AEROSOL RETRIEVAL IMPROVEMENTS

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- **Recap previous QWG → AOT retrieval**
- **OPERA AOT retrieval**
  - Validation results: ACIX & PV-LAC
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- **CAMS NRT AOT**
  - Recent upgrade
  - Data availability
- **Remaining actions**

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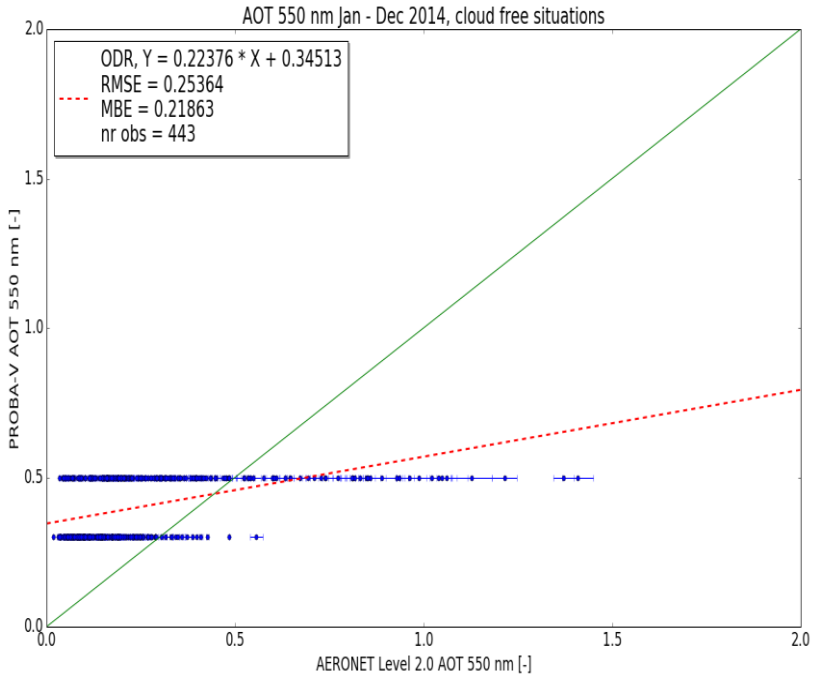
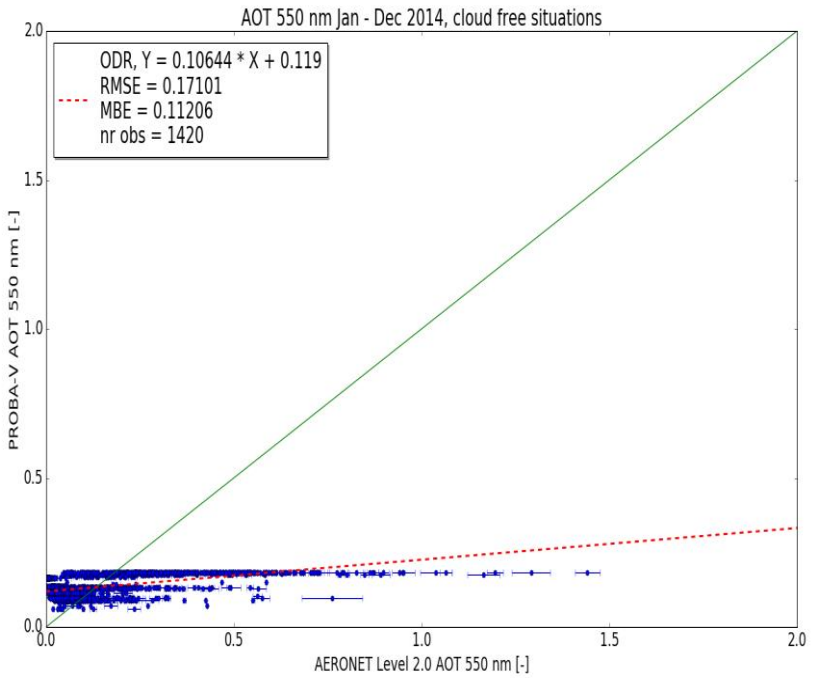
RECAP: PROBA-V AOT VALIDATION RESULTS

