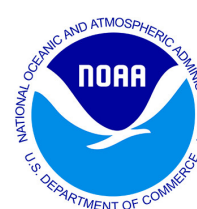
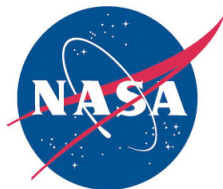




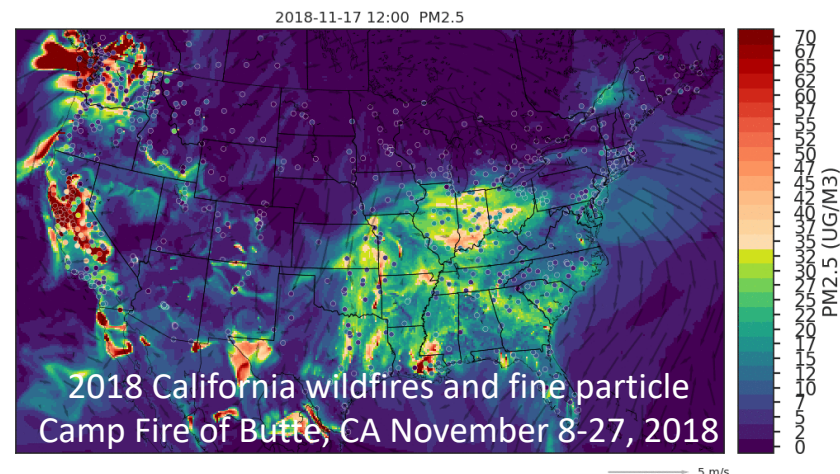
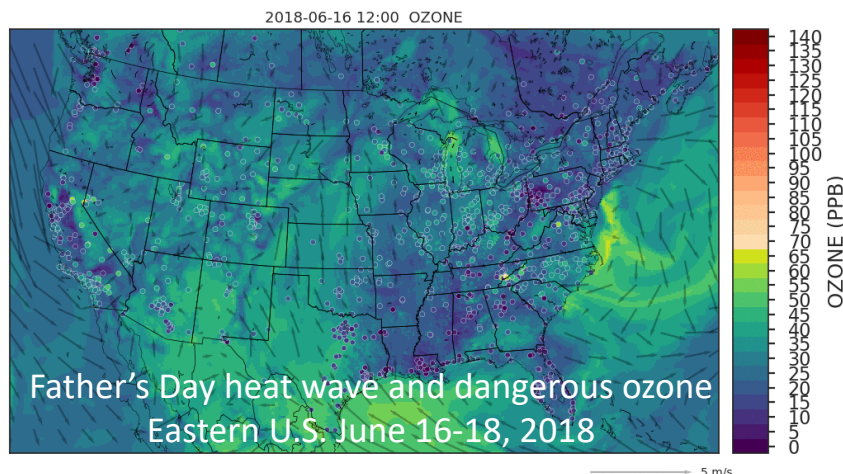
HAQAST 6 Meeting
July 10-12, 2019, Pasadena, CA



Updates of Satellite Applications in National Air Quality Forecasting

Patrick C. Campbell^{1,2,3}, Daniel Tong^{1,2,3} (*PI*),
Youhua Tang^{1,2,3}, Barry Baker^{1,3} and Pius Lee²

1. George Mason University, Fairfax, VA
2. NOAA Air Resources Lab, College Park, MD
3. University of Maryland, College Park, MD

