NRL and ICAP Multi-model Ensembles

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Navy Aerosol Analysis and Prediction System

NAAPS (see Zhang et al, 2008)
- Five Species (SO$_2$, Sulfate, Dust, Smoke, Seasalt)
- 1 degree global

Sunday 1 May 2011 00UTC NAAPS Forecast t+006
Sunday 1 May 2011 06UTC Valid Time
Total Aerosol Optical Depth at 550nm

0.1 0.2 0.4 0.8 1.2 2.5 5.0 9.0

NAAPS Ensembles

Meteorology

Not Official FNMOC NAAPS
- Reanalysis Research Product
- o 20 Members
- o NOGAPS ensemble based
- Tuned Wet/Dry Sinks
- Ginoux Dust Source
- o Impacts on timing
- Assimilating MODIS over land and ocean locations, sfc winds (sources)
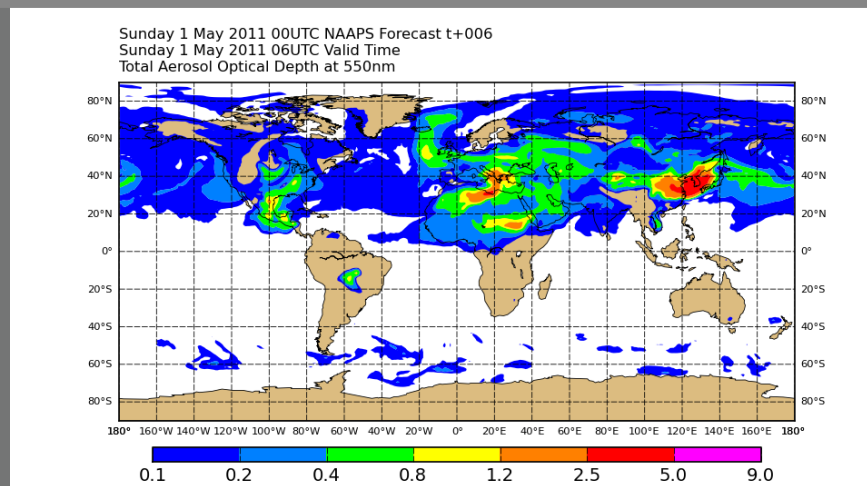
Aerosol
- o 5 Members
- o Perturbed Sources
  - ▪ Random within 1 geom sigma
- o Deterministic Met
- o Amplitude (no feedback)

Friday 28 January 2011 00UTC NAAPS Forecast t+000
Friday 28 January 2011 00UTC Valid Time
Total Met Ensemble Mean 0.8 Aerosol Optical Depth at 550nm
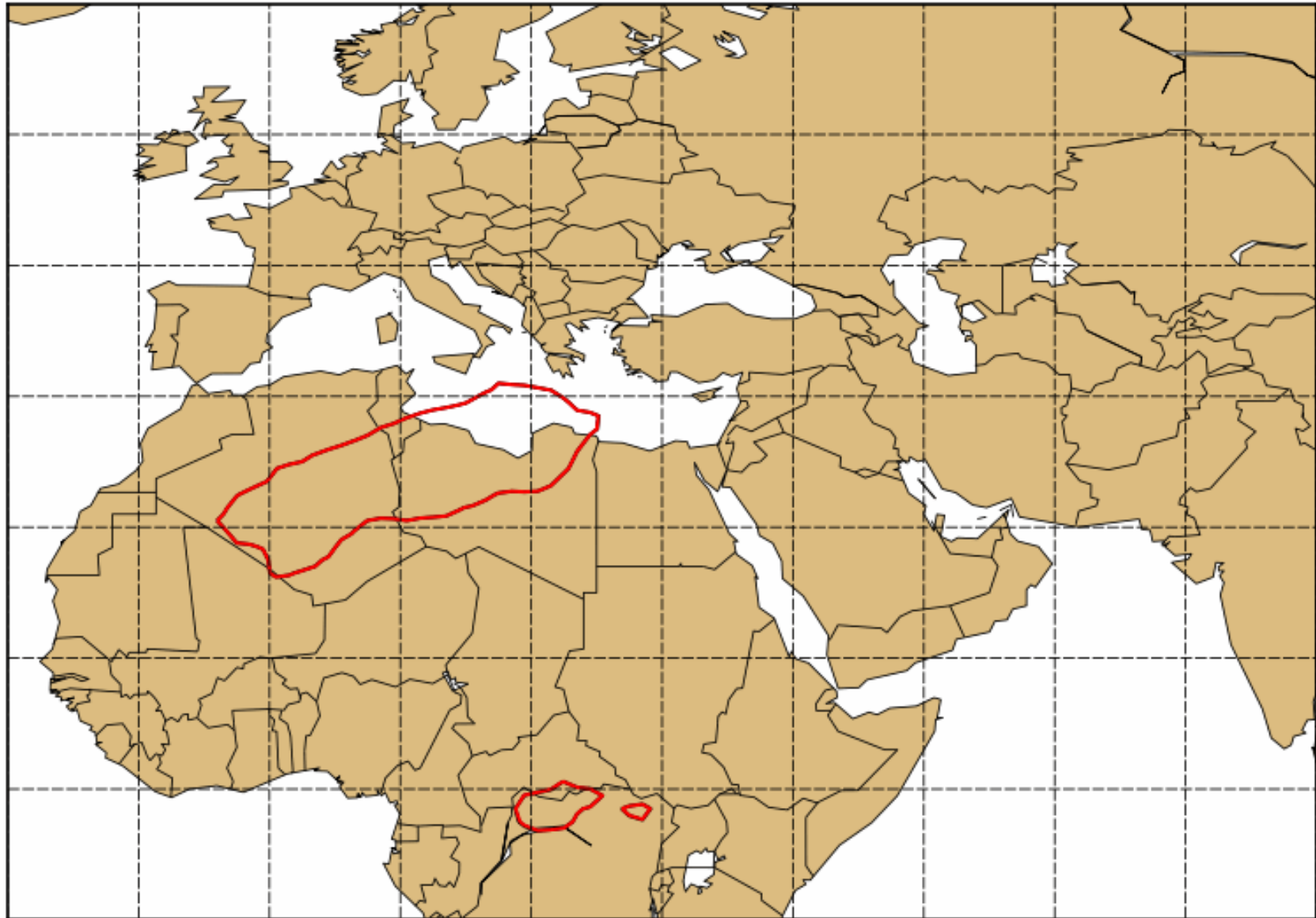
Plots Generated Friday 28 January 2011 12UTCNRL/Monterey Aerosol Modeling

