

5-day smoke forecasts

Ranil Dhammapala

Tes Ghidey

Farren Herron-Thorpe

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About long range forecasts

- Public never stops asking about that weekend hike
- Emissions uncertainty
- Few long range smoke models exist
- Explored ensemble forecasts
- Mapping monitors to areas
 - PSCAA shapefiles, SRCAA smoke control zone
 - Cluster analysis of Airpact vs obs 2015-2020

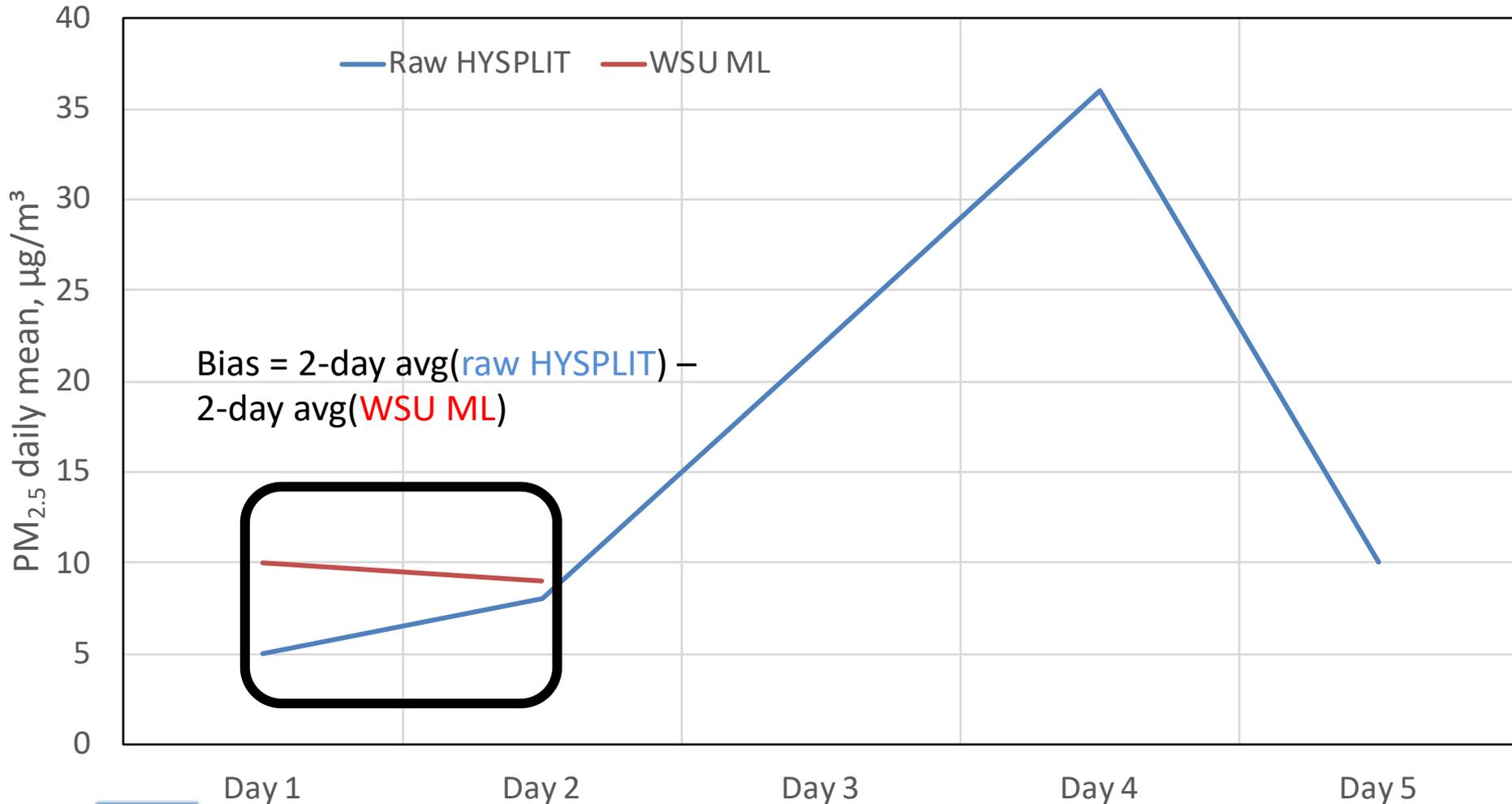


Ensemble members