AOT retrieval



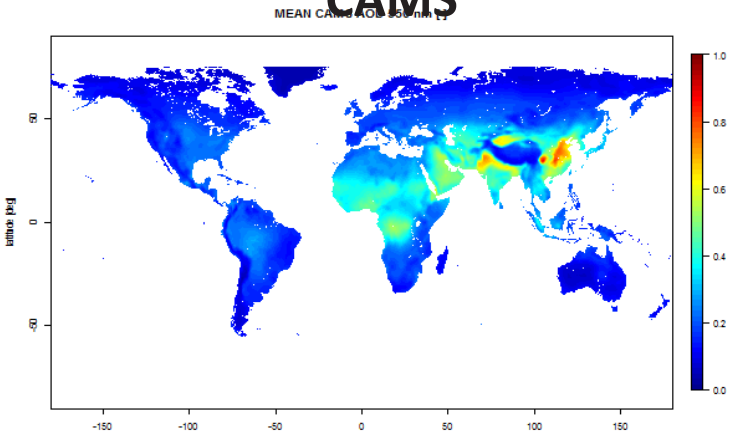
AOT latitudinal function



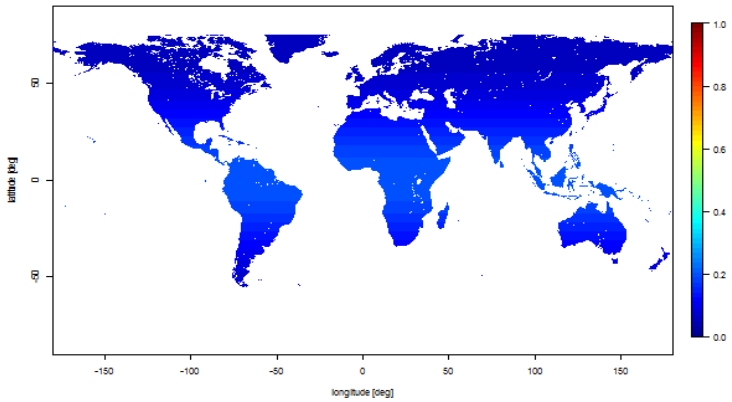
PROBA-V AOT VALIDATION RESULTS

- Comparison of lat. function to CAMS AOT dataset (monthly means)

