WASHINGTON STATE UNIVERSITY
LABORATORY FOR ATMOSPHERIC RESEARCH

BlueSky / SMARTFIRE-2 for AIRPACT-4

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NW-AIRQUEST Annual Meeting (June 18-20, 2014)

Overview

Goal:

- Provide daily fire emissions to AIRPACT using the newest version of BlueSky

Methods:

- Install BlueSky v3.5.1 with SMARTFIRE-2 on WSU Aeolus virtual server
- Configure separate processes for forecast mode and re-analysis mode
- Use SMOKE plume-rise method instead of BlueSky plume-rise so that meteorology is considered in buoyancy calculations

Current Status

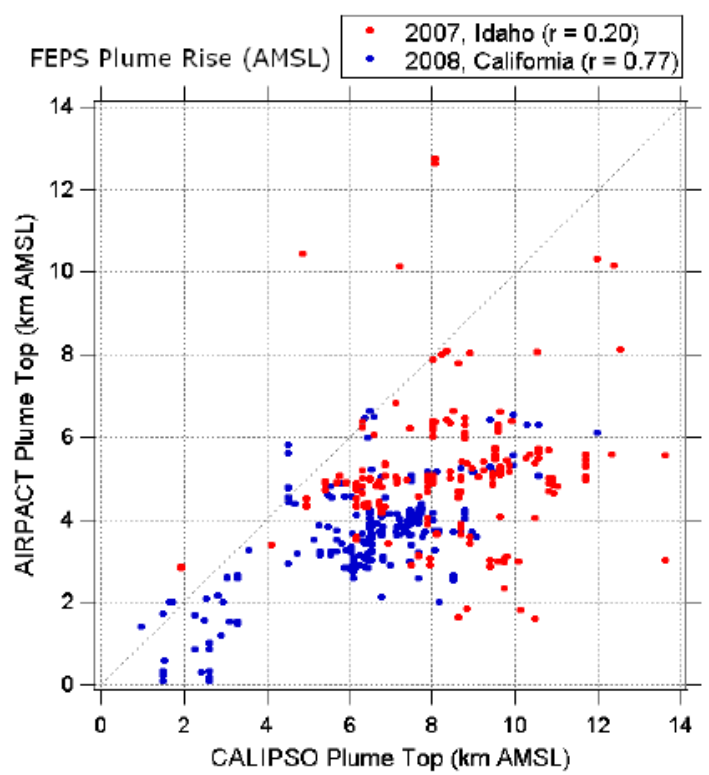
Completed:

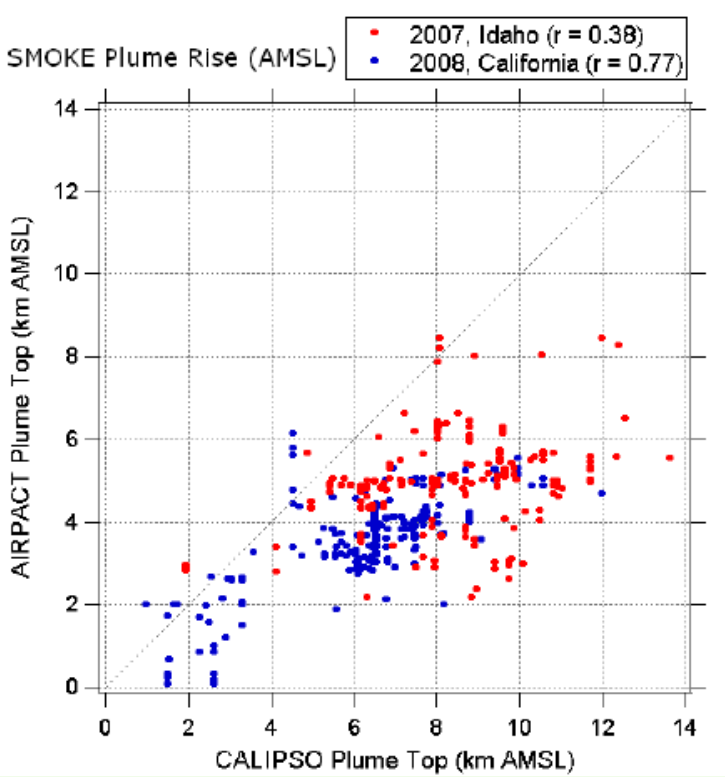
- Fire emissions currently operational in AIRPACT-4. BlueSky is run in-house nightly

Configuration Options:

