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TECHNICAL IMPLEMENTATION NOTICE 05-40  
NATIONAL WEATHER SERVICE HEADQUARTERS WASHINGTON DC  
1125 AM EDT MON MAY 23 2005

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

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

SUBJECT: UPGRADE OF THE RAPID UPDATE CYCLE /RUC/ FORECAST SYSTEM  
EFFECTIVE...JUNE 28 2005.

EFFECTIVE JUNE 28 2005...BEGINNING WITH THE 1200 COORDINATED UNIVERSAL  
TIME /UTC/ RUN...THE NATIONAL CENTERS FOR ENVIRONMENTAL PREDICTION /NCEP/  
WILL UPGRADE THE RAPID UPDATE CYCLE /RUC/ FORECAST SYSTEM TO IMPROVE ITS  
ACCURACY AND PRODUCTS. THE UPGRADE IS INTENDED TO PROVIDE IMPROVEMENTS  
TO THE FOLLOWING AREAS OF THE FORECAST GUIDANCE:

- CLOUD
- CEILING
- VISIBILITY
- ICING FORECASTS
- TEMPERATURE AND DEWPOINT FORECASTS AT THE SURFACE AND IN THE  
LOWER TROPOSPHERE
- PRECIPITATION FORECASTS.

THE FOLLOWING MODIFICATIONS TO THE RUC MODEL WILL BE MADE IN ORDER TO  
ACHIEVE THESE IMPROVEMENTS:

- INCREASE THE HORIZONTAL RESOLUTION FROM 20 KM TO 13.3 KM. USE NEW  
HIGHER RESOLUTION /ALSO 13 KM/ FIXED FILES FOR TERRAIN ELEVATION/  
LAND USE /WITH LAND-SEA MASK/ SOIL TYPE/ AND ROUGHNESS LENGTH.
- MODIFY GRELL-DEVENYI CONVECTIVE PARAMETERIZATION TO USE OPTIMIZED  
WEIGHTING FOR MULTIPLE CLOSURES FOR IMPROVED FORECASTS OF CONVECTIVE  
PRECIPITATION.
- IMPLEMENT UPDATED VERSION OF RUC/NCAR BULK MIXED-PHASE CLOUD  
MICROPHYSICS DESIGNED TO PRODUCE MORE ACCURATE DEPICTION OF SUPERCOOLED  
LIQUID WATER NEEDED FOR ICING FORECASTS.
- THE INITIALIZATION OF LOW-LEVEL MOISTURE FIELDS IS GREATLY IMPROVED BY:

1. MODIFYING THE MOISTURE ANALYSIS VARIABLE FROM LOG OF WATER VAPOR MIXING  
RATIO TO PSEUDO-RELATIVE-HUMIDITY
2. MODIFYING RUC MODEL DIGITAL FILTER INITIALIZATION
3. ASSIMILATING NEW OBSERVATIONS FROM GPS PRECIPITABLE WATER AND IMPROVING THE  
QUALITY CONTROL FOR PRECIPITABLE WATER DATA.

- ADD SOIL TEMPERATURE AND MOISTURE NUDGING IN ANALYSIS, ONLY INCLUDED UNDER CERTAIN CONSERVATIVE CONDITIONS, BASED ON NEAR-SURFACE ANALYSIS INCREMENTS OF TEMPERATURE AND MOISTURE. THIS LEADS TO SIGNIFICANT IMPROVEMENTS IN 2-METER TEMPERATURE AND DEW POINT FIELDS AS WELL AS INSTABILITY FORECASTS AND RESULTANT CONVECTIVE PRECIPITATION.
- ASSIMILATE NEW OBSERVATIONS MESONET SURFACE STATIONS AND BOUNDARY-LAYER WIND PROFILERS TO IMPROVE SURFACE ANALYSIS.
- ASSIMILATE METAR OBSERVATIONS OF CLOUD LEVELS AND VISIBILITY TO IMPROVE INITIAL CONDITIONS FOR RUC 3-D HYDROMETEOR FIELDS.

THE ENVIRONMENTAL MODELING CENTER (EMC) IS CURRENTLY RUNNING A NEAR REAL-TIME PARALLEL OF THIS NEW VERSION OF THE RUC FOR ALL MODEL CYCLES. EMC HAS A WEB PAGE DISPLAYING MODEL OUTPUT OF THESE PARALLEL RUNS VS. THE OPERATIONAL RUNS. THIS WEB PAGE CAN BE FOUND ONLINE AT /USE LOWER CASE LETTERS/:

[HTTP://WWW.EMC.NCEP.NOAA.GOV/MMB/RUC2/PARA/](http://WWW.EMC.NCEP.NOAA.GOV/MMB/RUC2/PARA/)

IF YOU HAVE ANY QUESTIONS CONCERNING THESE CHANGES...PLEASE CONTACT:

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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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