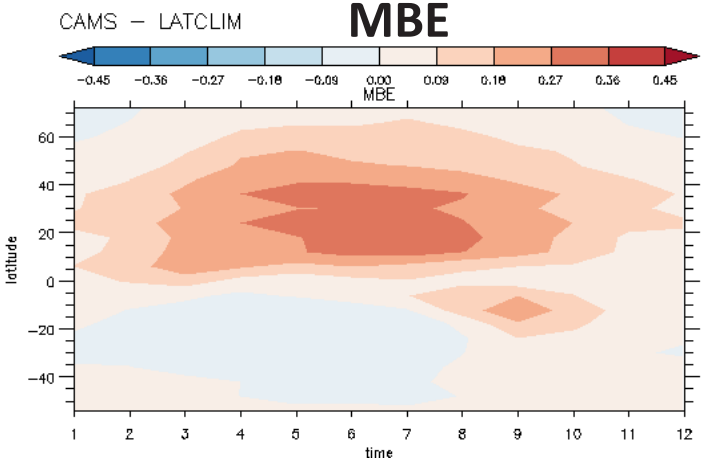
CAMS



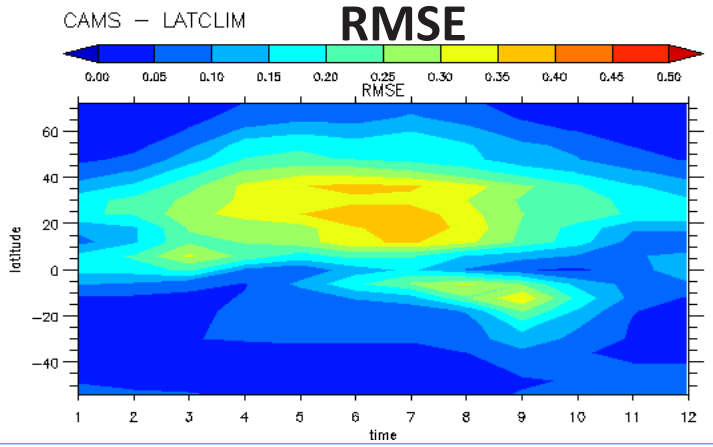
Lat. AOT



MBE

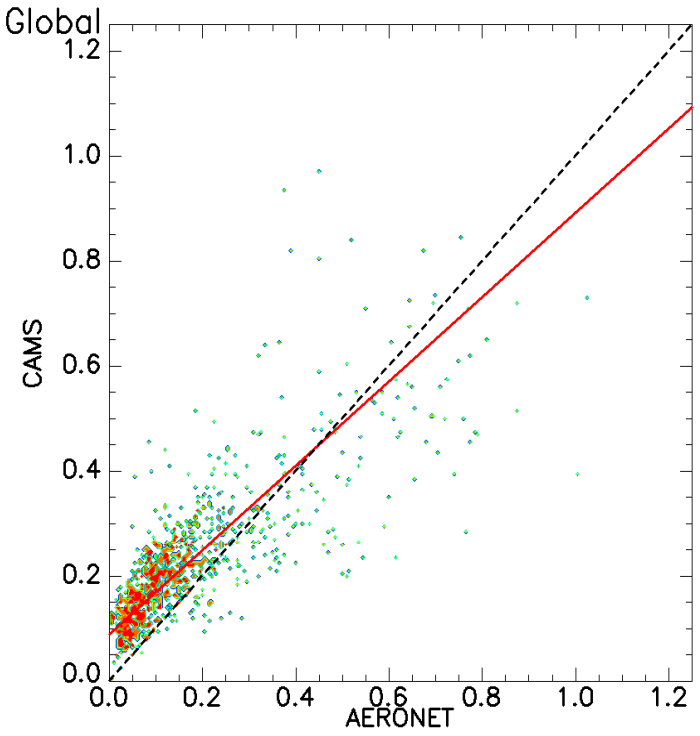


RMSE

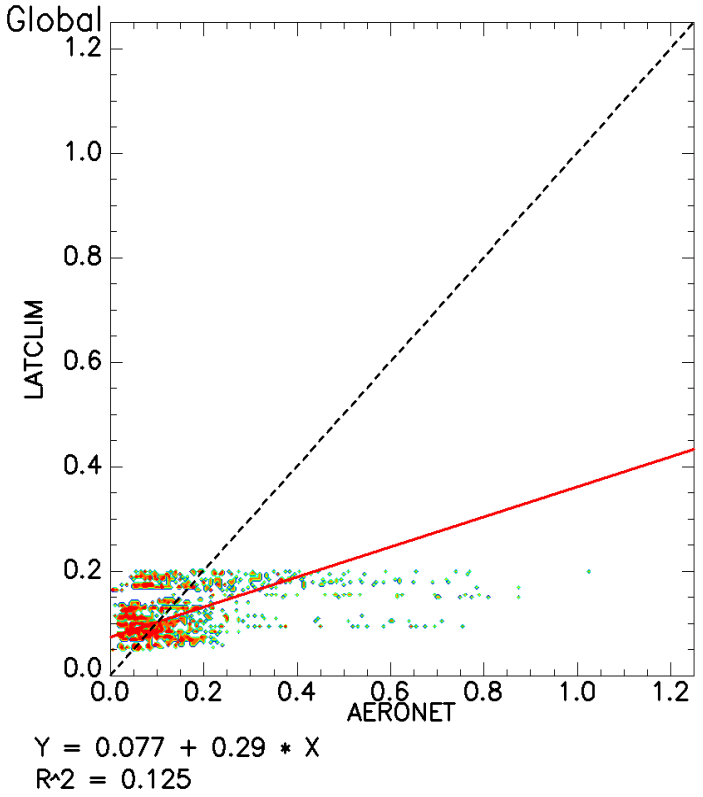


LATITUDINAL AOT & CAMS AOT VS AERONET

CAMS vs AERONET



LATCLIM vs AERONET



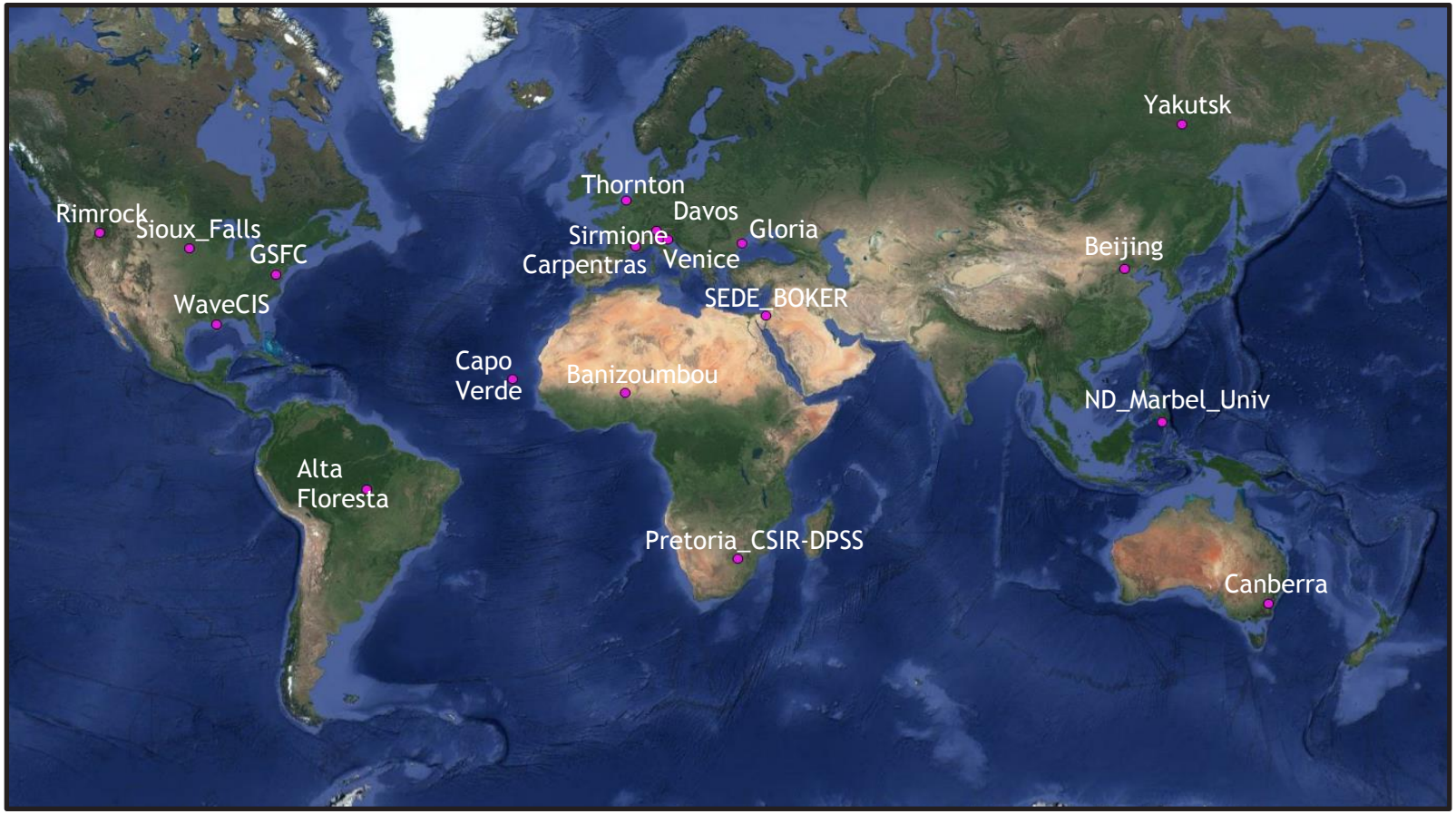
OPERA AOT RETRIEVAL

- **Based on Guanter et al. (2008)**
  - Superpixels of 30 x 30 km^2
  - Applied within OPERA: sensor-generic AC software
  - AOT = [0,1]

- **Participation in ACIX (applied to Sen-2 and LS8, global sites)**

- **Implementation for PROBA-V feasible**
  - LUTs computed for 100 m center camera
  - Cloud-free and snow/ice free pixels processed
  - Applied to Level 2A segments

