

Improving Smoke Modeling for Exposure Assessment Using New Satellite Products

Sean Raffuse

Air Quality Research Center
UC Davis

Susan O'Neill

AirFire Team
USDA Forest Service

HAQAST6 10-12 July 2019,
Pasadena, CA





Goal

Daily estimates of ground-level $\text{PM}_{2.5}$ at high spatial resolution for exposure assessment

Method

Model fire emissions and pass to chemical transport model (CMAQ)

Improvement

Use 5-minute time resolution of GOES-16 fire product to improve temporal allocation of emissions

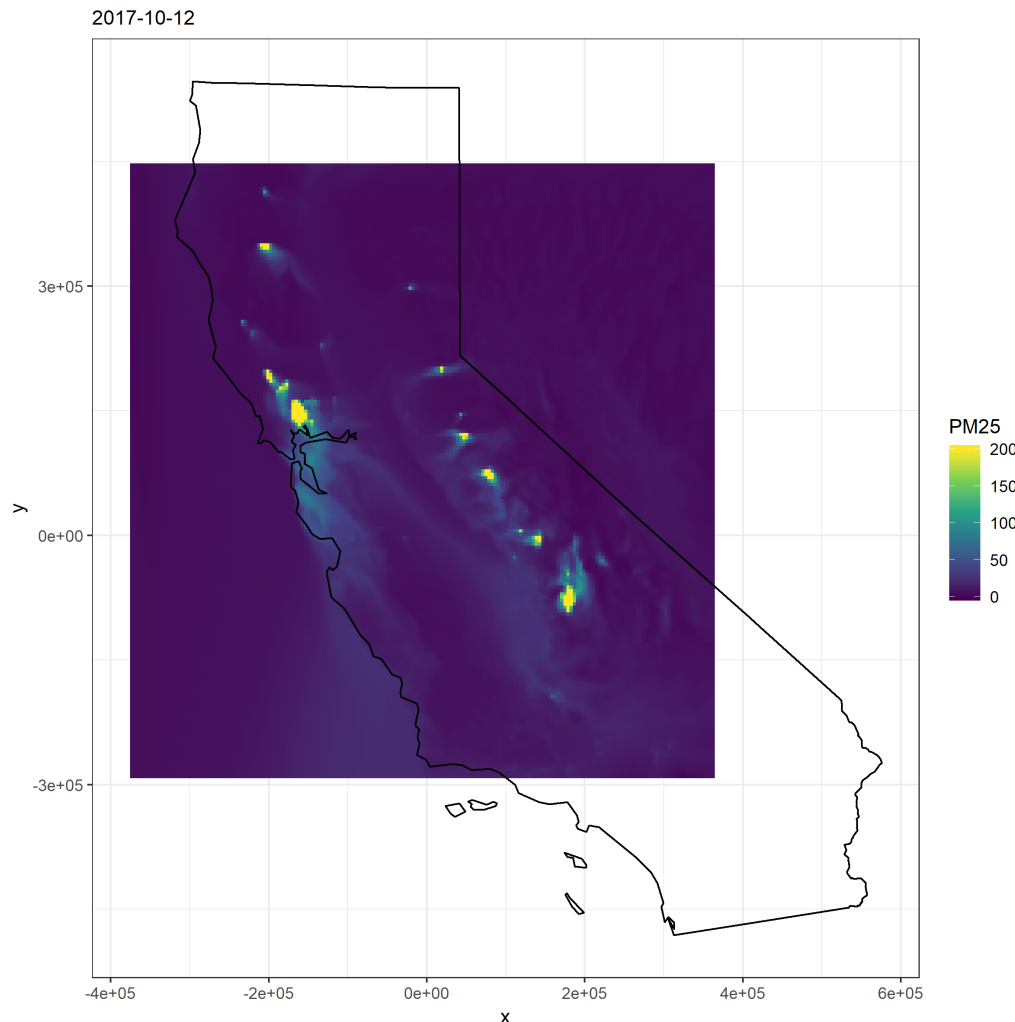
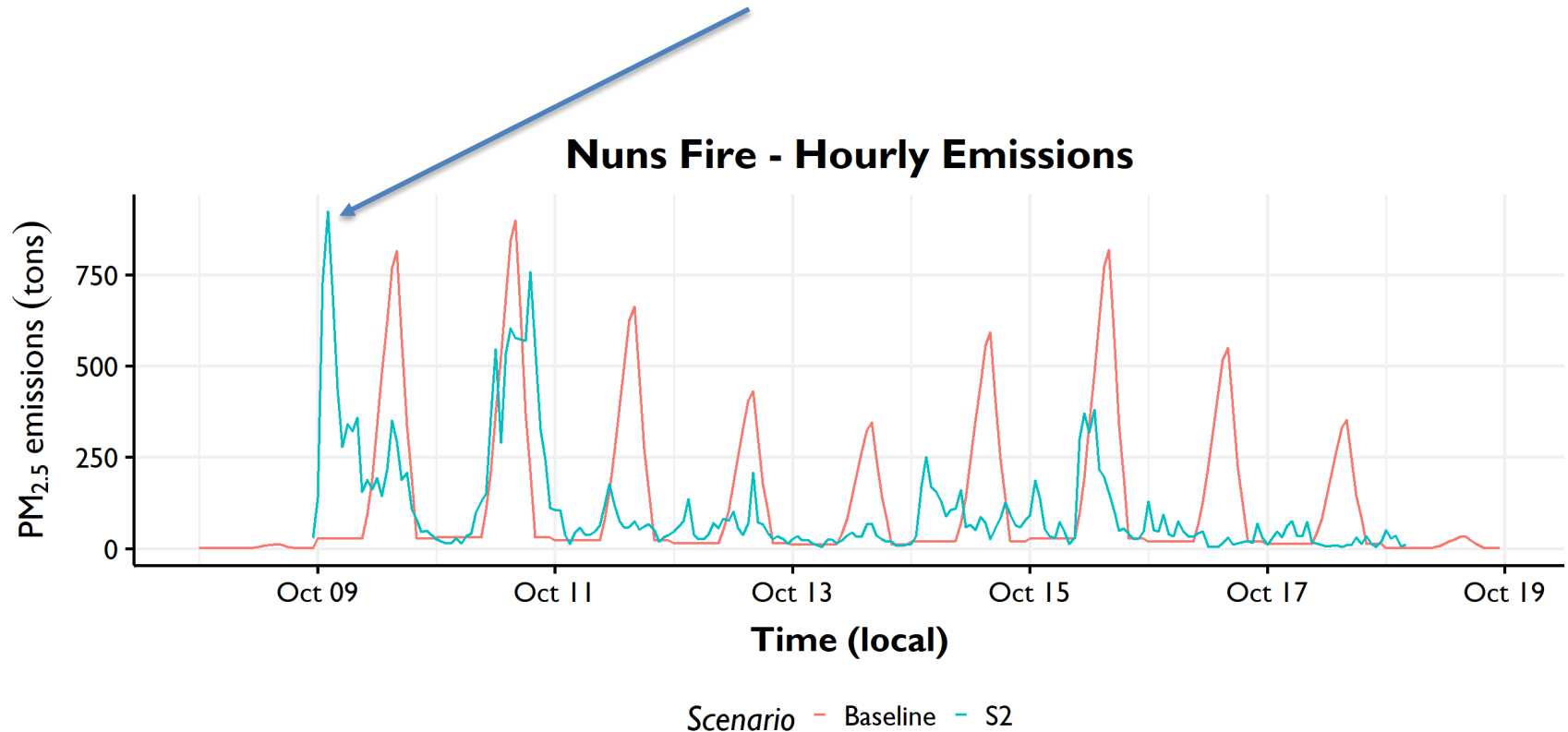




