

**Naval Research Lab Resources for Air Quality Modeling
Satellite Aerosol Products Workshop, September 25, 2018**

Introduction

The Naval Research Laboratory, Marine Meteorology Division, maintains several websites to supply data and graphical outputs from Navy models. For air quality prediction, the most significant of these models is the Navy Aerosol Analysis and Prediction System (NAAPS), which is used operationally by the Navy for prediction of visibility-reducing conditions.

NAAPS is an offline model producing 144-hour forecasts 4x/day of dust, smoke, sea salt, and anthropogenic/biogenic fine mode particles. The combination of these tracers is effectively a complete aerosol, and the total mass and optical depth are suitable for comparison to direct observations of these quantities. The NAAPS model does not include any chemical species (excepting an SO₂ tracer that is carried to facilitate calculation of dynamic conversion of sulfate aerosol particles).

Maps of NAAPS model output can be found here:

<http://www.nrlmry.navy.mil/aerosol>

At this site you can find maps (under 'NAAPS current') and animations ('NAAPS forecast loop') of surface PM concentrations for anthropogenic/biogenic (labeled 'sulfate'), dust, and smoke, as well as total optical depth. A long-term archive is also provided through this webpage, going back to 2002.

In addition to map products, near-real-time comparisons between NAAPS and AERONET sun photometer data are available from this page ('NAAPS/AERONET 1.5 Latest').

NRL has recently developed graphical products for near-real-time comparison of NAAPS output to surface PM monitor data from AirNowTech. These data are presented for instantaneous verification of the model, as well as visualization of the model forecast. There are currently three different regional portals for these NAAPS-AirNow comparisons:

https://www.nrlmry.navy.mil/aerosol/hourly_pm_airnowtech/AirNowTech_WestCONUS.html

https://www.nrlmry.navy.mil/aerosol/hourly_pm_airnowtech/AirNowTech_GulfCoast.html

https://www.nrlmry.navy.mil/aerosol/hourly_pm_airnowtech/AirNowTech_Texas.html

Each of these pages presents a map interface showing data availability for a selection of EPA surface monitors (green indicates data available for the current time period). The map is clickable and brings you to a plot showing the speciation of PM in the lowest model layer, as well as a time-height profile of the model total PM, as well as the surface monitor data.

Finally, NRL maintains a website for the multi-model ensemble forecasts produced through the International Consortium for Aerosol Prediction ('ICAP MME Fcst' from the main NRL aerosol page). This ensemble forecast is produced by combining NAAPS with predictions from other centers including NOAA NGAC, ECMWF, UK Met Office, and NASA GMAO. The ICAP MME website shows forecasts of aerosol optical depth and some ensemble metrics (AOD warning areas, ensemble spread). The eastern CONUS is included in the 'Subtropical Atlantic' domain, and the western CONUS as well as Alaska and Hawaii are included in the 'N. Pacific Basin' domain.