

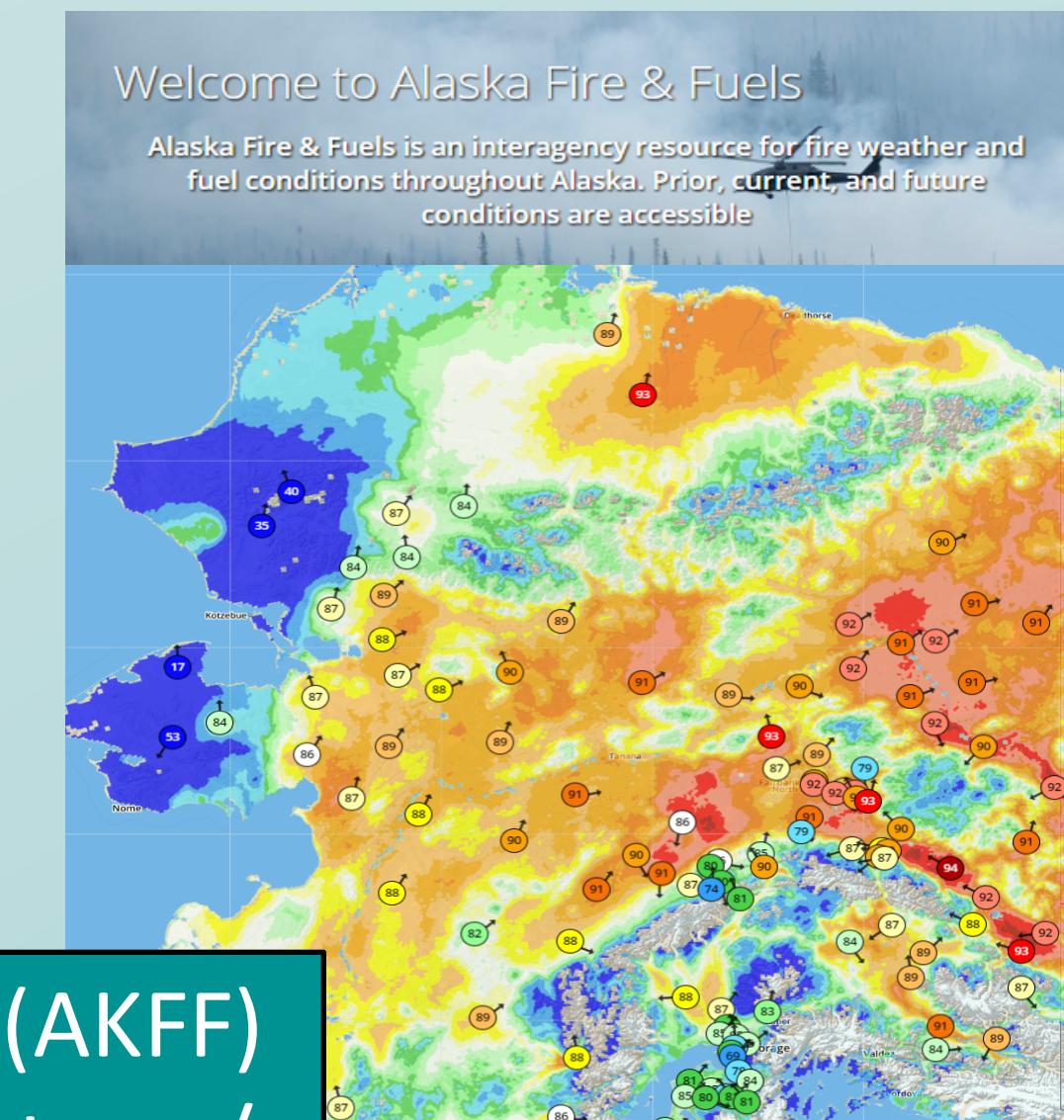
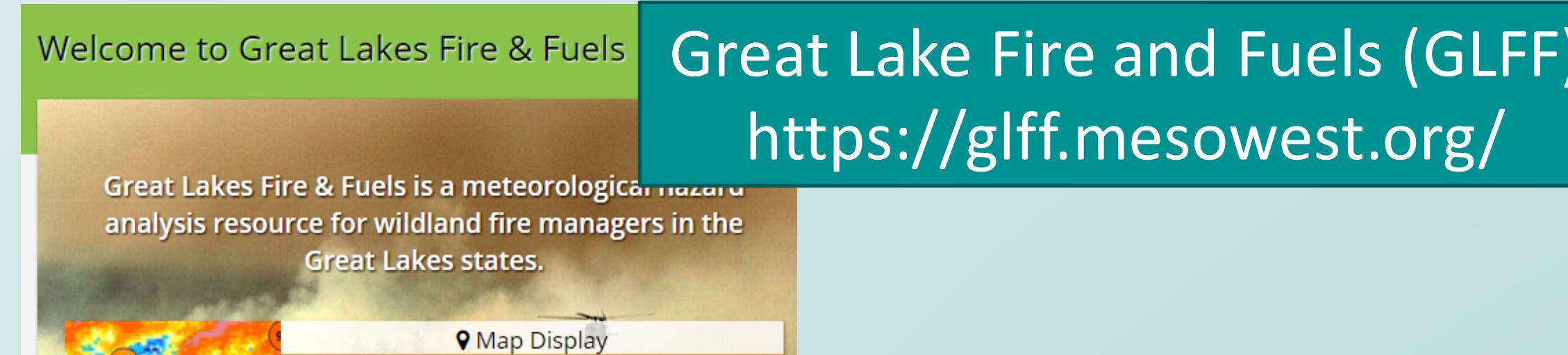
Communicating Fire Weather Risks at Short Lead Times using a Forecast Modeling System and Satellite Products