Ensemble Mean (red), Individual Ens Members (multiple,thin), Deterministic NAAPS (black)

Wednesday 30 March 2011 00UTC NAAPS Forecast t+000
Wednesday 30 March 2011 00UTC Valid Time
Aerosol Ensemble (20 Member) 0.04 Aerosol Optical Depth at 550nm
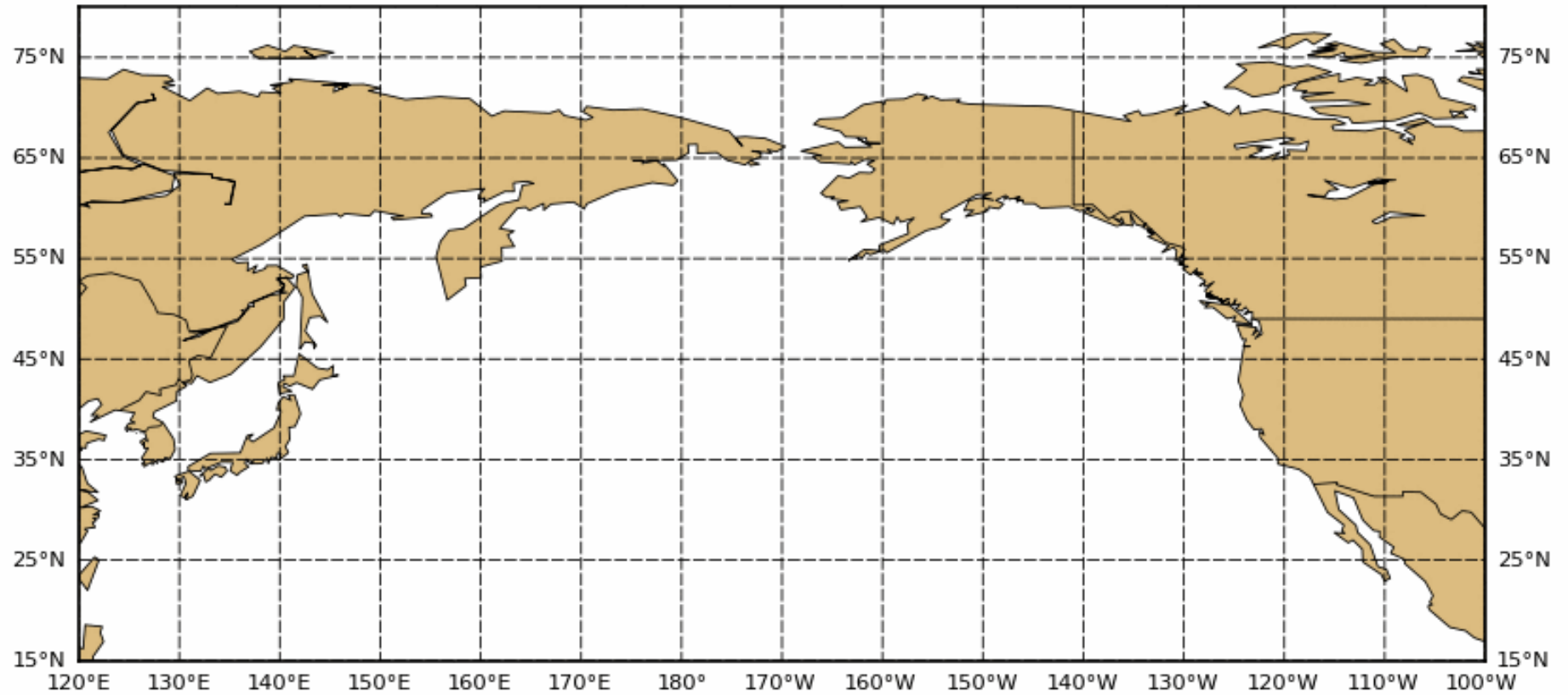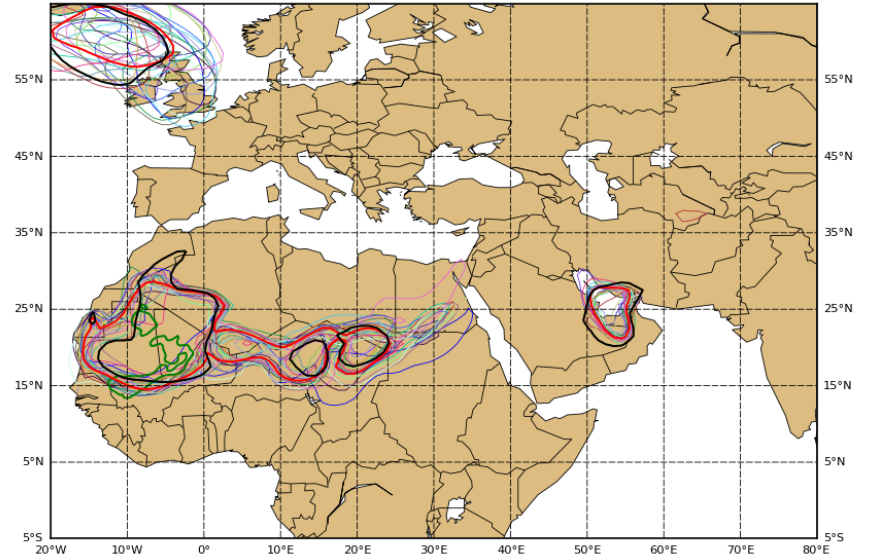
Plots Generated Wednesday 30 March 2011 20UTCNRL/Monterey Aerosol Modeling
NOT OFFICIAL FNMOC NAAPS RUN