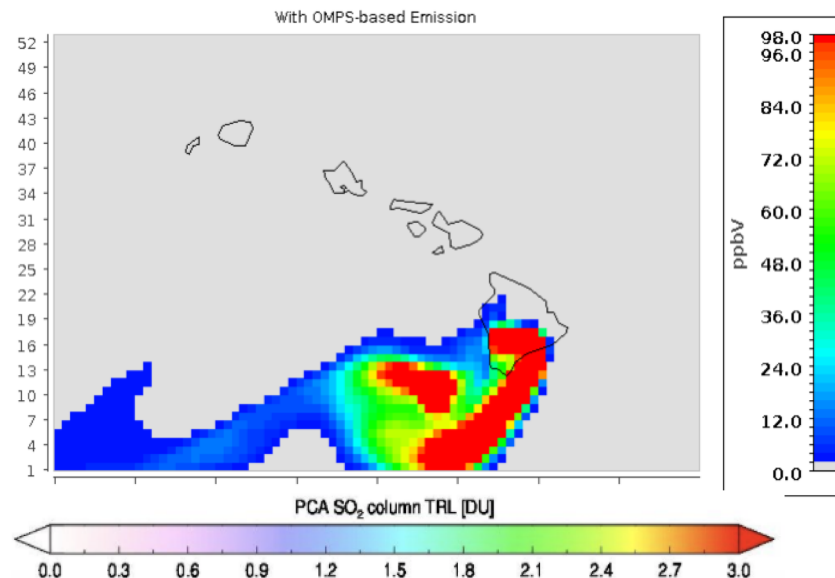


Volcanic SO₂ Forecasting with OMPS SO₂

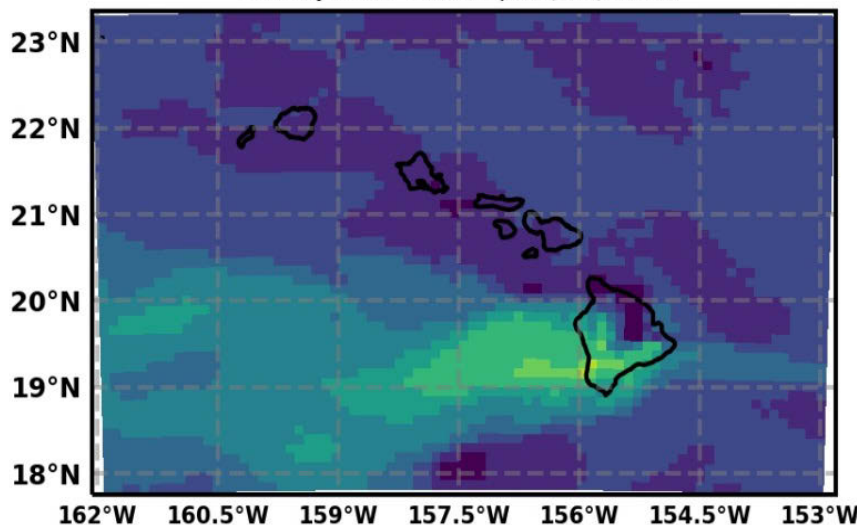


(REUTERS/Terray Sylvester)