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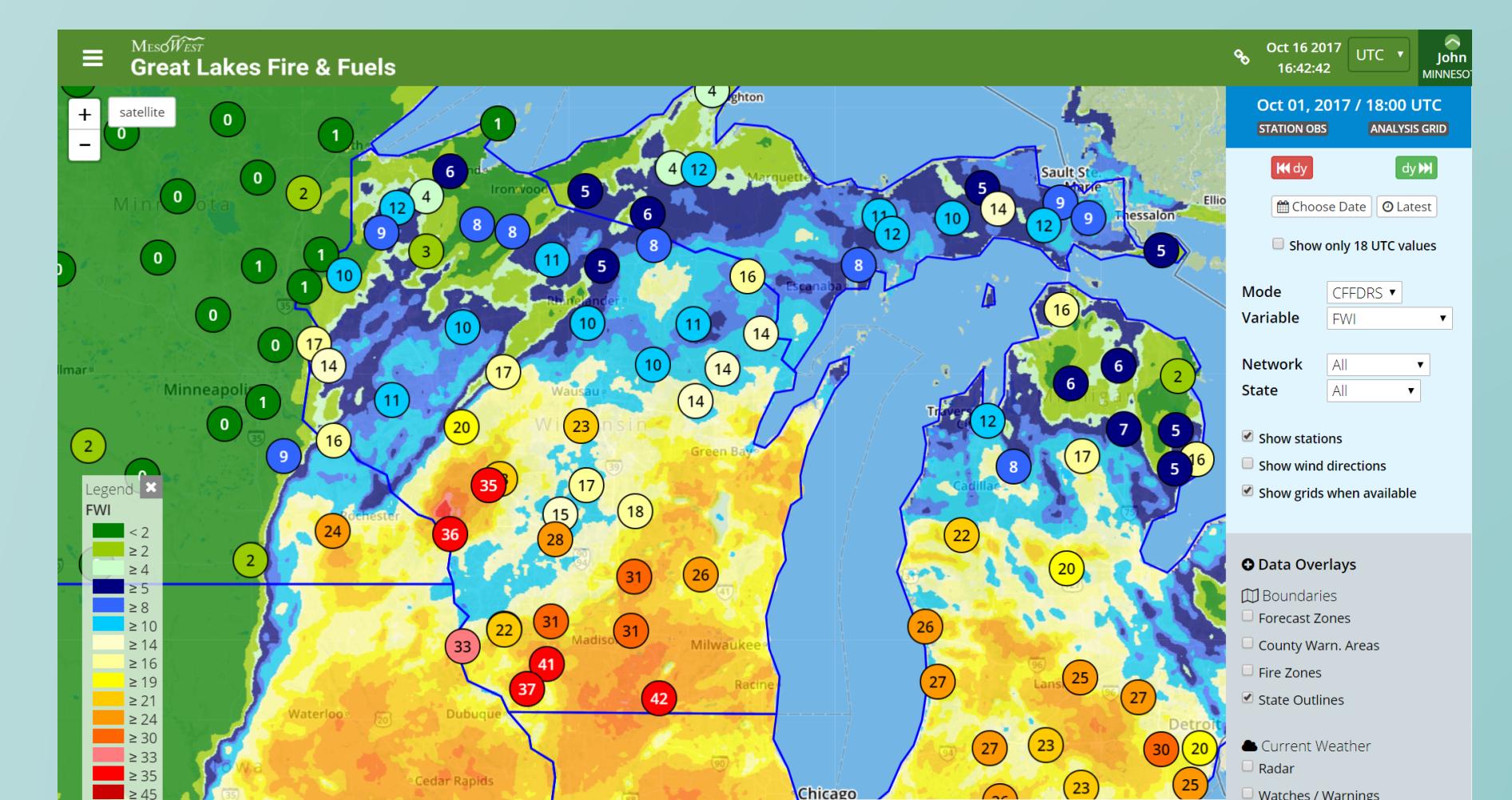
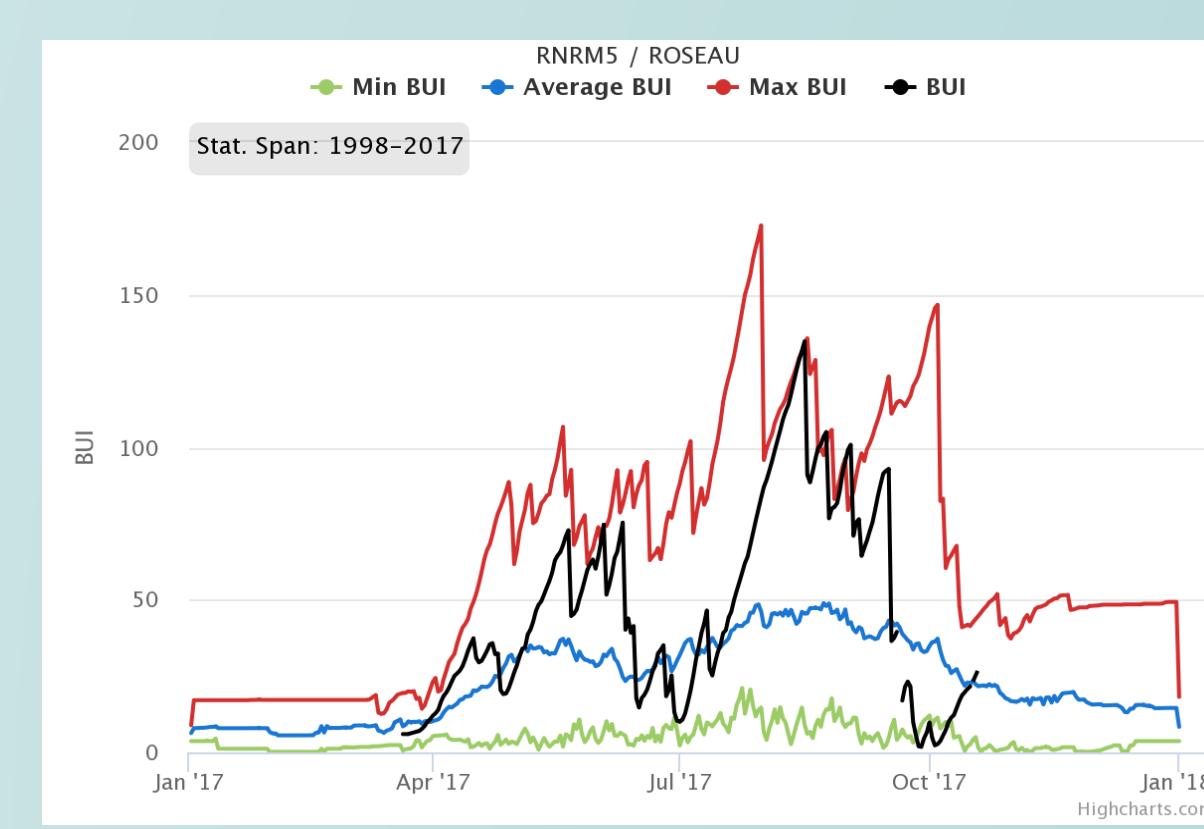