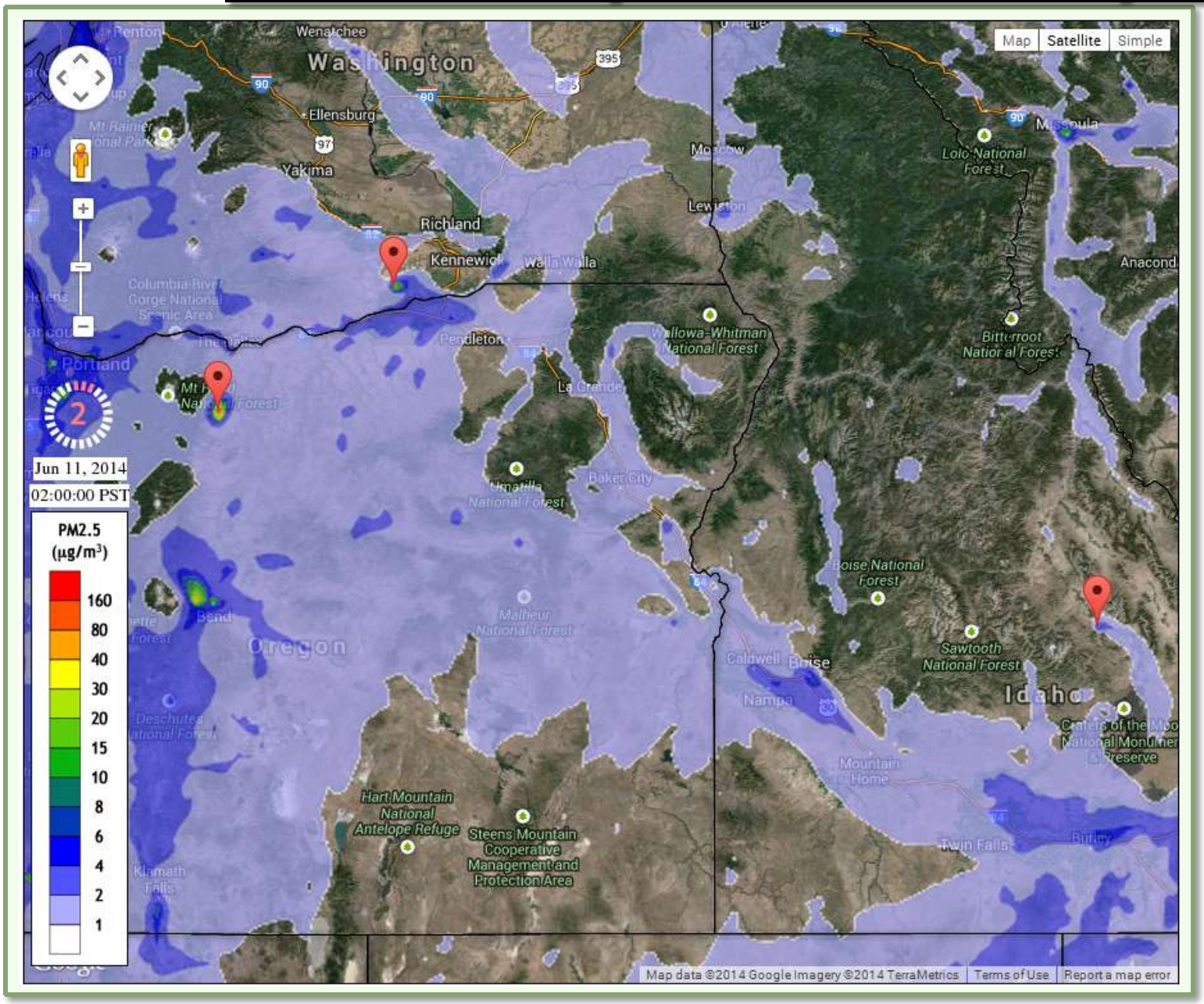
- Wildfire Growth = Persistence
- Rx Fire Growth = None
- Rx Canopy Fraction = None
- Spin-Up Emissions = previous 24 hours
- Minimum fire size = 100 acres

