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Further Applications of ROMAN to Fire Weather

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1. INTRODUCTION

As described in the preceding companion paper, the Real-time Observation Monitor and Analysis Network (ROMAN) has been developed to address the needs of wildland fire professionals for real-time weather data. Additional capabilities of ROMAN are described here, specifically techniques to access weather information in the vicinity of major wildland fires and to integrate observations into comprehensive analyses of surface temperature, wind, and relative humidity.

2. WEATHER NEAR FIRES

Once a wildland fire breaks out, fire professionals need to be able to identify the available weather resources in the vicinity of the fire. Even individuals familiar with the locations of the permanent weather stations in a particular area may be unaware of portable FIRE RAWS stations that are often deployed to support fire suppresion operations. In order to assess quickly the locations of stations in the vicinity of major fires, a number of tools have been created to expedite this task (in addition to simply searching by latitude/longitude or place name).

The locations of all active and recently contained major fires are retrieved daily from the National Interagency Fire Center as well as the map generated by the Center to display the locations of many of those fires (Fig. 1). Pull down menus organized by Geographic Area Coordination Center (GACC) list all the fires while links to each GACC provide access to maps that display the locations of the fires (Fig. 2). Once the user selects a specific fire from either the map interface or the pull down menus, the current weather and 24-h trend in the vicinity of the fire are available in a tabular format (Table 1).

Another way to determine the weather conditions in

Table 1. Weather near the Trapper Creek, MT fire complex.

Trapper_Creek_Complex Fire: Latitude 48.791 Longitude -113.914 25590 acres
(*Fire location* provided by: *TopoZone*)

24-Hour Trend Monitor

Settings: 2 -h Summary RAWS 50 mi Radius Change Settings

24-Hour Changes 22:48 UTC 08/23/2003 Sort by: name or elevation Help QC Flag: Ok, Caution, Suspect

Station	Info	Dist/Dir	Time	Temp	DewT	RH	Dir	Spd	Gust
TR513 FRWS-20	RAWS 6781 ft	6 mi W	2225Z 16:25MDT 2125Z 15:25MDT	53/- 6 56/- 5	36/- 4 39/+ 1	53/+ 4 52/+ 11	WSW / WNW WSW / W	5/+ 3 6/+ 2	16/+ 7 17/+ 5
NS039 POLEBRIDGE	RAWS 3550 ft	19 mi WSW	N/A 2145Z 15:45MDT	73/+ 0	40/- 5	30/- 6	SW / N	15/+ 9	23/+ 6
WGRM8 WEST GLACIER	RAWS 3199 ft	20 mi S	2210Z 16:10MDT 2110Z 15:10MDT	70/ 69/- 9	41/ 40/+ 4	35/ 35/+ 13	WSW/ WSW / W	5/ 9/+ 2	17/ 16/+ 4
CYFM8 CYCLONE	RAWS 5299 ft	20 mi WSW	2150Z 15:50MDT 2050Z 14:50MDT	66/- 1 66/- 6	38/- 2 40/+ 1	36/- 2 39/+ 8	SW / E SSW / SSW	5/+ 4 9/+ 6	27/+ 16 22/+ 10
SRYM8 ST. MARY	RAWS 4560 ft	22 mi E	2225Z 16:25MDT 2125Z 15:25MDT	71/- 4 73/- 6	35/+ 5 39/+ 11	27/+ 8 29/+ 14	NNE / SSW S / W	8/+ 3 7/+ 3	25/+ 12 22/+ 12
TR545 FRWS-22 (ROBER	RAWS 6489 ft	27 mi SW	2220Z 16:20MDT 2120Z 15:20MDT	60/- 1 59/+ 0	38/- 3 41/+ 4	44/- 4 51/+ 7	SSW / NW S / NW	7/+ 6 8/+ 6	20/+ 14 18/+ 8
TR512 FRWS-19	RAWS 6781 ft	28 mi WNW	2225Z 16:25MDT 2125Z 15:25MDT	55/- 2 56/+ 1	35/- 8 36/- 6	46/- 12 47/- 14	SSW / SSW S / WSW	16/+ 4 15/+ 3	32/+ 14 31/+ 10
HNYM8 HUNGRY HORSE	RAWS 3225 ft	29 mi SSW	2210Z 16:10MDT 2110Z 15:10MDT	76/ 76/+ 0	39/ 41/+ 0	26/ 28/+ 0	W/ SW / SW	8/ 6/- 3	23/ 24/+ 8