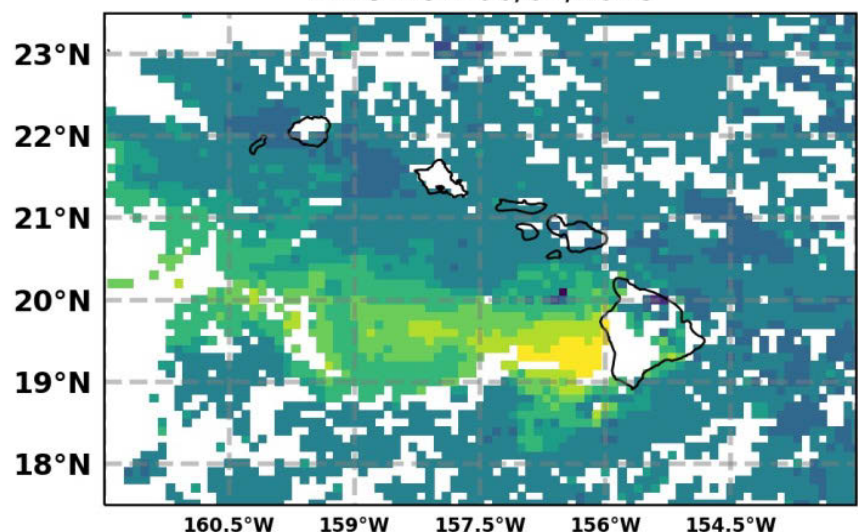
New SO₂ Forecasting



CMAQ AOD 23UTC, 06/04/2018

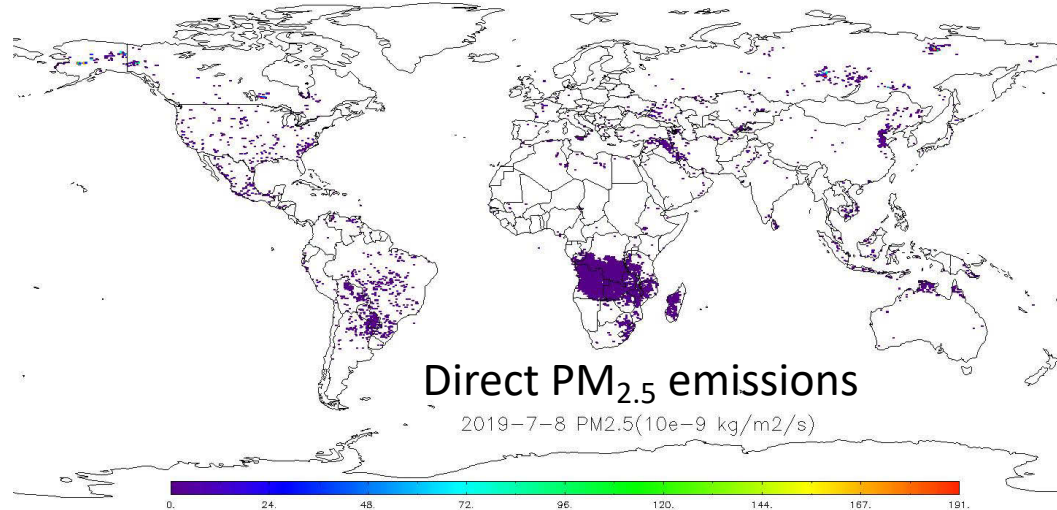


VIIRS AOD 06/04/2018

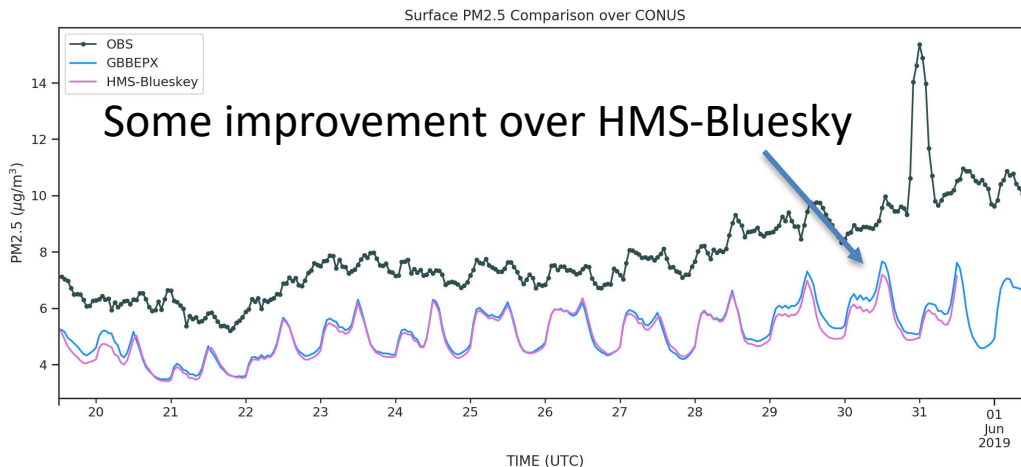




The Blended Global Biomass Burning Emissions Product (GBBEPx V2)



GBBEPX 0.1x0.1 Emission testing in a real-time PM_{2.5} forecast



- Speciated wildfire emissions
- Diurnal variation/daily ratio
- Duration when forest fraction > 0.4
- Inline plume rise using Briggs
- Heat flux derived from FRP
- Burn area is 10% of gridded area

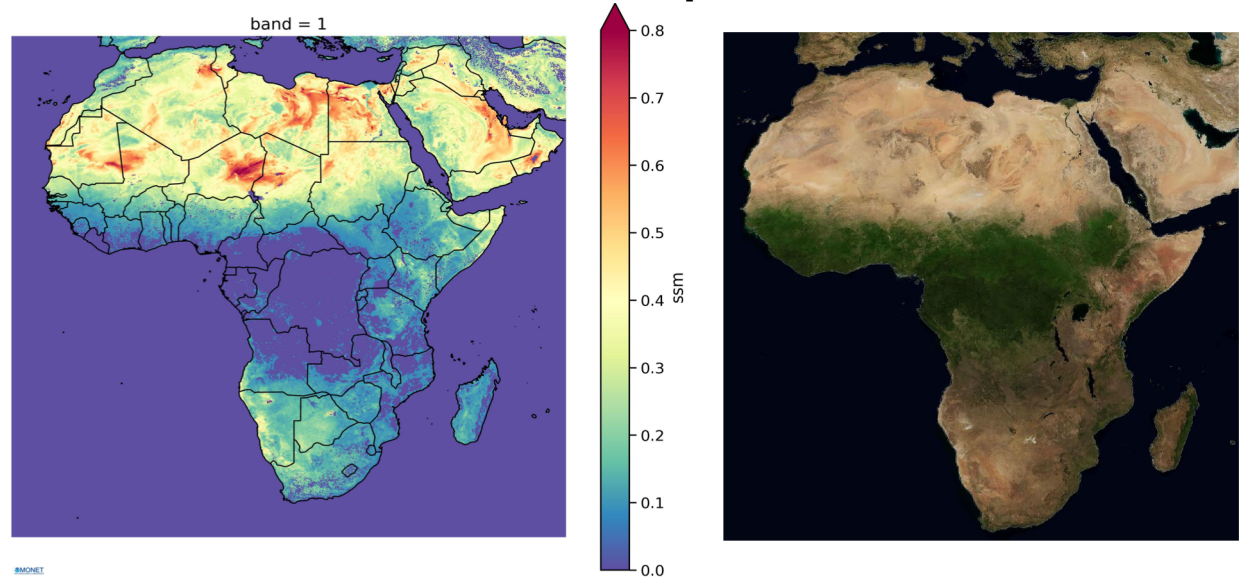
Goal:

Novel method to improve dust forecasting nationally and globally.