Operational Regional Fire Weather and Behavior Products

- This research builds on fire weather resources that are being used operationally:

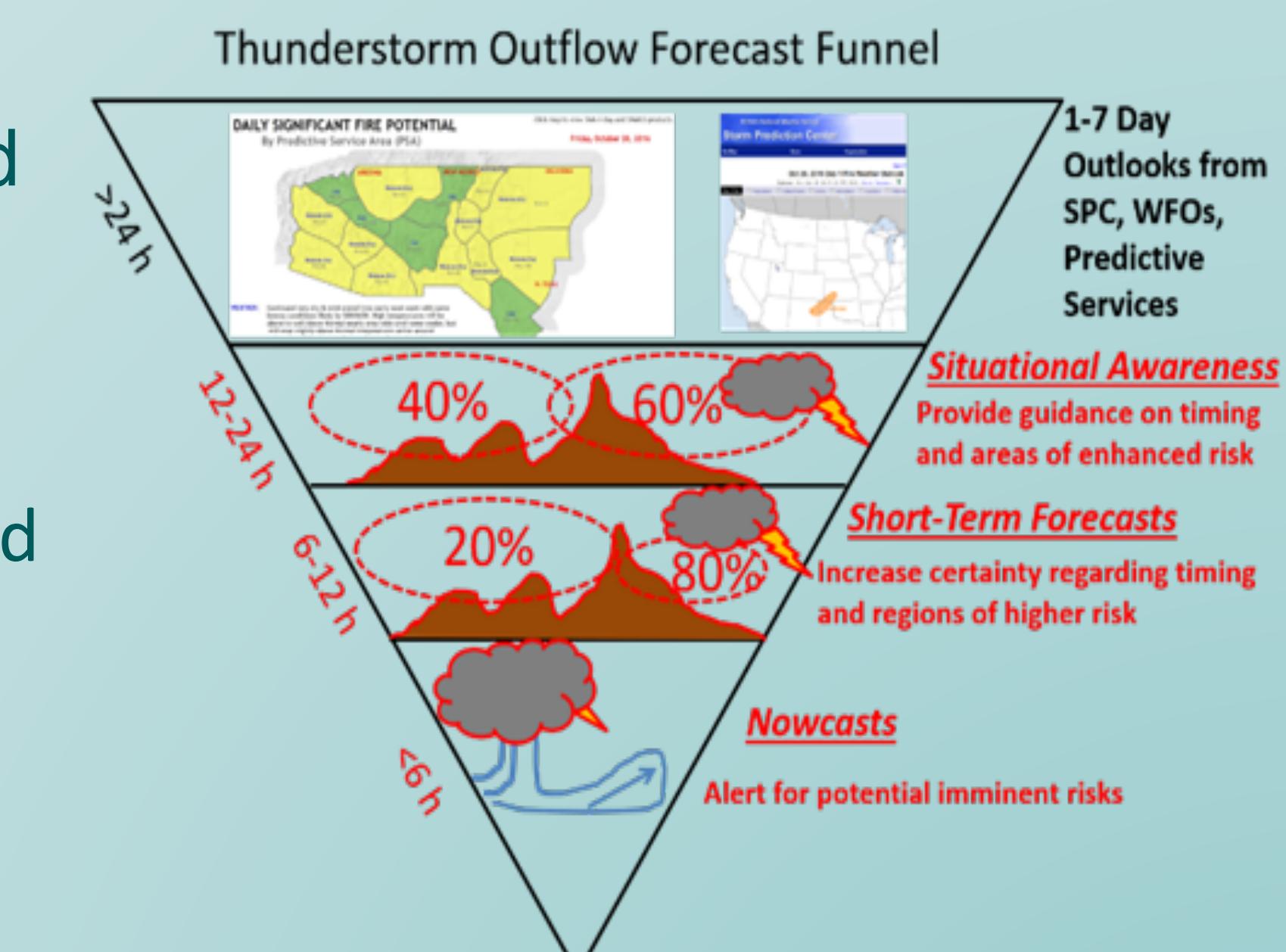


- Integration of observations, operational analyses and forecasts
 - weather observations from RAWS and other networks
 - NWS Real Time Mesoscale Analyses
 - 3-72 h forecasts from the NWS National Digital Forecast Database
- Fire weather and behavior indices computed using the Canadian Forest Fire Danger Rating System