Wednesday 6 April 2011 00UTC NAAPS Forecast t+120
Monday 11 April 2011 00UTC Valid Time
Dust Meteorological Ensemble Mean Aerosol Optical Depth at 550nm
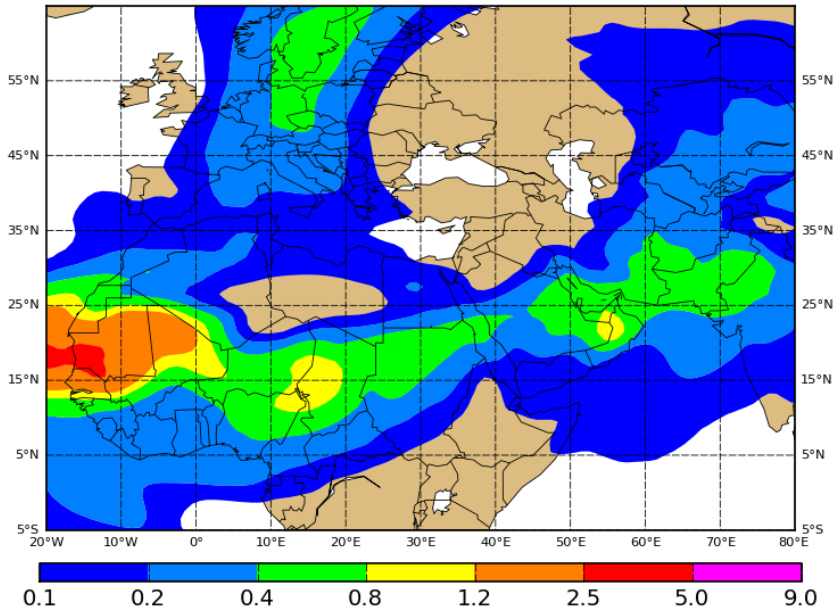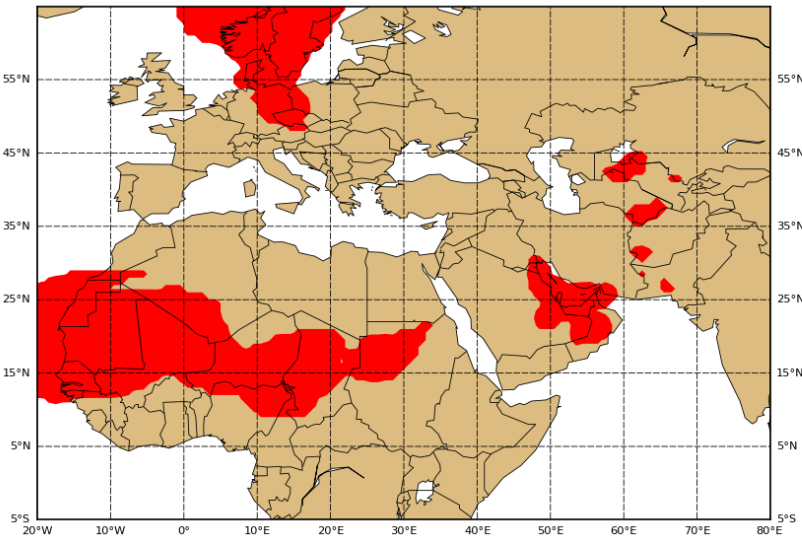
0.1   0.2   0.4   0.8   1.2   2.5   5.0   9.0

Plots Generated Thursday 7 April 2011 18UTCNRL/Monterey Aerosol Modeling
NOT OFFICIAL FNMOC NAAPS RUN

Wednesday 6 April 2011 00UTC NAAPS Forecast t+072
Saturday 9 April 2011 00UTC Valid Time
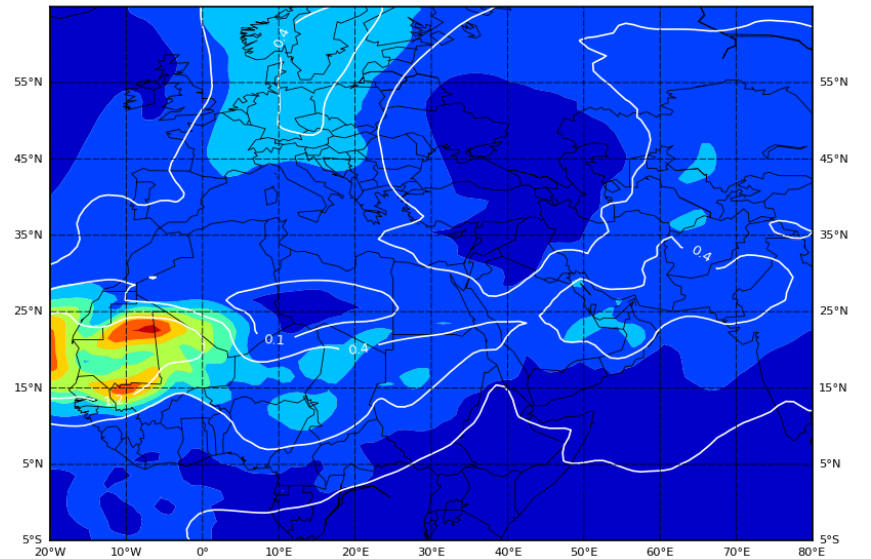Dust Meteorological Ensemble Mean 0.8 Aerosol Optical Depth at 550nm