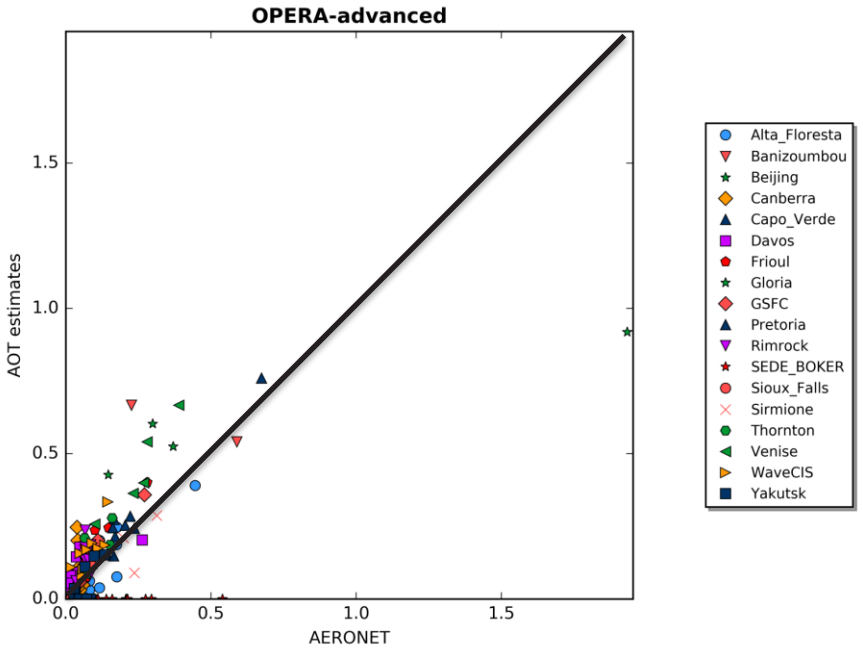
OPERA AOT: VALIDATION ACIX



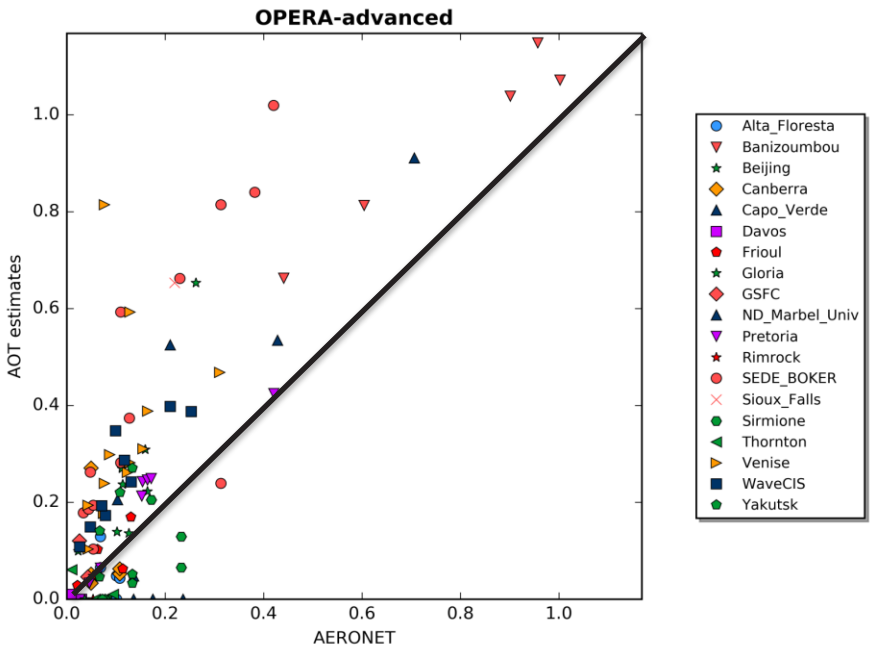
AOT validated with AERONET Level 1.5 AOT

