

Fire Weather Forecasting Applications on AWIPS

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We have developed and implemented into Alaska Region forecast operations applications for the Advanced Weather Information Processing System (AWIPS) which automatically provide support to fire weather forecast operations.

One application generates fire weather forecasts for 48 fire weather zones in Alaska out to 7 days based upon:

- The existing public zone forecast in the 48 zones out to 7 days which is the source for weather (clouds, precipitation), maximum and minimum temperature, and the wind speed and direction. The wind speed and direction is available only for the first day.
- The words from the original public zone forecast are processed to generate standardized wording of fire weather parameters i.e., THUNDERSHOWERS became WET THUNDERSTORMS.
- Gridded model and model sounding forecasts to provide forecast elements not included in the public zone forecast: minimum relative humidity, lightning activity level based upon a calculated K index, wind speed and direction at 20 feet for all days, 24-hour trend in temperature and humidity, Haines index (convective stability plus 850 hectaPascal spread between temperature and dewpoint), mixing height, and boundary layer transport wind.
- The 48 fire weather zones in Alaska are “digitized” on the eta model 45km grid, i.e., the grid points are identified which are enclosed by the zone boundaries. The grid points within a zone boundary determine the model values of the fire weather elements.
- The 45km eta model is the source of model forecasts out to day 2. The 190km MRF model is the source of model forecasts for days 3-7.

The application, automatically launched when the public zone forecast is disseminated, processes the public zone forecasts, processes the model information, and formats all of the information into the standard fire weather forecast. Fire weather forecasters then review and modify the automated forecast for final distribution to the Alaska Fire Service (AFS) and the web.

A second AWIPS application automatically generates forecast elements from eta model forecasts at selected sites -- minimum relative humidity, maximum temperature, wind speed -- for the AFS to calculate their Fire Weather Index. The AFS includes values for observed precipitation and fuel moisture to complete the calculation of the Index. 48 site forecasts are automatically generated.

A third AWIPS application automatically generates graphic fire weather briefing products from model and observation data which are posted to the web and serve as the briefing material for the daily AFS statewide fire situation teleconference. 22 briefing graphics are produced daily. These include:

- Past 24hr Precipitation
- 500hPa heights/winds 4am today
- Surface pressure 4am today
- GOES VIS Image low/high resolution
- Surface Fronts with High & Low center positions
- 500hPa heights/winds 4pm today
- Surface Pressure 4pm today
- Precipitation forecast 4am to 4pm today
- Convective available potential energy forecast 4pm today
- 500hPa heights/winds 4pm tomorrow
- Surface Pressure 4pm tomorrow
- Precipitation forecast 4am to 4pm tomorrow
- Convective available potential energy forecast 4pm tomorrow
- Surface Pressure/winds day 3-6 outlook
- 500hPa heights/winds day 3-6 outlook
- Surface Pressure/winds day 7-10 outlook
- 500hPa heights/winds day 7-10 outlook
- Haines Index (low) 4am today
- Haines Index (low) 4pm today
- Precipitation forecast 4pm to 4am tonight

A fourth AWIPS application provides the forecast trajectories of smoke particles from wildfires based upon the forecast from an atmospheric particle dispersion and tracking model called PUFF. The 4-dimensional forecast wind field which supports the PUFF model forecasts is selectable from model data in the AWIPS database – eta, AVN, MRF, etc. PUFF model results showing the path and altitude of the smoke are displayable as a graphic loop. The smoke trajectory helps the wildfire fighting agencies develop plans of attack in deciding whether or not to let a fire burn or to aggressively seek suppression.

The fire weather forecast, briefing products, and PUFF forecasts are available for viewing at www.alaska.net/~nwsar/html/firewx/firewx.html.