NOUS41 KWBC 081600
PNSWSH

TECHNICAL IMPLEMENTATION NOTICE 08-79
NATIONAL WEATHER SERVICE HEADQUARTERS WASHINGTON DC
1200 PM EDT WED OCT 9 2008

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

FROM: JASON TUELL
         CHIEF...SCIENCE PLANS BRANCH
         OFFICE OF SCIENCE AND TECHNOLOGY

SUBJECT: NORTH AMERICAN MESOSCALE MODEL CHANGES: EFFECTIVE
          DECEMBER 02 2008

EFFECTIVE TUESDAY DECEMBER 2 2008...BEGINNING WITH THE 1200
COORDINATED UNIVERSAL TIME /UTC/ RUN...SEVERAL CHANGES WILL BE
MADE TO THE FOLLOWING:
- 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 MODIFICATIONS INCLUDE:

1. CHANGE TO THE WRF-NMM RADIATION PARAMETERIZATION TO DOUBLE THE
ABSORPTION COEFFICIENT FOR CLOUD WATER AND CLOUD ICE.

2. TWO COLD-SEASON RELATED CHANGES TO THE WRF-NMM LAND-SURFACE
PHYSICS:
- CHANGING THE COMPUTATION OF POTENTIAL EVAPORATION TO DECREASE
  LINEARLY WITH BULK RICHARDSON NUMBER UNDER STABLE CONDITIONS
  /WEIGHTED BY SNOW COVERAGE/
- ALLOWING THE SLOPE OF THE SATURATED HUMIDITY FUNCTION WITH
  RESPECT TO TEMPERATURE TO DECREASE LINEARLY WITH SNOW COVERAGE.

3. CHANGING THE TURBULENT MIXING AND DIFFUSION SCHEMES SO THAT
THEY VERTICALLY MIX AND DIFFUSE EACH HYDROMETEOR SPECIES
SEPARATELY.

THE ANALYSIS CHANGES INCLUDE:

1. ASSIMILATION OF NEW OBSERVATION TYPES...INCLUDING METOP2

RADIANCE DATA...AND TAMDAR/AMDAR AIRCRAFT DATA

2. USE OF THE LATEST /1Q 2008/ VERSION OF THE GSI ANALYSIS...AND
AN IMPROVED VERSION OF THE COMMUNITY RADIATIVE TRANSFER MODEL
/CRTM/

THE CHANGES TO THE NDAS INCLUDE:

1. INITIALIZING EACH NDAS CYCLE USING ATMOSPHERIC STATES FROM THE
GLOBAL DATA ASSIMILATION SYSTEM /GDAS/ INSTEAD OF FROM THE
PREVIOUS NDAS CYCLE /SO-CALLED PARTIAL CYCLING OPTION/. NDAS
LAND-SURFACE STATES WILL CONTINUE TO BE FULLY CYCLED FROM THE
PREVIOUS NDAS RUN.

2. REPLACING THE OBSOLETE WRF STANDARD INITIALIZATION /WRF-SI/
SOFTWARE USED TO PROCESS THE GDAS FIRST GUESS FOR THE NDAS WITH
THE NEW WRF PREPROCESSING SYSTEM /WPS/ SOFTWARE.

3. REPLACING THE CURRENT AFWA SNOW DEPTH ANALYSIS WITH A NEW
HIGHER RESOLUTION /23-KM/ AFWA ANALYSIS.

ALL WRF-NMM MODEL CHANGES WILL BE SIMULTANEOUSLY IMPLEMENTED INTO
THE DGEX AS WILL THE REPLACEMENT OF WRF-SI SOFTWARE WITH WPS
SOFTWARE...WHICH PROCESSES THE 78-H NAM FORECAST INTO INITIAL
CONDITIONS TO THE DGEX.

NAM OUTPUT CHANGES INCLUDE:

1. PROVING A NEW ENLARGED 32-KM OUTPUT GRID COVERING THE ENTIRE
EXPANDED NAM COMPUTATIONAL DOMAIN...WHICH WILL HAVE THE SAME
FIELDS AS THE EXISTING 32-KM GRID 221 /AWIP32/ FILE.

2. ADDING RICHARDSON NUMBER BASED PLANETARY BOUNDARY LAYER
HEIGHT...MIXED LAYER DEPTH...AND TRANSPORT WIND COMPONENTS TO
GRID 221 /AWIP32...32 KM NORTH AMERICA/...GRID 218/AWIP12...12
KM CONUS/...AND GRID 242/AWP242...11.25 KM ALASKA/ STATIONS.

3. CHANGING THE NAM POST-PROCESSOR SOFTWARE TO USE SHELTER
TEMPERATURE INSTEAD OF SKIN TEMPERATURE IN THE UNDERGROUND CHECK
FOR LOWEST FREEZING LEVEL HEIGHT.

4. ADDING SNOW MIXING RATIO ON PRESSURE LEVELS TO THREE OUTPUT
GRIDS /GRID 104..GRID 212...GRID 237/ THAT CURRENTLY ONLY
OUTPUT CLOUD ICE...SO THAT TOTAL ICE CAN BE COMPUTED.

THE COMBINED IMPACT OF THESE CHANGES LEADS 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.

2. NEUTRAL OR BETTER QUANTITATIVE PRECIPITATION FORECAST SCORES
/DEPENDING ON SEASON/ WITH LOWER PRECIPITATION BIAS.

3. SLIGHT IMPROVEMENTS TO MOST NEAR-SURFACE FORECASTS...
ESPECIALLY IN THE COLD SEASON /DUE TO THE WRF-NMM MODEL RADIATION
CHANGE/.

MORE DETAILS ABOUT THESE CHANGES ARE ONLINE AT /USE LOWERCASE/:

  HTTP://WWW.EMC.NCEP.NOAA.GOV/MMB/MMBPLL/PARALOG/PARALOG.NAMX_
  OPSPLL_FALL2008.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/MMB/NAMCHANGES_FALL2008/
  NAM_UPGRADES.FALL2008.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 THE CHANGES OUTLINED ABOVE. FOR THOSE GRIDS IMPACTED...THESE
CONTENT CHANGES WILL IMPACT ALL DISSEMINATION ROUTES INCLUDING
NOAAPORT...THE NWS PUBLIC FTP SERVER AND THE NCEP PUBLIC FTP
SERVER.

PARALLEL DATA FOR THE NAM...NDAS AND DGEX WILL BECOME AVAILABLE
ON THE NCEP FTP SERVER ON OCTOBER 14 2008. IT WILL BE AVAILABLE
AT THE LINKS BELOW /USE LOWERCASE/:

  FTP://FTP.NCEP.NOAA.GOV/PUB/DATA/NCCF/COM/NAM/PARA

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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TECHNICAL IMPLEMENTATION NOTICES ARE ONLINE AT /USE LOWERCASE/:

HTTP://WWW.WEATHER.GOV/OS/NOTIF.HTM

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