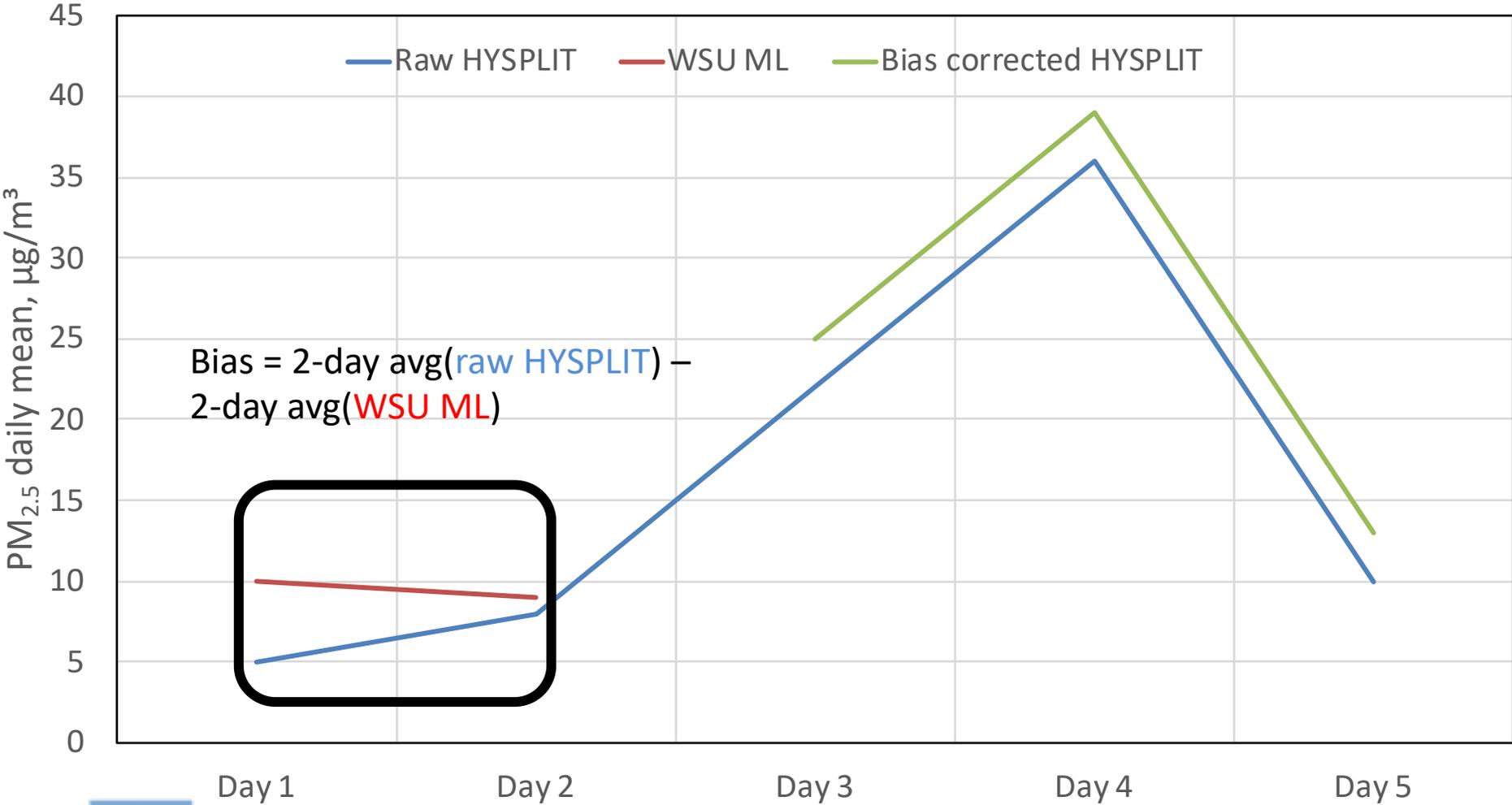
- 8 HYSPLIT runs
 - Emissions from NOAA HMS FRP
 1. Persistence
 2. Adjusted by NIFC 7-day significant fire potential
 3. (2) above x 2 (fire growth)
 4. (2) above x 0.5 (fire reduction)
 - Two vertical plume velocity parameterizations
 - UW WRF 12km extended meteorology
 - 8 hours spin-up time for carryover smoke
 - Additive bias correction with WSU ML forecast
 - ML gets honorary FEM status
 - Ranges between 5 and 500 $\mu\text{g}/\text{m}^3$.



