

## **Computation of the Low Elevation Haines Index**

Brian E. Potter, Julie A. Winkler, Dwight F. Wilhelm, and Ryan P. Shadbolt  
**SIXTH FIRE AND FOREST METEOROLOGY SYMPOSIUM/19th INTERIOR  
WEST FIRE COUNCIL MEETING 25-27 October, 2005, Canmore, Alberta,  
Canada.**

### Abstract:

The Haines Index is a frequently used tool in wildfire weather forecasting and monitoring. Introduced in 1988 as the "Lower Atmospheric Severity Index," this index is a function of temperature and dewpoint in the lower troposphere, and has three different versions (referred to as the "low," "mid," and "high" Haines Index) that consider differences in surface elevation. The formulation of the Haines Index was designed to employ readily available observations from upper air soundings. The "low" index uses temperature and humidity observations at 850 hPa, which is a mandatory sounding level, and temperature observations at 950 hPa, which was a regularly reported pressure level when the index was formulated although it was not an official mandatory level. In 1991 the National Weather Service (NWS) implemented a new mandatory level for radiosonde observations at 925 hPa, and subsequent to this measurements at 950 hPa became much less frequent. In spite of the popularity of the Haines Index, there has not been a coordinated, standardized modification of the low version of the Haines Index to accommodate this change. An informal survey of Haines Index values on NWS and USDA Forest Service web sites indicated that some sources continue to use 950 hPa temperature, usually interpolated from 925 hPa and surface temperatures, to calculate the Haines Index. Others directly substitute the 925 hPa temperature for the originally intended 950 hPa value. This study employs 39,818 soundings for 0000 UTC from rawinsonde locations in the central United States when both 950 hPa and 925 hPa levels were available in order to investigate the impact of the different approaches currently employed for calculating the low version of the Haines Index. Results show that direct substitution of 925 hPa temperature for the original 950 hPa temperature can dramatically underestimate potential wildfire severity compared to the original formulation of the Haines Index. On the other hand, a low elevation Haines Index calculated from interpolated 950 hPa temperature is usually in close agreement with the original formulation of the index.