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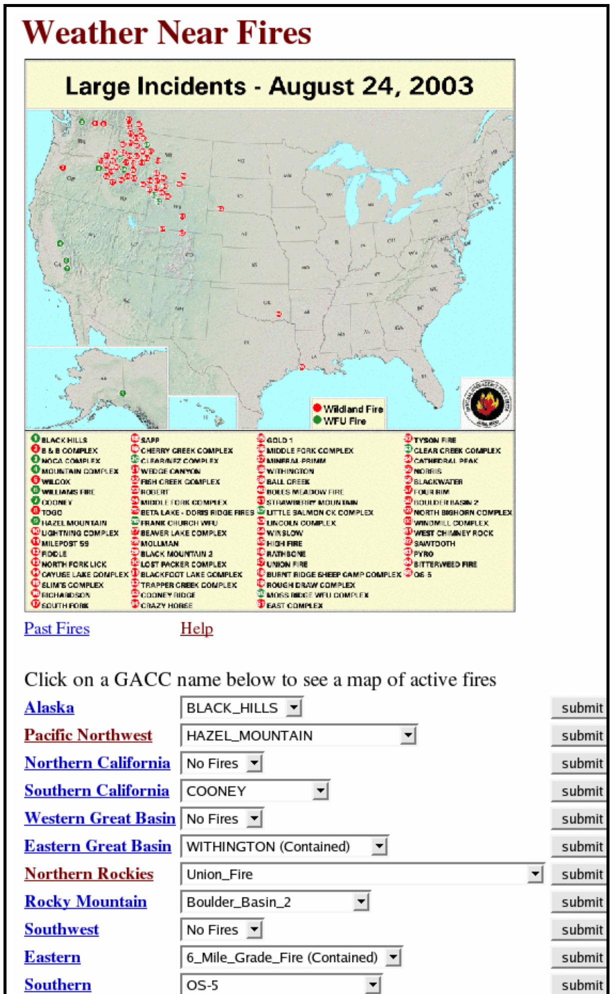

Figure 1. ROMAN Weather Near Fires summary page.

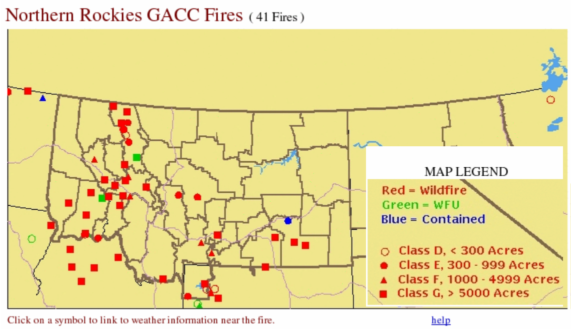

Figure 2. Location of major fires on 24 August, 2003 in the Northern Rockies GACC.

the vicinity of major fires is illustrated in Fig. 3. _ The MODIS interface relies upon georeferencing of the actively burning and previouly burned areas derived from satellite (see http://activefiremaps.fs.fed.us for details). The locations of weather stations are superimposed upon the topographic maps generated by the Remote Sensing Applications Center and weather conditions at those stations can be determined.