Plots Generated Thursday 7 April 2011 18UTCNRL/Monterey Aerosol Modeling
NOT OFFICIAL FNMOC NAAPS RUN

Wednesday 6 April 2011 00UTC NAAPS Forecast t+114
Sunday 10 April 2011 18UTC Valid Time
Dust Meteorological Ensemble Mean AOD Warning Area (>50% members above 0.8)

Plots Generated Thursday 7 April 2011 18UTCNRL/Monterey Aerosol Modeling
NOT OFFICIAL FNMOC NAAPS RUN

Wednesday 6 April 2011 00UTC NAAPS Forecast t+120
Monday 11 April 2011 00UTC Valid Time
Dust Meteorological Ensemble Mean Mean AOD at 550nm (white) with Normalized Spread (color)

Plots Generated Thursday 7 April 2011 18UTCNRL/Monterey Aerosol Modeling
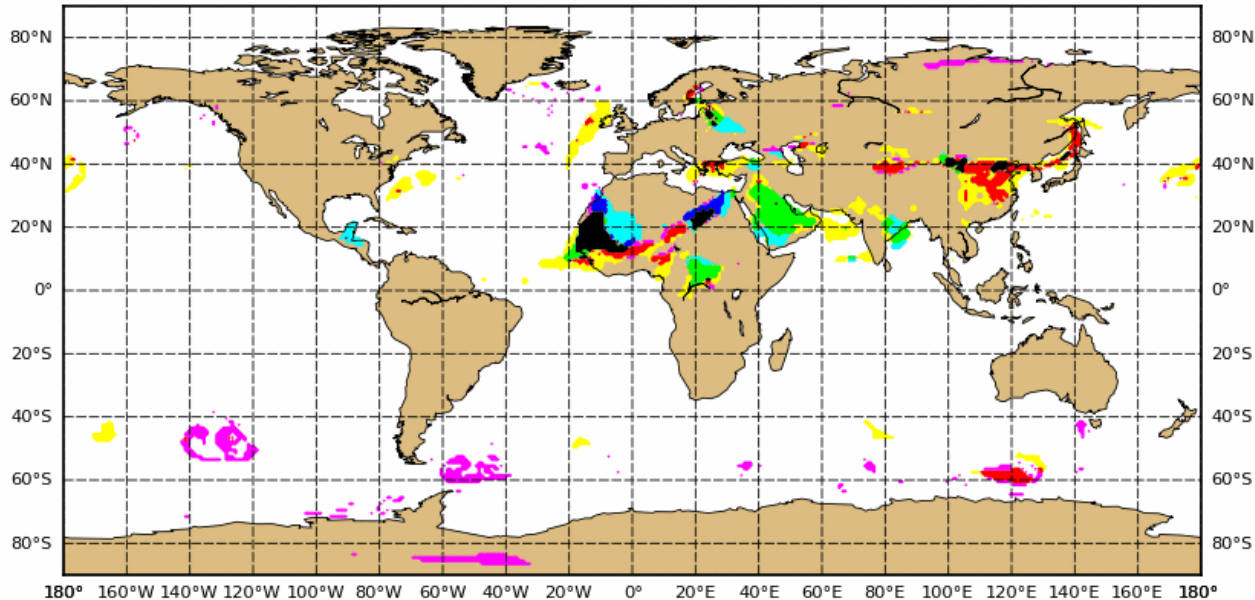NOT OFFICIAL FNMOC NAAPS RUN

