

# **On the accuracy of Haines Index predicted by real-time MM5 forecasts over the eastern half of the US**

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The accuracy of the Haines Index predicted by real-time MM5 model forecasts is evaluated using rawinsonde observations. The evaluation compared predicted and observed Haines Index during a five-month period from 1 June to 31 October 2003 at 29 upper-air stations within the forecast domain over much of the eastern half of the United States. In spite of a consistent cold bias of 1-3 °C in the lower to mid troposphere in the MM5 forecasts, very little bias is found in the Haines Index predictions. This is due mainly to the fact that the Haines Index is derived based on the gradient of temperature which is not very sensitive to the temperature biases themselves. A perfect match between the predicted and observed Haines Index occurs approximately 45% of the time and at another 43% of the time, the differences are  $\pm 1$ , representing a very good forecast. Among the five possible categories from the lowest (HI=2) to the highest (HI=6) potential for large fire growth, the MM5 forecasts adequately captured the occurrences of HI=2 and HI=5, but exhibited a tendency to shift from very low (HI=3) to low (HI=4) potential. This shift towards slightly higher fire growth potential is attributed to a general dry bias at 850 mb which dominates the slightly weaker instability in the predicted lower atmosphere. The forecasts, however, fail to predict any cases when the observed HI reaches its highest value 6. Although such conditions occur in only 1% of the time, they are conditions that are most conducive to dangerous and erratic fire behaviors and, therefore, are most critical to be forecasted.