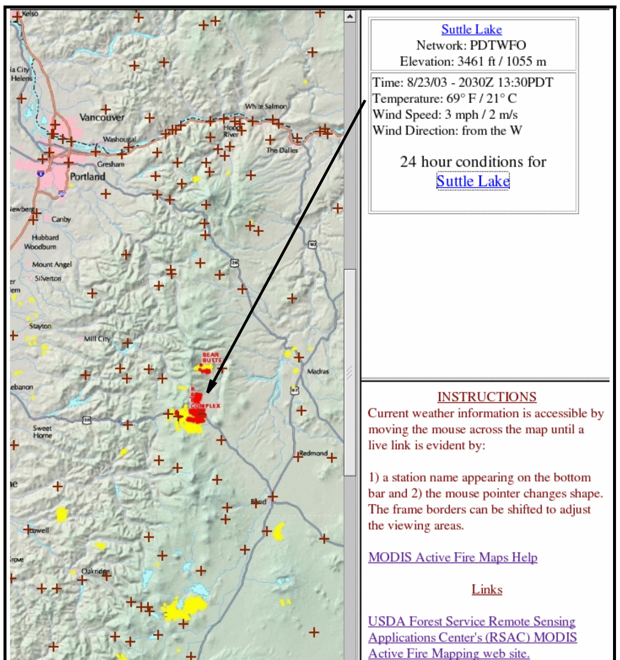

Figure 3. ROMAN MODIS interface. Superposition of ROMAN station locations (plus symbols) in central Oregon upon MODIS active fire map on 23 August, 2003. Yellow denotes previously burned areas while red denotes areas burning within the past 24 hours. The ROMAN MODIS interface allows access to station information and current weather information by selecting one of the plus symbols (in this case the Suttle Lake station near the Bear Butte fire complex).

3. ADAS SURFACE ANALYSES

The distortion of weather systems as they interact with the mountainous terrain of the western United States presents many challenges for the weather forecaster. In order to enhance the use of MesoWest/ ROMAN observations in NWS and fire weather operations, data assimilation using the Advanced Regional Prediction System Data Assimilation System (ADAS) is used to synthesize the irregularly spaced observations onto a regular grid over the western United States (Lazarus et al. 2003). ADAS surface analyses are generated every 15 minutes (hourly) at 10 km (2.5 km) horizontal resolution. Maximum/minimum temperature, relative humidity, and wind speed summary graphics for 00-00 UTC and 12-12 UTC periods are also created (e.g., Fig. 4). A user interface is coupled to the contoured graphical maps to allow a user to access station weather observations

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4. REFERENCES

Lazarus, S., C. Ciliberti, J. Horel, K. Brewster, 2002: Near-real-time Applications of a Mesoscale Analysis System to Complex Terrain. *Wea. Forecasting*, **17**, 971-1000.

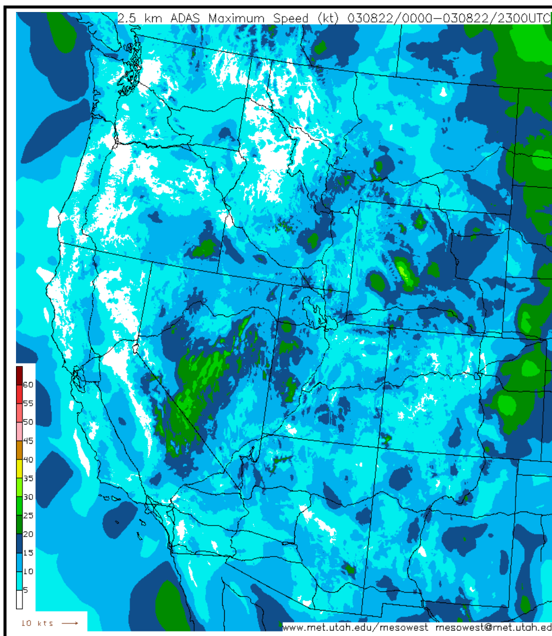

Figure 4. Maximum wind speed (kt) between 00-23 UTC 23 August, 2003 based on hourly ADAS 2.5 km analyses.