CMYK Plots

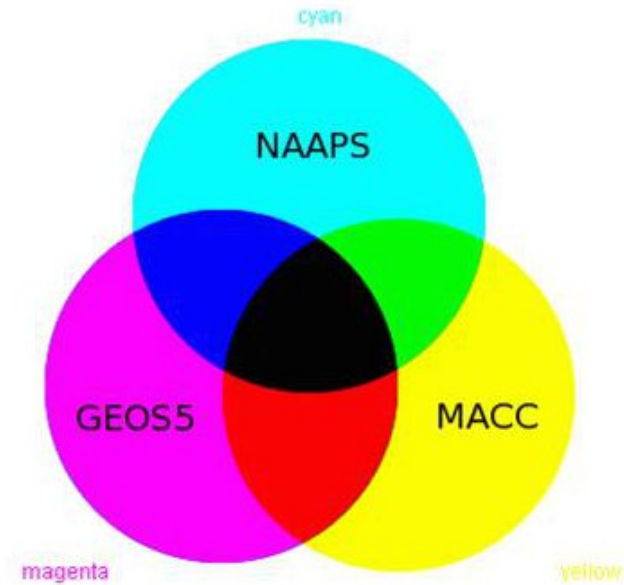Friday 1 April 2011 00UTC NAAPS Forecast t+006
Friday 1 April 2011 06UTC Valid Time
Total AOD Warning Area (Individual Models >0.6)
NAAPS (Cyan), GEOS-5 (Magenta), MACC (Yellow), N+G (Blue), N+M (Green), G+M (Red), All (Black)
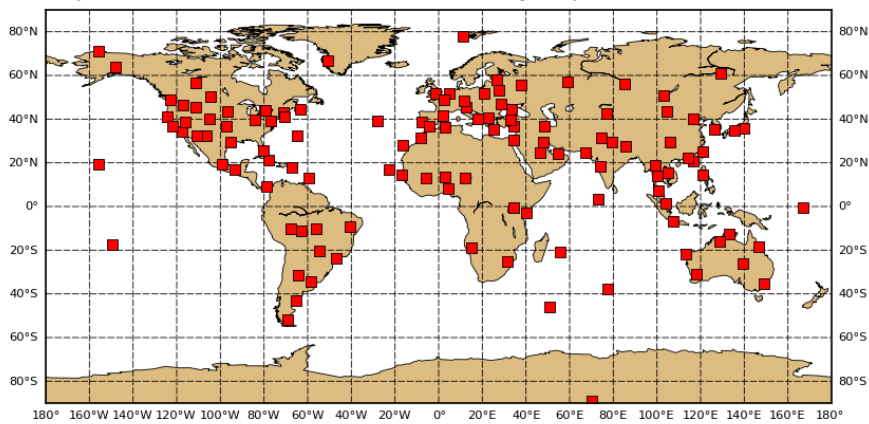
Plots Generated Thursday 5 May 2011 23UTCNRL/Monterey Aerosol Modeling
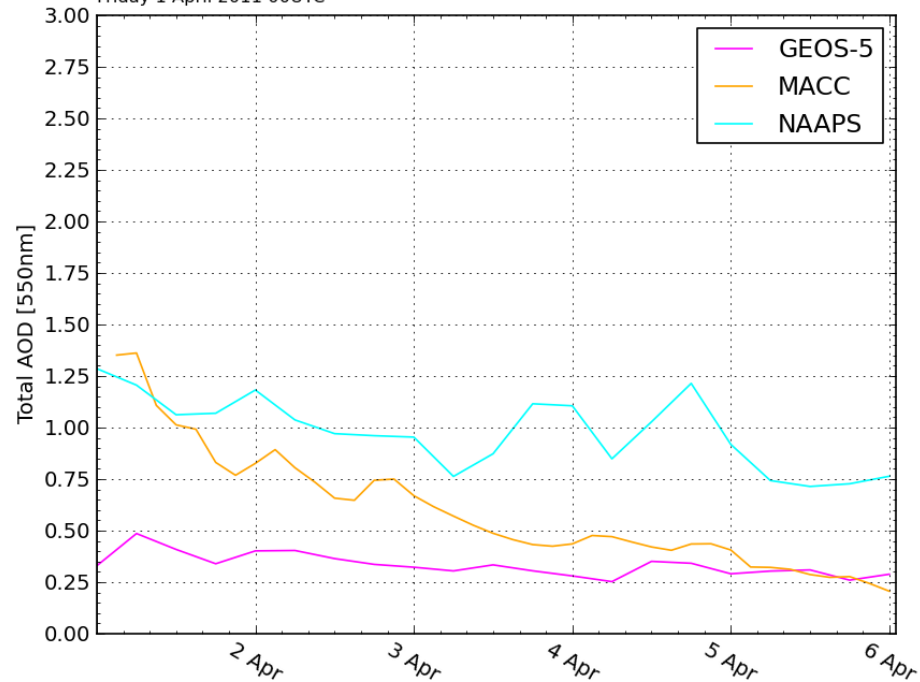NOT OFFICIAL FNMOC NAAPS RUN

- Filled Contours at Single Threshold Value
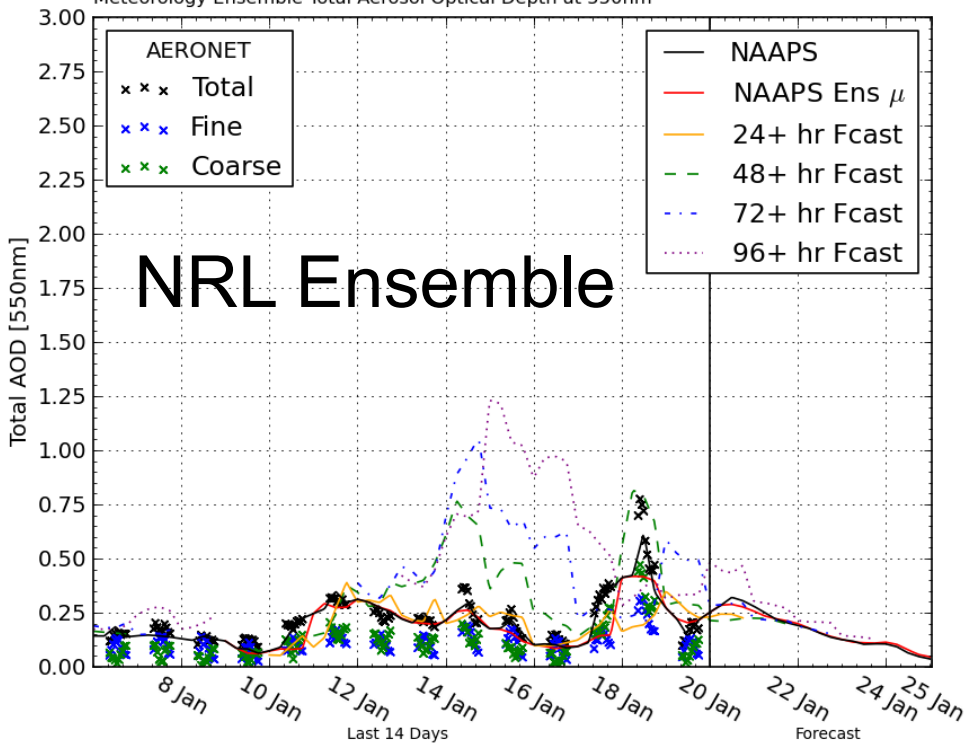- 7 colors, each a particular model or combination

