SOIL AND ATMOSPHERIC SCIENCES

Chair: RONALD W. PRZYBYLINSKI
National Weather Service
Indianapolis International Airport
Box 51526
Indianapolis, Indiana 46251

Chair-Elect: C.W. LOVELL
Department of Civil Engineering
Purdue University
West Lafayette, Indiana 47907

ABSTRACTS

A Comparison of MOS Values to Observed Readings on Clear Calm Nights with Varying Snow Depths. TIMOTHY W. MCCLUNG, National Weather Service, NOAA, Michiana Regional Airport, South Bend, IN 46628.—Forecasting low temperatures on clear calm nights in the summer usually is routine, but in winter, especially with a significant snow depth, it can be quite challenging. A varying number of cases, totalling ninety-five, from twenty-three different cities in 1986 and 1988 are used to determine how accurate MOS forecasts are in predicting nighttime lows over snow covered ground when skies are clear and winds are calm. In forecasts when less than one inch of snow was on the ground, guidance was fairly accurate. However, a slight cold bias was noted. When snow depths ranged from one to five inches, MOS forecasted lows were erratic. However, average results over the whole category have shown that MOS deviated from the actual low by only one-tenth of a degree. When locations were covered by six or more inches of snow, MOS guidance was very poor. In the ninety-five cases examined, MOS had an average warm bias of 7.3 degrees.

Performance of the AFOS Data Analysis Program (ADAP) over the Lower Great Lakes Region During the 1988 Spring and Summer Convective Seasons. R. W. PRZYBYLINSKI, National Weather Service, NOAA, Indianapolis Int'l Airport, Indianapolis, IN 46241.—During the early spring of 1988, a new application program called AFOS Data Analysis Program (ADAP) was installed at WSFO Indianapolis. The ADAP program is executed hourly and generates a host of surface based kinematic fields. Several severe and non-severe convective cases during the spring and summer of 1988 have been collected and examined to determine the strengths and weaknesses of several ADAP parameters. Preliminary findings have shown that once several fields become in phase with each other (i.e., strong warm advection superimposed over the surface moisture convergence axis and/or the strongest instability axis superimposed over the weakest part of the capping inversion when less than two degrees) significant or severe convective activity often occurred. Additional preliminary findings have shown that: (1) severe convection often occurred within the gradient region of the strong instability axis and where surface based lifted index values exceeded -10; and (2) significant or severe convection usually propagated along the moist side of the surface moisture convergence axis. Several cases will be presented to show these findings.

A Look at Maximum Temperature Bias in MOS on a Monthly and a Seasonal Basis. DAVID R. TUCEK, National Weather Service NOAA, Michiana Regional Airport, South Bend, In 46228.—Model Output Statistics (MOS) maximum temperature data for South Bend was analyzed to determine the frequency and magnitude of temperature bias for warming and cooling events. Results were tabulated on a monthly and seasonal basis. Overall, MOS correctly forecast the direction of maximum temperature change from one day to the next around 80% of the time. During autumn and winter, MOS exhibited a warm bias for warming and cooling events. During spring and summer, MOS had a warm bias for cooling events and a cold bias for warming events. The months within transition seasons appeared to be the most reliable predictors of bias. Summer was the least reliable trend predictor except for the drought summer of 1988 (June and July only) which consistently under-forecast warm-ups and overforecast cool-downs. Average absolute errors for the seasons ranged from 2.6 to 3.6 degrees; summer and the months of summer averaged lowest. For all seasons, errors tabulated most frequently ranged from one to three degrees. The range of errors was largest in autumn, the month of November in particular.

Temperature Anomalies During the Drought of 1988. THOMAS B. WILLIAMS and SHERMAN R. SHEWMAKER, Department of Geography, Indiana University—Purdue University at Indianapolis, Indianapolis, IN 46202.—A recurrent weather pattern of clear skies, dry air, and minimal rainfall prevailed during early summer 1988, causing a widespread drought and producing unusually large daily ranges of temperature. Daytime high temperatures rose much above normal while overnight lows dropped below normal as the unchanging weather conditions allowed both rapid heating during the day and rapid radiational cooling at night. From May through the first 10 days of July, daily temperature ranges averaged more than 28.0°F. The most important factors controlling diurnal temperature range are cloud cover and atmospheric moisture content. Early summer was characterized by an absence of clouds, limited supply of moisture (indicated by low dew points), and lack of significant rainfall. Between April 23 and July 9, rainfall totaled only 1.53 inches, 15.9% of the normal amount expected through the period. In comparison to prior years and to climatic normals, weather conditions in May, June, and early July 1988 were clearly abnormal, and represent a distinct anomaly in the climate record.