The bias correction



Corrected = Raw HYSPLIT - Bias



Global models among ensembles

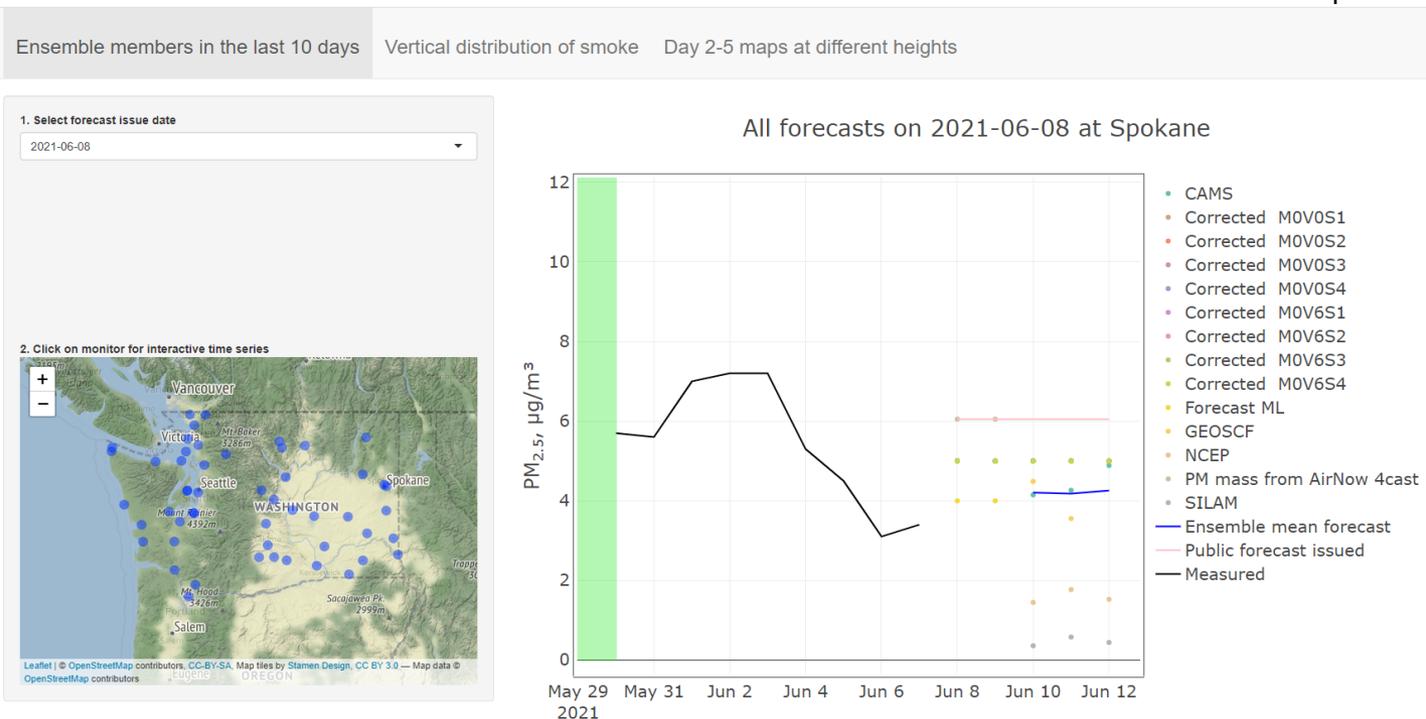
- 120hr PM_{2.5} forecasts
- Emissions from all categories + chemistry
- ≤ 0.5 degree resolution
- Free grids available by 4AM PDT
 - ECMWF CAMS (same day 0Z, 0.4°)
 - NASA GEOS-CF (previous day 12Z, 0.25°)
 - NOAA GEFS-Aerosol (same day 6Z, 0.25°)
 - Finnish SILAM (same day 0Z, 0.5°)
- Days 3-5 interpolated to common 0.25° grid
- Max daily 2x2 grid avg around WA PM_{2.5} monitors
- Not bias corrected
- Averaged with 8 bias corrected HYSPLIT members



Observing forecast performance

- (Internal only):

http://aeolus.ecy.wa.gov:3838/ensemble_forecasts/



Please note

- No $PM_{2.5}$ obs data yesterday → no ML forecast → no HYSPLIT bias correction → no ensemble forecast
 - Unless LAA submits to AirNow, OR
 - ECY manually overrides days 1 &/ or 2.
- AQI only
 - LAA AirNow forecasts use AQI
 - Temporal & spatial averaging; uncertainty
- USFS working to show 5-day forecast on smoke blog
- Back to 2-day forecast Nov- May



No smoke expected this summer

Smoke covers in the glitz of technical tools

Ask ozone why it doesn't impact Kennewick anymore