Changes in Plume Rise





/eb Graphics Example

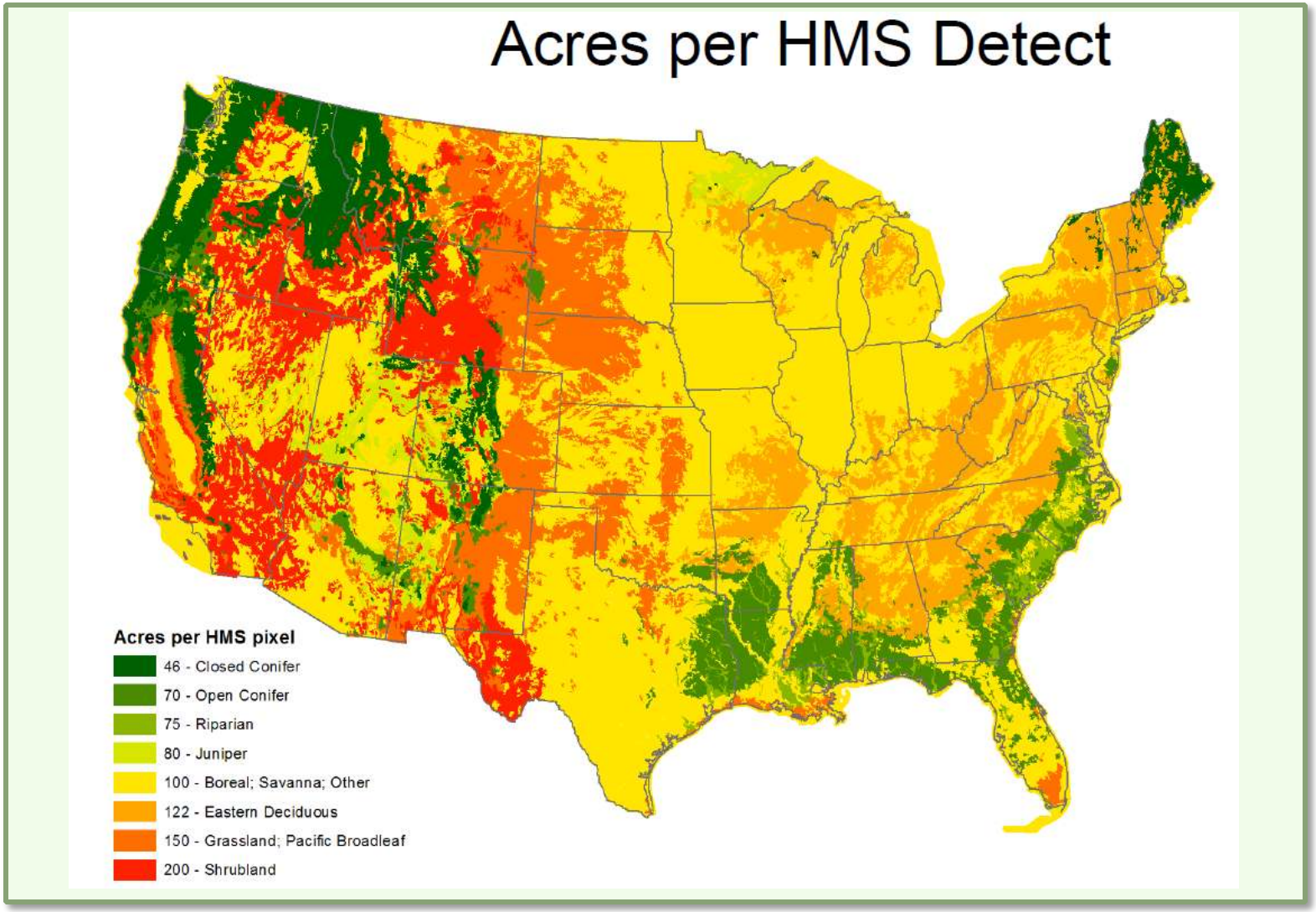


Problems

SMARTFIRE-2:

- Fires reported by the Hazard Mapping System (HMS) have assumed parameters
  - minimum size is large
    - fire size scales directly by number of HMS detects (large overages seen in the past)
  - state/month determines Rx vs WF
    - "WF season" for WA, ID, MT, CO, WY, OR = June-Aug
    - "WF season" for CA, NV, and UT = May- Oct

Problems (cont.)

