MAY CHANGE WITH FUTURE NCEP MODEL IMPLEMENTATIONS. NCEP WILL MAKE EVERY ATTEMPT TO ALERT USERS TO THESE CHANGES BEFORE IMPLEMENTATION.

FOR QUESTIONS CONCERNING THESE CHANGES...PLEASE CONTACT:

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OR

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THIS AND OTHER NWS TECHNICAL IMPLEMENTATION NOTICES ARE AVAILABLE
ONLINE AT /USE LOWER CASE LETTERS/:

[HTTP://WWW.NWS.NOAA.GOV/OM/NOTIF.HTM](http://www.nws.noaa.gov/om/notif.htm)

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