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TECHNICAL IMPLEMENTATION NOTICE 05-80
NATIONAL WEATHER SERVICE HEADQUARTERS WASHINGTON DC
100 PM EST MON DEC 19 2005

TO: FAMILY OF SERVICES /FOS/ SUBSCRIBERS...NOAA WEATHER WIRE SERVICE /NWWS/ 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: NEW CALCULATION OF CAPE IN NCEP NAM MODEL:
EFFECTIVE FEBRUARY 7 2006 AT 1200 UTC

EFFECTIVE FEBRUARY 7 2006...BEGINNING WITH THE 1200 COORDINATED UNIVERSAL TIME /UTC/ RUN...THE NATIONAL CENTERS FOR ENVIRONMENTAL PREDICTION /NCEP/ WILL CHANGE THE COMPUTATION OF THE SURFACE-BASED CONVECTIVE AVAILABLE POTENTIAL ENERGY /CAPE/ AND CONVECTIVE INHIBITION /CIN/ PARAMETERS IN THE NORTH AMERICAN MESOSCALE /NAM/ MODEL. THE CURRENT FORMULATION SEARCHES THE LOWEST 70 MILLIBARS /MB/ FOR THE LEVEL WITH THE HIGHEST EQUIVALENT POTENTIAL TEMPERATURE /THETA-E/. THIS PARCEL IS THEN LIFTED TO GENERATE VALUES FOR CAPE AND CIN.

VARIOUS NWS OFFICES AND THE NCEP STORM PREDICTION CENTER HAVE SUGGESTED THIS FORMULATION OCCASIONALLY RESULTS IN A PARCEL BEING LIFTED THAT IS NOT REPRESENTATIVE OF TRUE SURFACE CONDITIONS. SEVERAL CASES HAVE BEEN IDENTIFIED IN WHICH CONDITIONS AT THE SURFACE WERE NOT UNSTABLE...HOWEVER THE CALCULATION GENERATED A HIGH VALUE OF CAPE BY LIFTING A PARCEL WELL ABOVE THE GROUND. BECAUSE THE NAM OFFERS SEVERAL CAPE/CIN COMPUTATIONS TO REPRESENT ELEVATED INSTABILITY...NWS DECIDED THE CURRENT DETERMINATION OF A SURFACE-BASED PARCEL SHOULD BE REVISED TO MORE ACCURATELY REPRESENT LOW-LEVEL CONDITIONS.

THE REVISED COMPUTATION WILL SEARCH FOR THE HIGHEST THETA-E AT EACH GRID POINT OVER A DEPTH SMALLER THAN THE 70 MB CURRENTLY USED. THE PRECISE DEPTH WILL BE BASED ON THE SURFACE PRESSURE TO MAKE SURE THAT A LEVEL CLOSE TO THE GROUND IS USED AT LOW ELEVATIONS...WHILE ABLE TO SEARCH OVER A LARGER DEPTH AT HIGHER ELEVATIONS WHERE THE FIRST MODEL LEVEL ABOVE THE GROUND IS OFTEN MUCH HIGHER ABOVE THE SURFACE. THIS FORMULATION LEADS TO A RANGE OF DEPTHS FROM ABOUT 10 MB AT SEA LEVEL TO AS MUCH AS 50 MB OVER THE HIGHEST TERRAIN.

PLEASE NOTE THAT THERE ARE CURRENTLY FOUR SETS OF CAPE/CIN COMPUTATIONS IN THE NAM.

1. THE SURFACED-BASED FIELDS
2. BEST CAPE/CIN COMPUTED BY FINDING THE HIGHEST THETA-E
   IN THE SIX MIXED 30 MB DEEP LAYERS CLOSEST TO THE GROUND
3. MIXED LAYER CAPE/CIN COMPUTED BY TAKING THE AVERAGE
   THERMODYNAMIC PROPERTIES IN THE LOWEST 90 MB
4. BEST CAPE/CIN COMPUTED BY FINDING THE LEVEL IN THE
   LOWEST 300 MB WITH THE HIGHEST THETA-E

THIS CHANGE WILL AFFECT ONLY THE FIRST ITEM IN THE LIST ABOVE.
DAILY PLOTS OF ALL OF THESE FIELDS CAN BE VIEWED AT /USE LOWER
CASE LETTERS/:

HTTP://WWW.EMC.NCEP.NOAA.GOV/MMB/NAMSVRFCST

IF YOU HAVE QUESTIONS CONCERNING THIS CHANGE...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

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