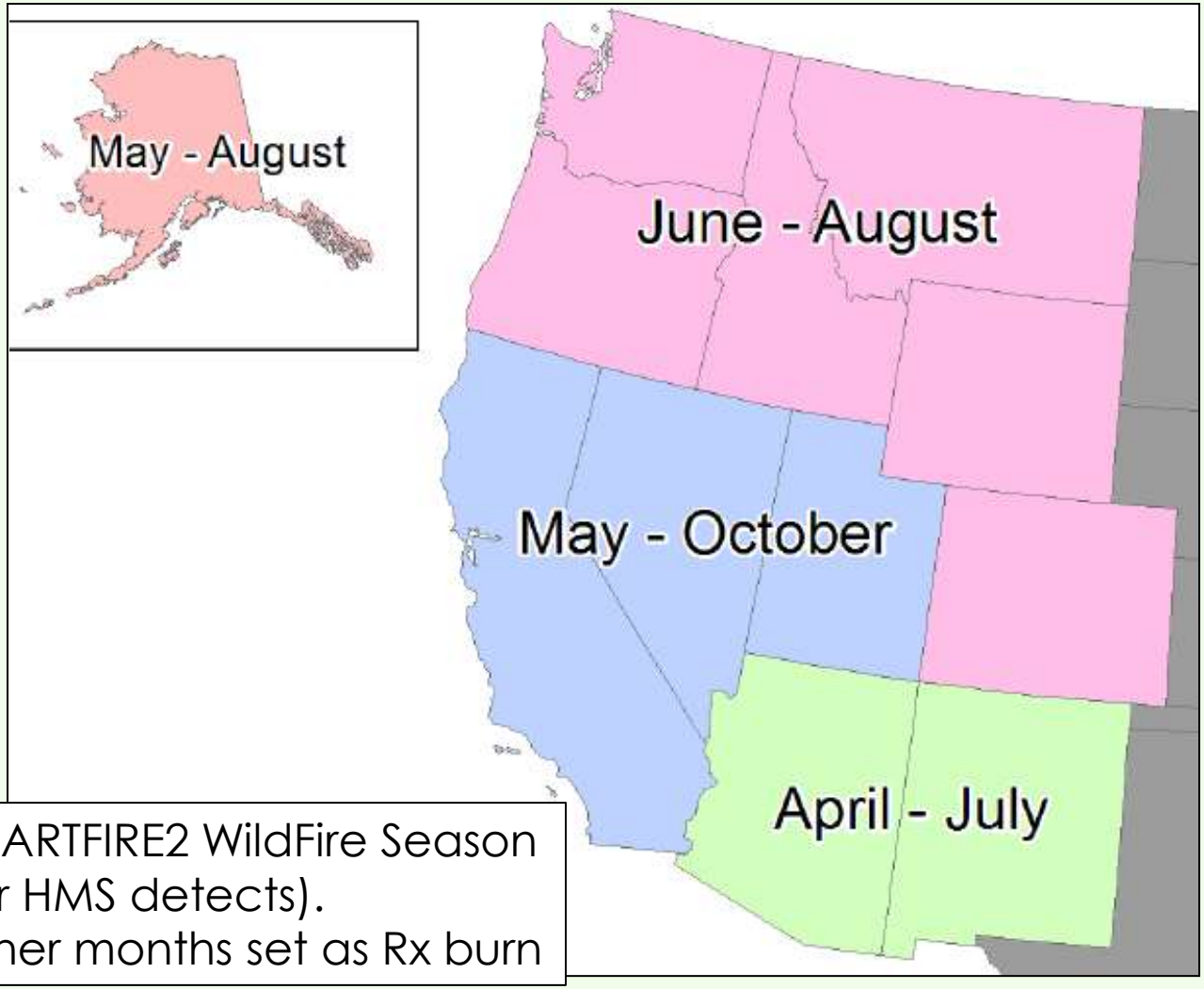


Problems (cont.)

Forecast/Persistence:

- Forecast mode grabs fires reported on previous day
- Persistence setting for Rx fires does not allow them to be modeled in forecast mode
  - Fires reported by HMS assume fire type
  - Effectively, no HMS fires are being forecasted during non-WF season months.
  - Implications for fires along borders of states with different "WF seasons"

Problems (cont.)



SMARTFIRE2 WildFire Season (for HMS detects).
Other months set as Rx burn

Problems (cont.)

Canadian Fires:

- Canadian fires are detected by HMS and reported by SF-2
  - country and county reported as "unknown"
  - coordinates given
- BlueSky / FCCS does not include fuels for Canada
  - no fire emissions available for Canada

Possible Solutions

HMS Fire Type:

- Turn on persistence for Rx fires (canopy will not burn unless we change setting)
- Convert all Rx fires to WF if over size threshold (what size though?)

HMS Fire Size:

- Set minimum fire size?
  - can eliminate single HMS detect fires
    - 100 acres currently implemented
- Overwrite minimum fire sizes
  - e.g. overwrite them as 1 acre fires
    - implemented in old framework

Possible Solutions

Canadian Fires:

- Assume a single fuel type so we at least get some emissions
- Efforts were made to implement Canadian fuels into FCCS map used by BlueSky in previous version
  - updates to the BlueSky system make previous methodology invalid
  - very time consuming / problematic
- Perhaps the BlueSky/Canada folks would share their fire emissions?

Future Work

HMS –Detected Fires:

- Preferred methods for fire size and type?

Fires in Canada:

- What is reasonable?