OPERA AOT: VALIDATION ACIX

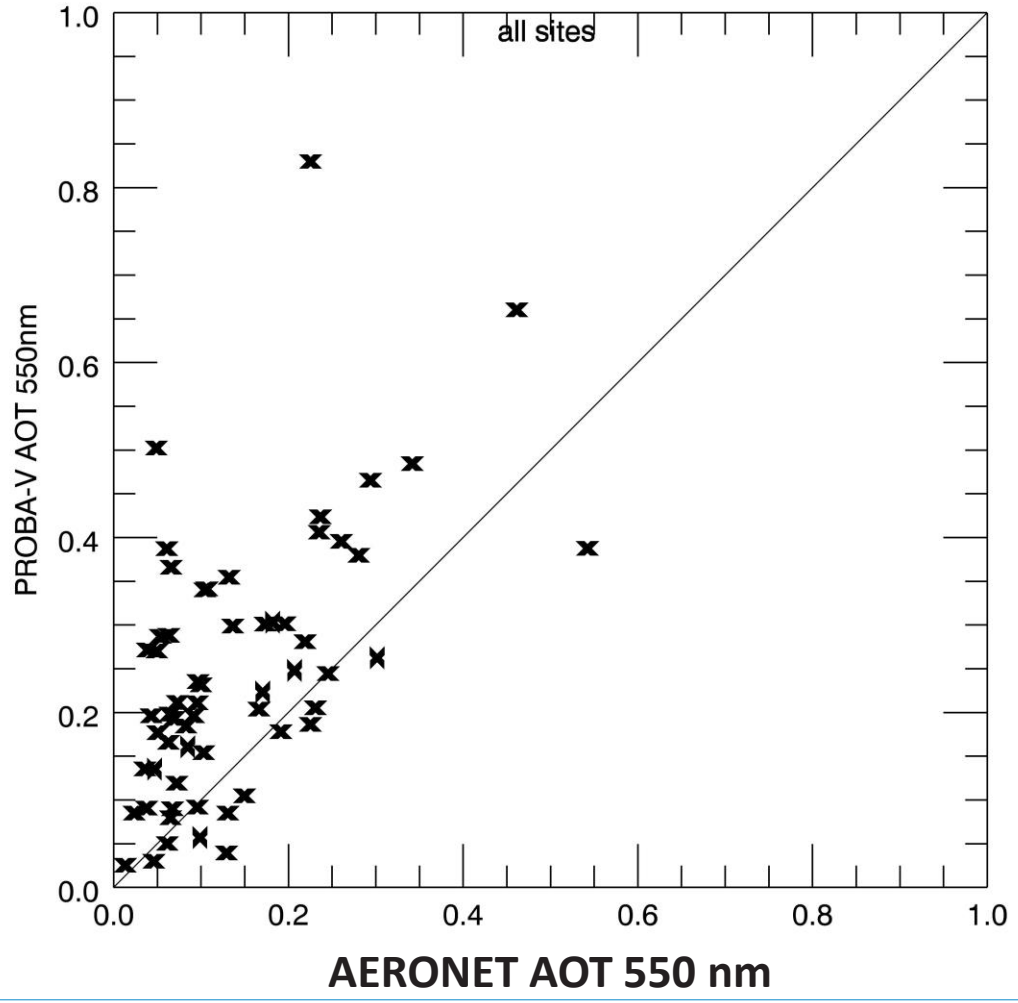
Landsat 8



Sentinel 2



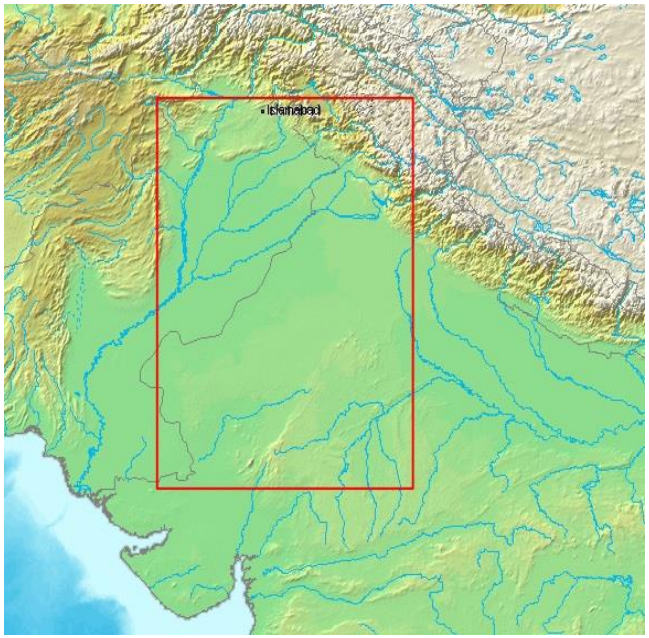
OPERA AOT VALIDATION PV-LAC



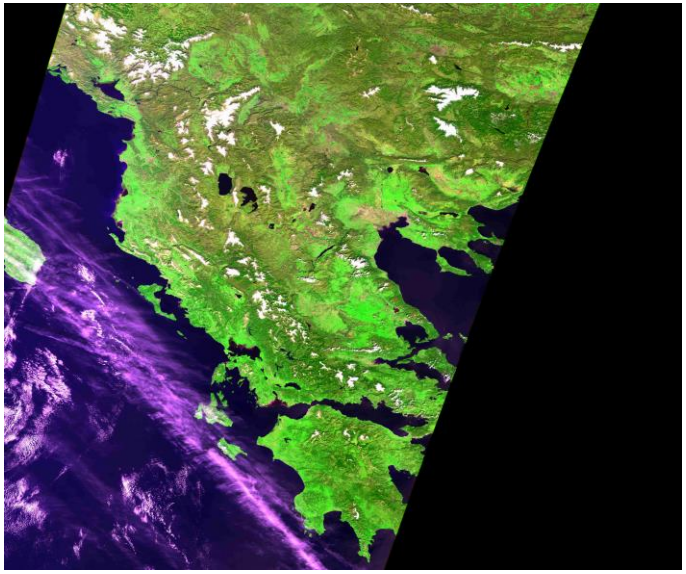
COMPARISON OPERA VS CURRENT AOT

- PROBA-V 100 m center camera

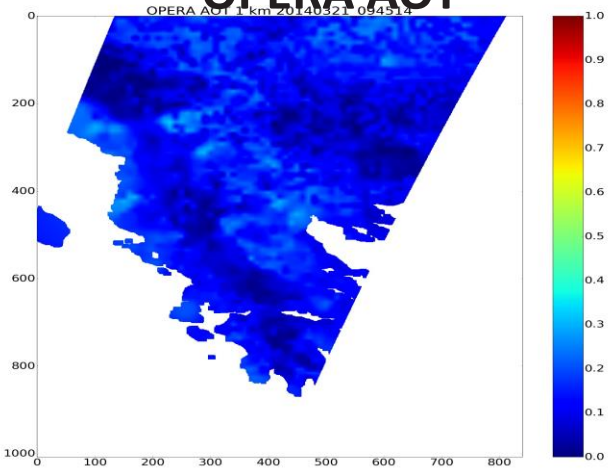
- OPERA, current AOT, MODIS MOD04 AOT as reference