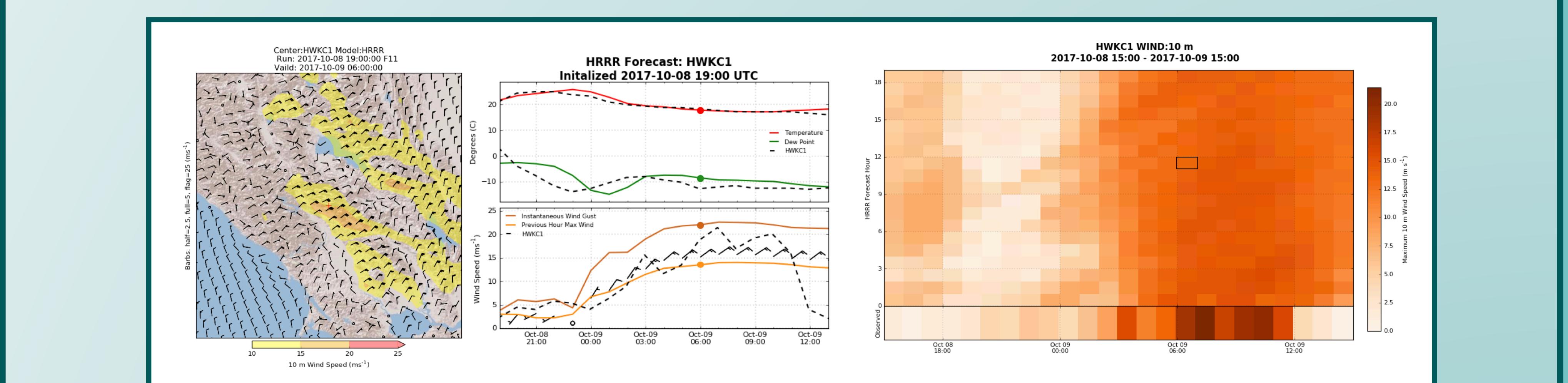


Problem Statement and Objectives

- Behavior and progression of wildfires throughout the United States influenced by mesoscale atmospheric boundaries that arise from thunderstorm outflows
- Evaluate the ability of High Resolution Rapid Refresh (HRRR) modeling system for the continental United States and Alaska to forecast these conditions in the vicinity of fires at short lead times (< 24 h)
- Evaluate the Global Precipitation Measurement (GPM) Mission's precipitation products derived using the Integrated Multi-satellitE Retrievals for GPM version 5 (IMERGv5) algorithm for daily use in operational Alaska fire weather products.



Monitoring Wildfires Across the CONUS with the HRRR



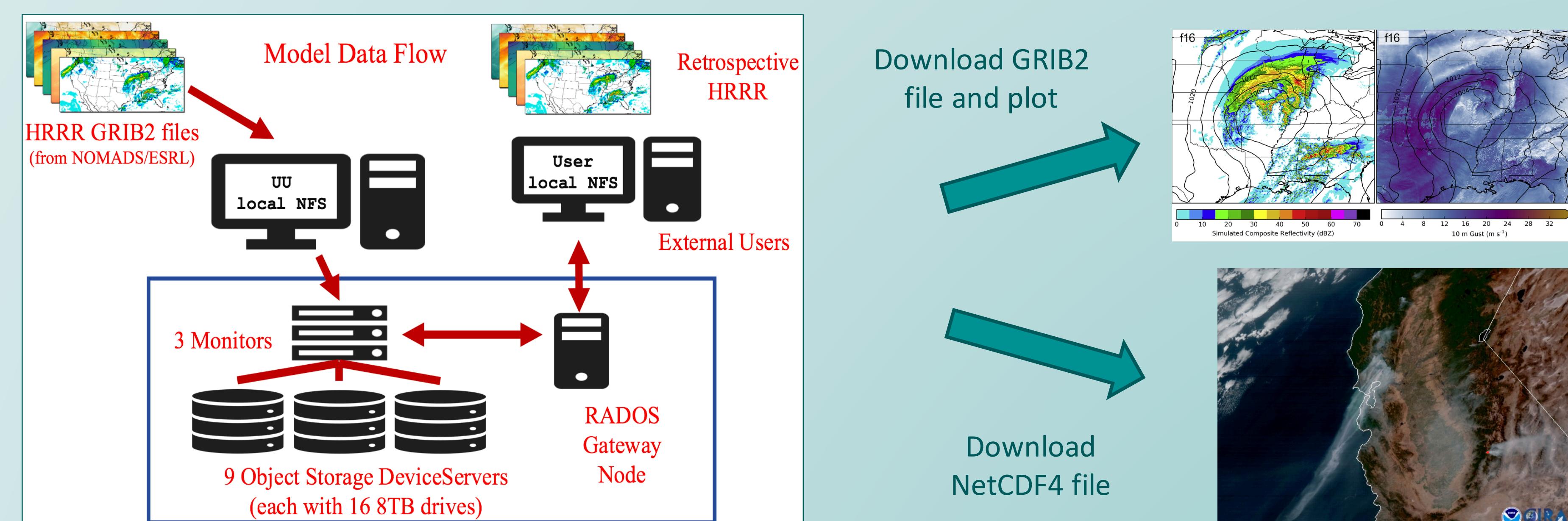
Left: 11-hour forecast of 10-m wind for a point forecast near the California Central LNU Complex fire. Wind barbs according to scale on left, contours according to scale on bottom.
Right: 11-hour point forecast of 2-m temperature (red line), dew point (green line), 10-m wind speed (orange), and instantaneous wind gust (burnt orange) initialized at 1900 UTC 8 October, valid at 0600 UTC 9 October. Black dashed lines are Hawkeye station observations.