Satellite Products:

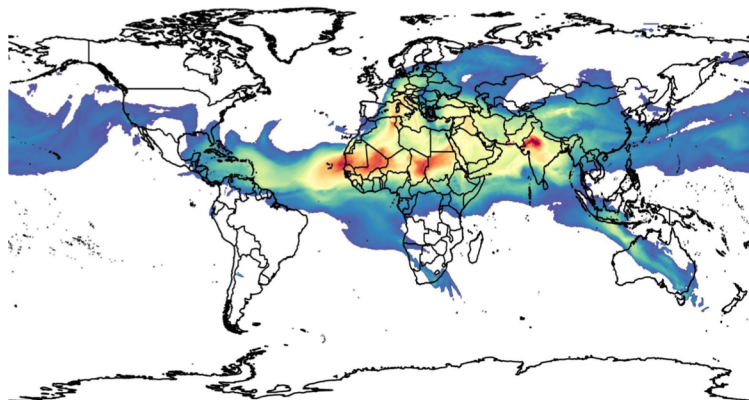
- MODIS/VIIRS Albedo;
- MODIS/VIIRS BRDF;
- MODIS/VIIRS AOD;

MODIS Albedo-based Dust Map



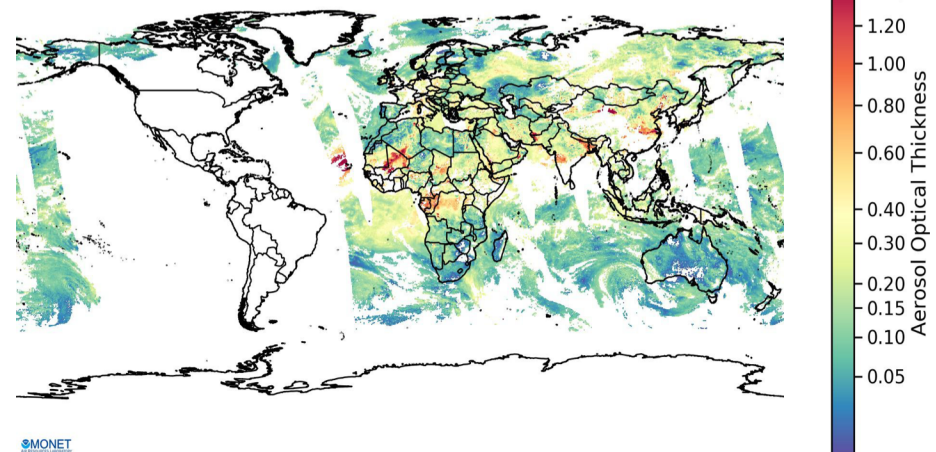
Global Dust Forecasting

time = 2019-06-10, level = nan



MODIS AOD

time = 2019-06-10, level = nan



- Emission data assimilation (EDA) algorithms are being developed at HAQAST to improve emission modeling;
- Initial applications to real-time air quality forecasting show promising results;
- Working with National Weather Service for further evaluation and transition to operational forecasts.

Emission data assimilation, air quality forecasting and reanalysis

- Air quality forecasting:
 - Advancing air quality forecasting to protect human health [Tong and Tang, 2018];
 - The particle dry deposition component of total deposition from air quality models: right, wrong or uncertain? [Saylor et al., 2019]
- Fire emissions:
 - Retrospective simulations of the 2018 Camp Fire in California (Oct 5-25, 2018);
 - Real-time ensemble forecasting for FIREX-AQ;
 - Evaluating a fire smoke simulation algorithm in the National Air Quality Forecast Capability (NAQFC) using SENEX [Pan et al., 2019];
- Outreach: Six presentations; Twelve stakeholder meetings;

Tiger Team Participation

- TT O'Neal & Diao: CA Fire
 - Testing different satellite-based fire emission products with NAQFC;
 - Conducting a national scale simulation of the 2018 Camp Fire.
- TT Fiore: Regional Haze.
 - Worked with TCEQ to study dust contribution to haze in Texas.
- TT Anenberg.
 - Working on a long-term dust dataset for Lancet Countdown.

Two papers published;
Two accepted;
Two under review.