AERONET Sites

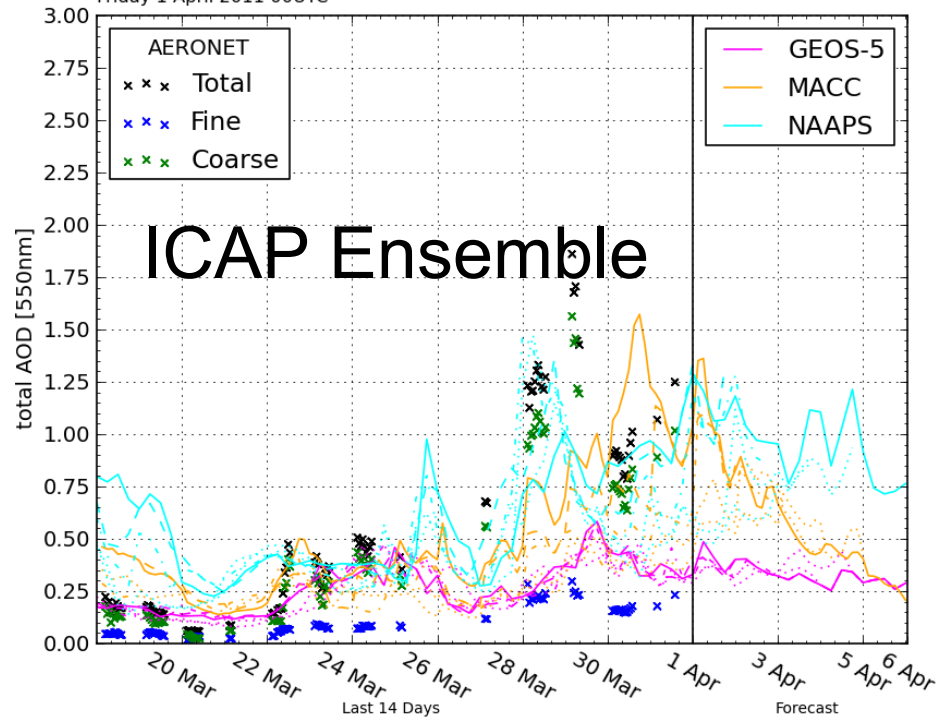Map of Available Ensemble Points for Thursday 7 April 2011 00UTC

Modeled Total AOD fields at Solar Village, SA
Friday 1 April 2011 00UTC

NAAPS Forecast at Cape Verde
Meteorology Ensemble Total Aerosol Optical Depth at 550nm

NRL Ensemble

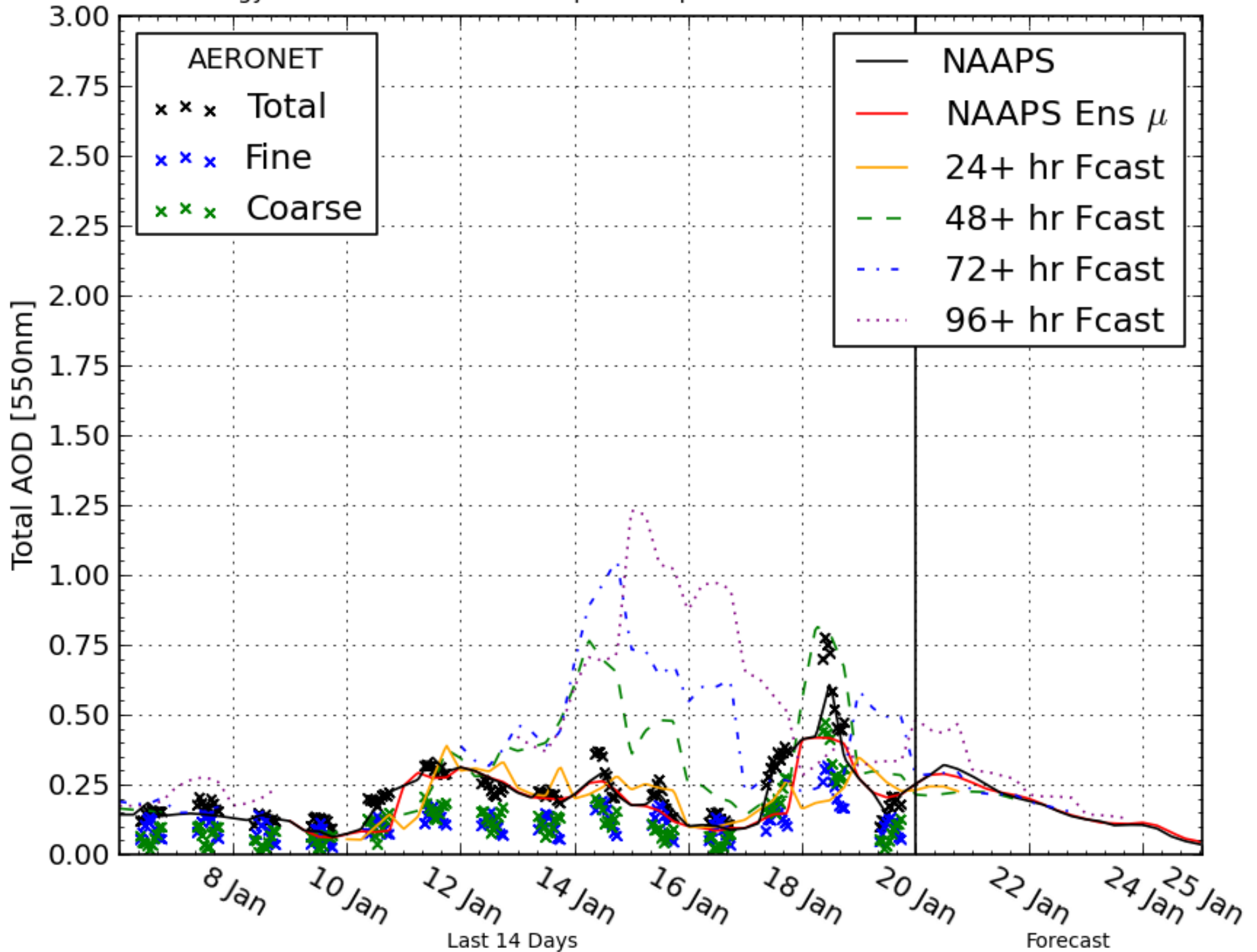AERONET and Modeled Total AOD fields at Solar Village, SA
Friday 1 April 2011 00UTC

