WESTERN REGION TECHNICAL ATTACHMENT
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NGM RELATIVE HUMIDITY FIELDS

[Editor's Note: The attached memo explains a minor problem with the NGM, causing relative humidity values greater than 100 percent to sometimes occur at initial time. Values slightly greater than 100 percent can also occur at other forecast times due to the independent smoothing of temperature and specific humidity fields that is done before calculating relative humidity. Values of relative humidity greater than 100 percent should no longer appear on any of the AFOS charts now that the change to eliminate these unrealistic values has gone into effect.]

U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL WEATHER SERVICE

National Meteorological Center
W/NMC22, WWB, Room 204
Washington, DC 20233

December 30, 1985 W/NMC22:JEH

TO: Addressees

FROM: W/NMC22 - James E. Hoke

SUBJECT: Change to the Nested Grid Model

As quickly became apparent with the addition of the initialized Nested Grid Model (NGM) fields to AFOS on December 4, 1985, relative humidities in excess of 100% can be produced by the NGM postprocessor. These values arise because at temperatures colder than -20°C the NGM computes relative humidity using saturation vapor pressure over ice, instead of liquid water. From -20°C to 0°C a linear transition from the ice phase to the liquid water phase is assumed in the NGM.

Our short-term solution to this problem will be to limit relative humidities to no more than 100% when produced by the NGM postprocessor. Such a change is cosmetic only, and will have no effect whatsoever on NGM forecasts. We plan for this change to be implemented with the 1200 GMT, January 15, 1986, run of the Regional Analysis and Forecast System. In the long-term, we will take a new look at the relationship of specific humidity and relative humidity throughout the Regional Analysis and Forecast System. Additional changes may follow that evaluation.

As an additional comment, please note that the RAFS 0-hour fields transmitted on AFOS are produced by the NGM postprocessor. Thus, they are initialized, rather than analyzed, fields and represent the initial conditions for the forecast model. By modifying the analysis the initialization, anticipating non-meteorological oscillations in the NGM, removes these oscillations before the forecast begins. We have seen occasional significant differences between the observations and the 0-h fields that are transmitted on AFOS. Although small differences between analyzed and initialized fields, of course, are expected, some of the differences seem unsatisfactorily large. We're currently studying the problem.

Addressees:

Dr. Bonner
Dr. Brown
Dr. Collins
Mr. Dallavalle
Dr. Deaven
Dr. DiMego
Dr. Gerrity
Dr. Glahn (W/OSD2)
Mr. Hughes
Mr. Keyser
Mr. La Porte
Dr. McPherson
Lt. Col. Moore
Mrs. Morone
Mr. Olson
Mr. Ostby (W/NMC6)
Dr. Phillips
Mr. Przywarty (W/AR11)
Mr. Rasch (W/WR3)
Mr. Saylor
Dr. Schaefer (W/CR3)
Mr. Smith (W/SR3)
Dr. Stackpole
Dr. Tracton
Mr. Travers
Mr. Tuccillo
Mr. van Haaren (W/CRx3)
Dr. Ward
Mr. Zuckerberg (W/ER3)