Forecasted 10-m wind speed for the California Central LNU Complex fire between 8 October 1500 UTC and 9 October 1500 UTC. Each forecasted wind speed has two time dimensions—the valid time (x-axis) and the forecast lead time (y-axis). The black square corresponds to the forecast value on the left.

High Resolution Rapid Refresh (HRRR)

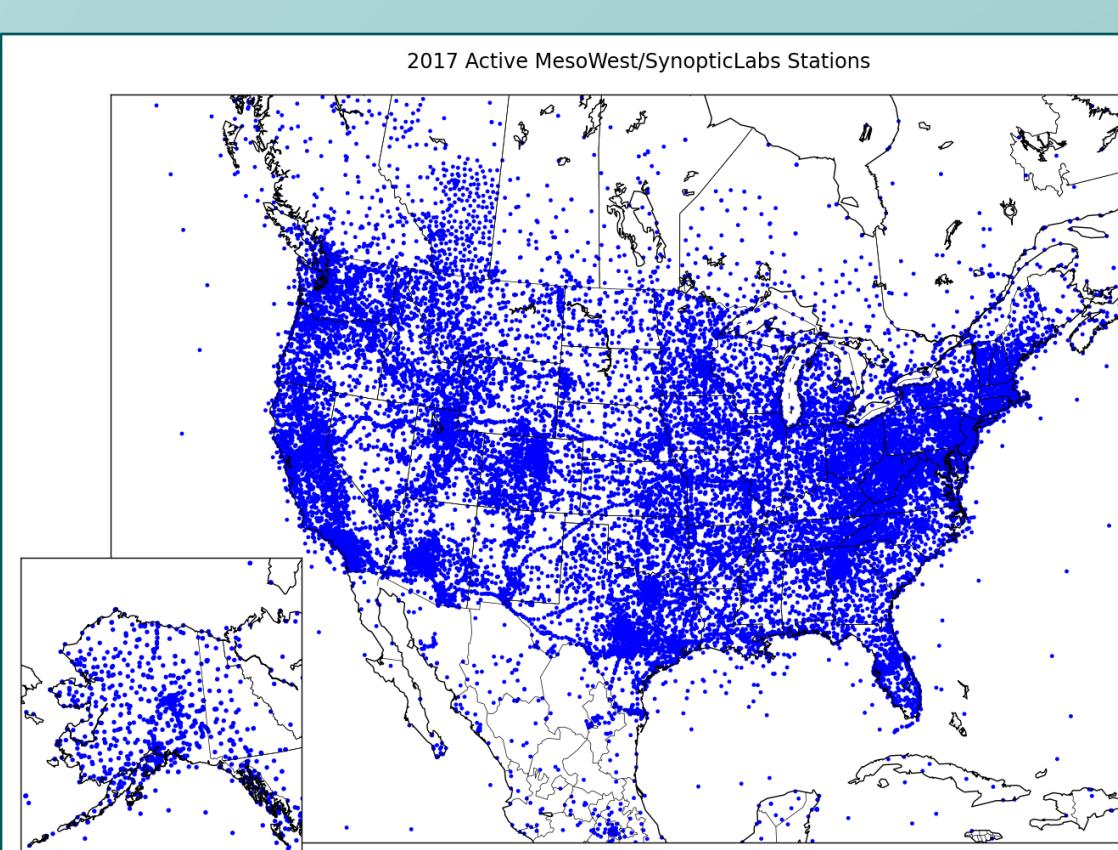
Model Forecast & GOES-16 Data Stored:

- Lower 48 states HRRR with hourly updates and hourly forecasts from 0-18h
- Alaska HRRR with 3-h updates and hourly forecasts from 0-36h
- 40+ TB of files in local S3 (<http://hrrr.chpc.utah.edu>)
- 2-km CONUS GOES-16 images in local S3 archive. Soon will archive GPM IMERG data as well. http://home.chpc.utah.edu/~u0553130/Brian_Blaylock/cgi-bin/goes16_pando.cgi