Photo: Stuart Palley

GOES-16 Fire Radiative Power (FRP) captures overnight blowup

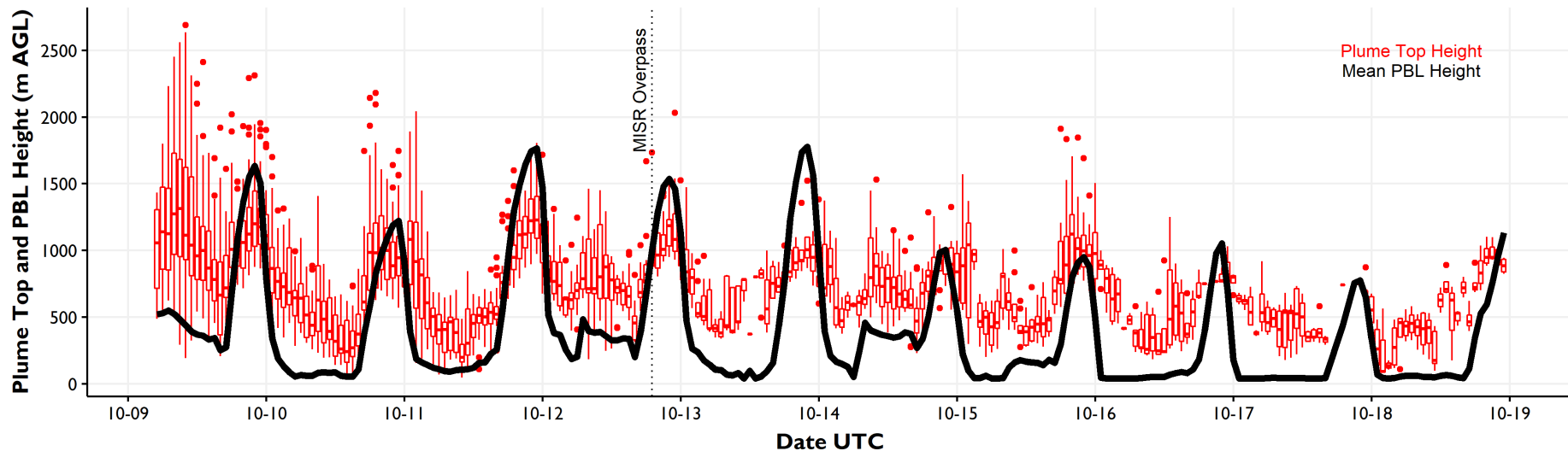


GOES-16 FRP allows for tracking of plume injection height



Plume Heights (S2)

GOES-16 fire activity with Sofiev plume rise



GOES-16 is improving our ability to model smoke exposure

Thank you!

Susan O'Neill – USFS – HAQAST Tiger Team PI, BlueSky modeling

Chris Schmidt – NOAA – GOES-ABI fire product algorithms

Stephen Reid and Yiqin Jia – BAAQMD – CMAQ modeling

NASA FEER group – FRP-driven emission estimates

Sofiev et al. (2012) – FRP-driven plume injection height methods

Plume top is not the whole story

Atlas Fire, East of Napa
October 9, 2017

What fraction of the emission
are lofted beyond the first
model layer?

For smoke that is lofted, what
is the plume bottom?



Michael Short / Special to the SF Chronicle