ICAP Ensemble

NAAPS Forecast at Cape Verde
Meteorology Ensemble Total Aerosol Optical Depth at 550nm

Plot generated Friday 18 February 2011 00UTC NRL/Monterey Aerosol Modeling

AERONET and Modeled Total AOD fields at Solar Village, SA
Friday 1 April 2011 00UTC

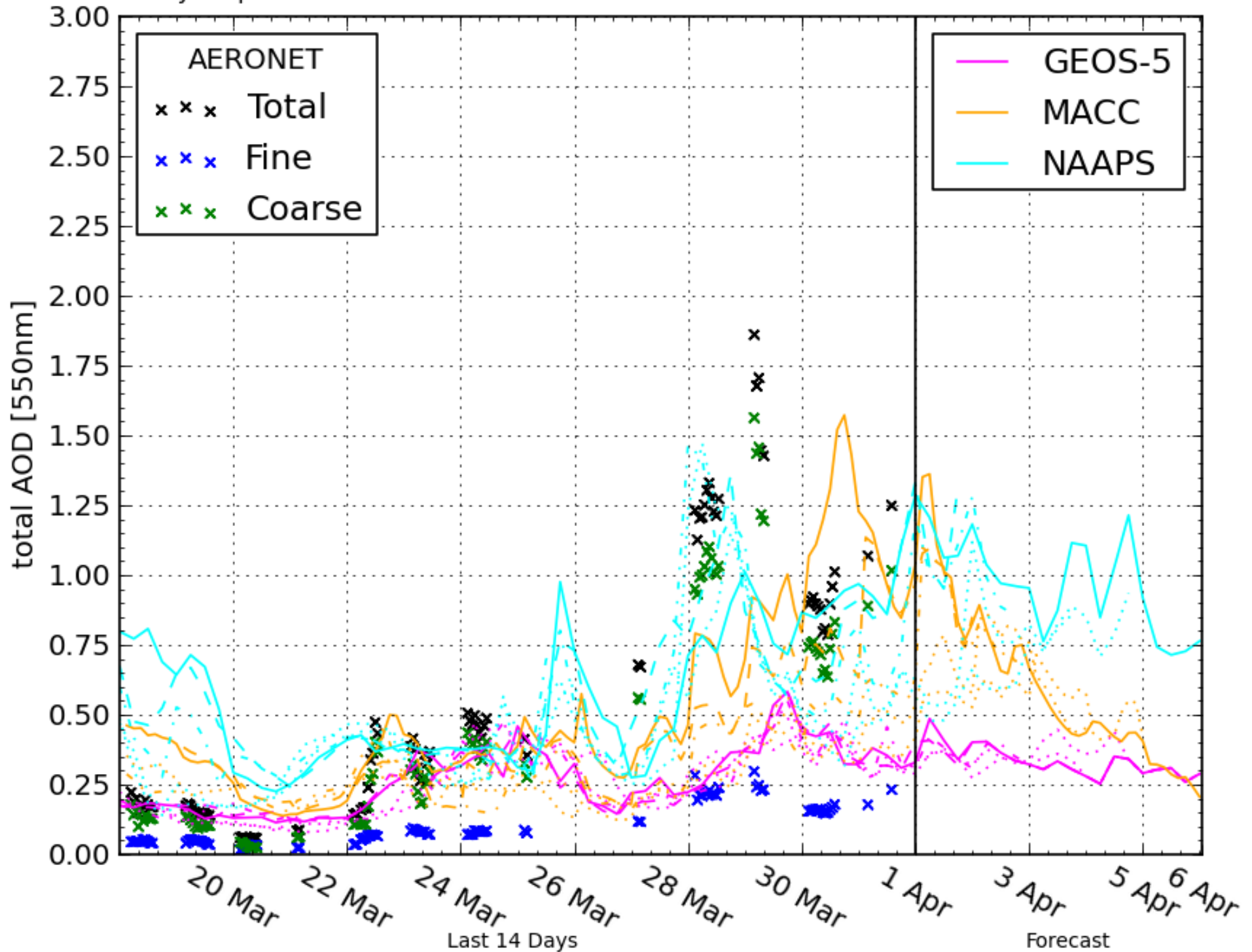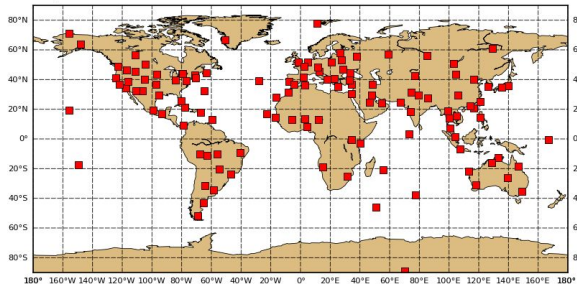Plot generated Wednesday 4 May 2011 10UTC NRL/Monterey Aerosol Modeling