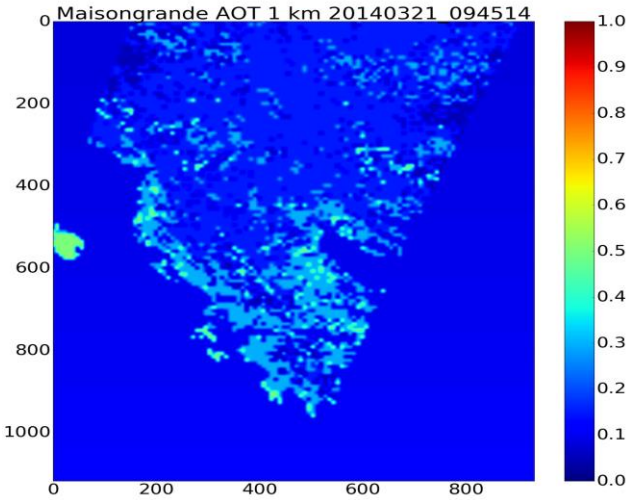
OPERA VS CURRENT AOT – GREECE 21/3/2014 0945



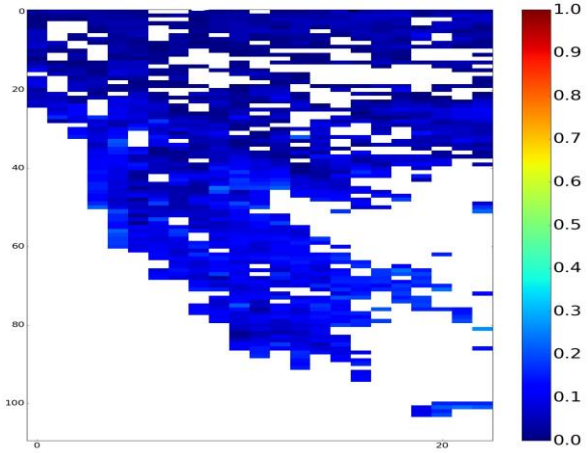
OPERA AOT



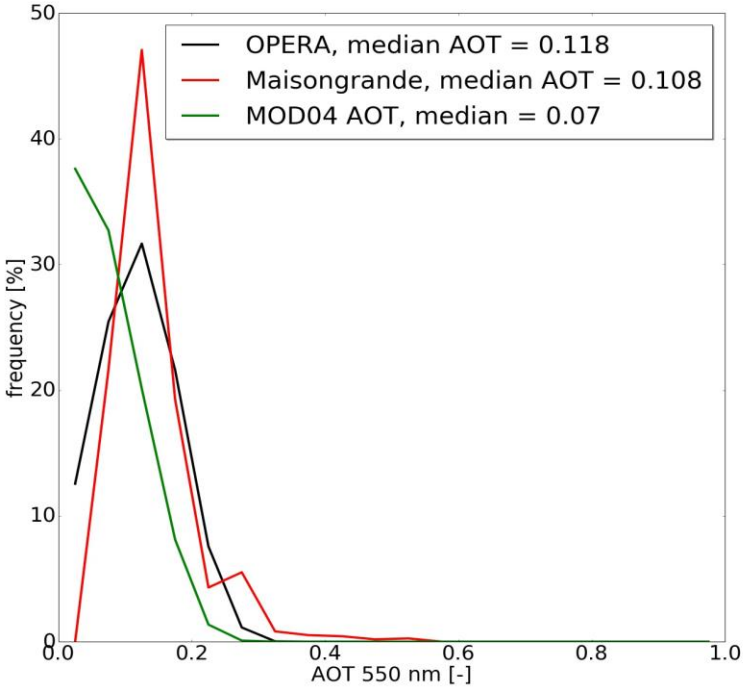
Current AOT



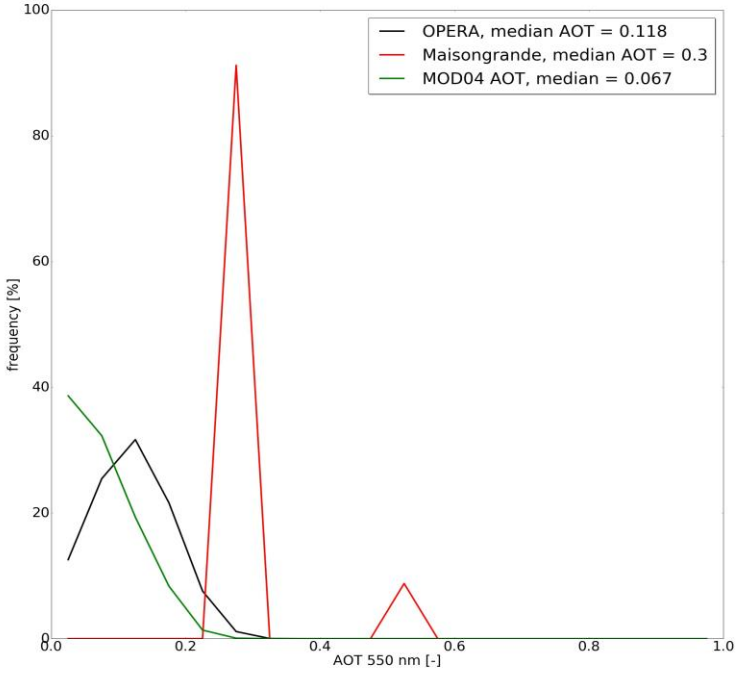
MOD 04 AOT 20140321 0850



AOT HISTOGRAMS