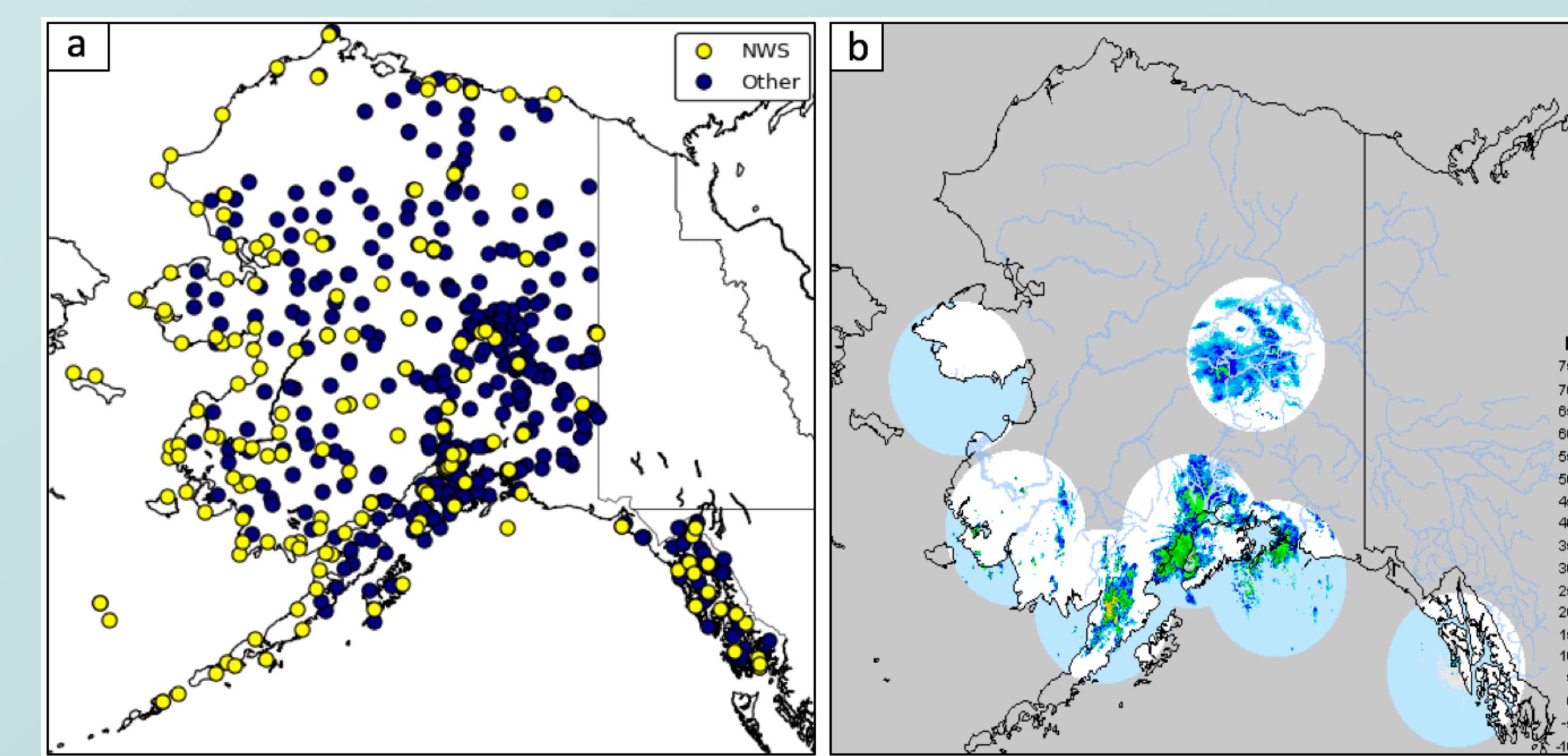
In-Situ Observations:

- In-situ environmental data are accessed via MesoWest (<https://mesowest.org>)
- Data are sourced from NWS, ASOS/AWOS, and other mesonets across the CONUS and Alaska