What and Where

Current ICAP Models
- MACC (ECMWF)
- GEOS-5 (GSFC)
- NAAPS (NRLMRY)

NRL Ensembles
- Meteorological
- Aerosol (soon)

Regions
- Global Models
- 9 Subregions

Webpage intended for ICAP use only

NRL Monterey NAAPS Forecast

This page is an official U.S. Navy site and is intended as an internal research and development testbed.
Products should not be treated as operational forecasting tools!
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Marine Meteorology Division (Code 7500)
U. S. Navy   Navy Recruiting   Navy FOIA   ONR

PRODUCTS	INDIVIDUAL ICAP MODELS - REGIONS									
	GLOBAL	NIOSEA	BYZANTIUM	EASTASIA	SUBTROPATL	PACIFIC	CONUS	SATLANTIC	SIOAUS	NPOLAR
ALL MODELS AOD 2011.05.09	sulfate dust smoke seasalt total	sulfate dust smoke seasalt total	sulfate dust smoke seasalt total	sulfate dust smoke seasalt total	sulfate dust smoke seasalt total	sulfate dust smoke seasalt total	sulfate dust smoke seasalt total	sulfate dust smoke seasalt total	sulfate dust smoke seasalt total	sulfate dust smoke seasalt total
MULTI-MODEL CMYK 2011.05.09	sulfate dust smoke seasalt total	sulfate dust smoke seasalt total	sulfate dust smoke seasalt total	sulfate dust smoke seasalt total	sulfate dust smoke seasalt total	sulfate dust smoke seasalt total	sulfate dust smoke seasalt total	sulfate dust smoke seasalt total	sulfate dust smoke seasalt total	sulfate dust smoke seasalt total

Map of Available ICAP Ensemble Points
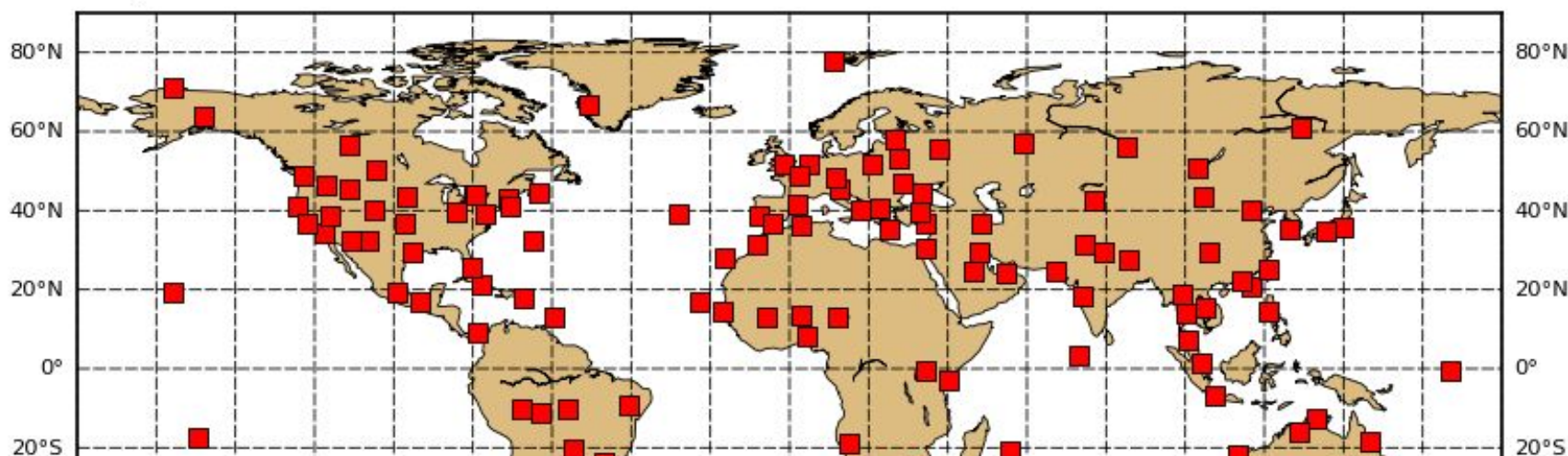
Multimodel File Format

Multi-Model Dimensions

- Keep native
- 0.5°x0.5°
- 1°x1°
- 120 hour forecasts
- 3 / 6 / 12 hourly

Fields

- Sulfate,Dust,'Smoke',Seasalt, Total
- Surface Concentrations
- Meteorological Fields

Library Versions

- NetCDF > V3.6
- NCDF4 / LFS
- Estimated Daily Filesizes

	3 hrly	6 hrly	12 hrly
native	2G	1G	500M
0.5°	600M	310M	160M
1.0°	160M	79M	42M

Data Retrieval

- Backfill missing data
- Timing of release

Plot Methodology

- Stick with standard model fields
- Model output statistics
  - 1 sigma events
  - MET