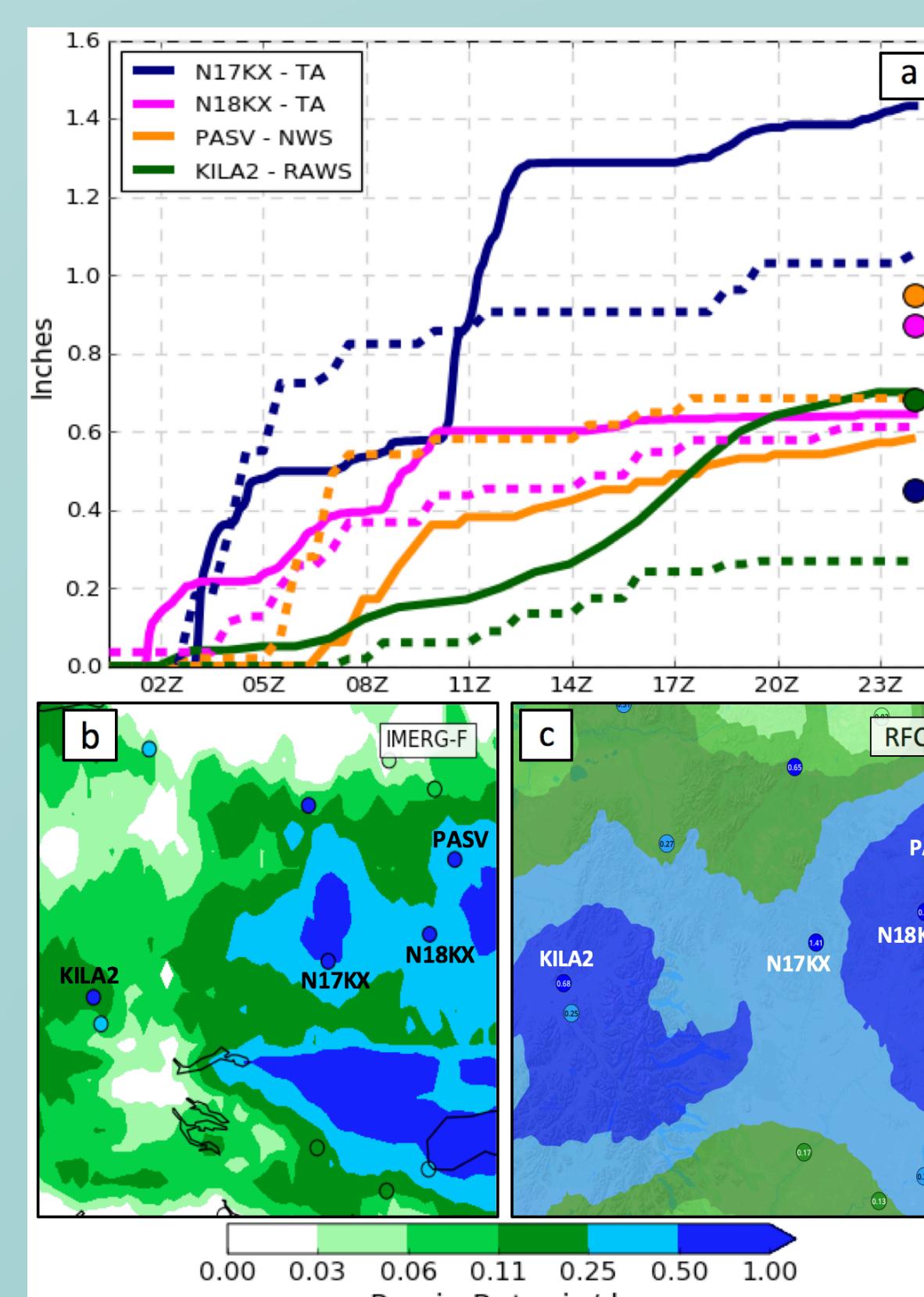
Global Precipitation Measurement (GPM) Mission

- The GPM Mission is the latest constellation of satellites intended to provide near real-time 10 km precipitation estimates at 30-minute intervals for all latitudes using a multi-satellite algorithm.
- The Integrated Multi-satellitE Retrievals for GPM (IMERG) algorithm was developed to incorporate all microwave and infrared precipitation estimates from GPM satellites into a single precipitation estimate.
- The latest IMERG version, 5B (IMERGv5), calculates three precipitation estimates from satellite retrievals at all latitudes: Early (-E), Late (-L) and Final (-F) at latencies of 6 hours, 12 hours, and ~2.5 months, respectively.



An evaluation of these IMERGv5 precipitation products will be performed using in-situ (Fig. a, above) and radar-derived precipitation estimates (Fig. b, above) in order to determine their efficacy for use in operational fire weather applications in the state of Alaska.

- A successful IMERGv5 evaluation will provide another precipitation dataset that can be used for calculating fire weather indices and fuel flammability (Figs. a & b, right).
- Currently these are calculated using precipitation estimates provided by the AK River Forecast Center (Fig. c, right).



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