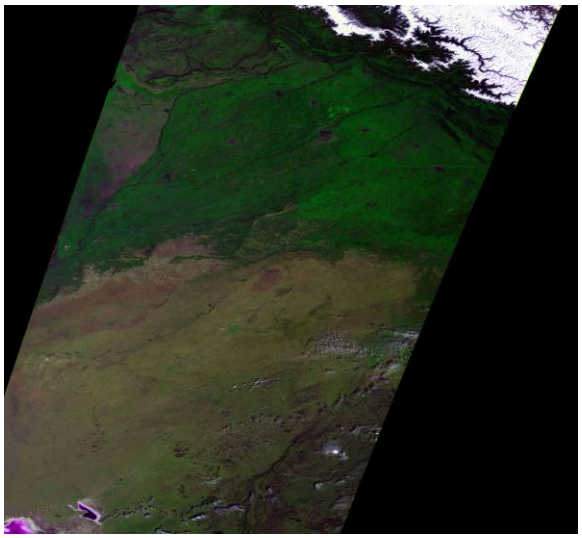


Red = Maisongrande + static clim

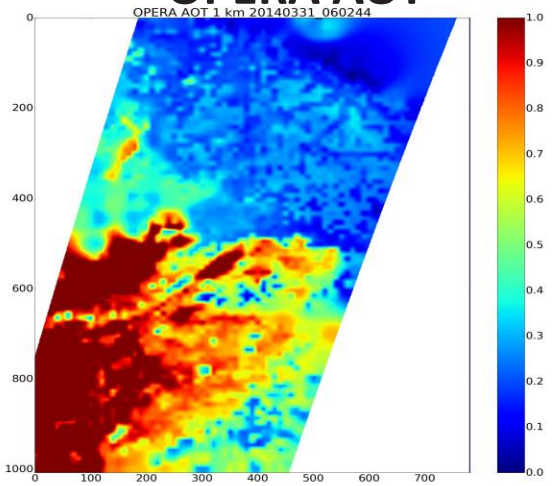


Red = Maisongrande only

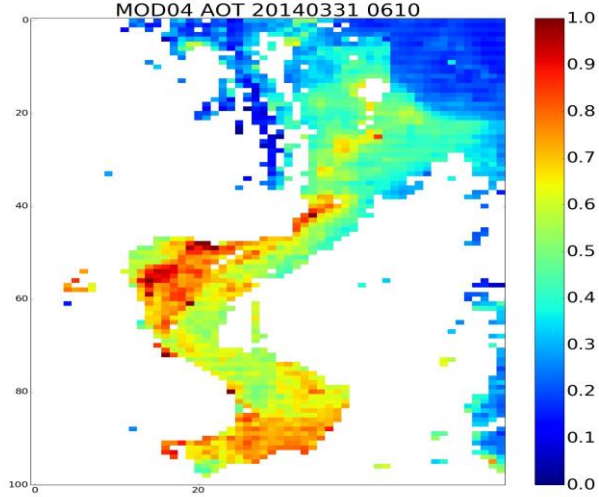
OPERA VS CVB AOT – INDIA 20140331 0602



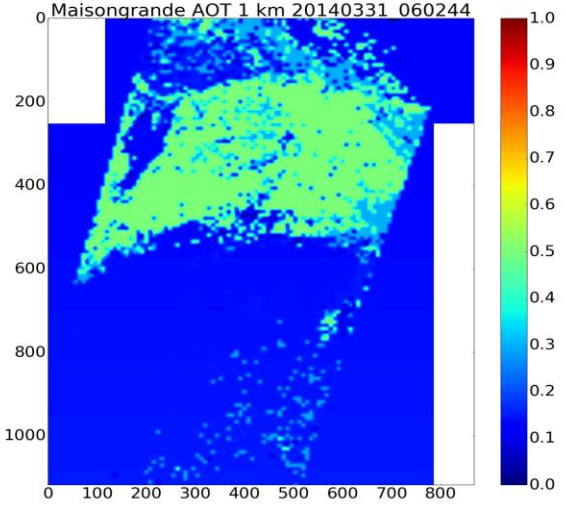
OPERA AOT



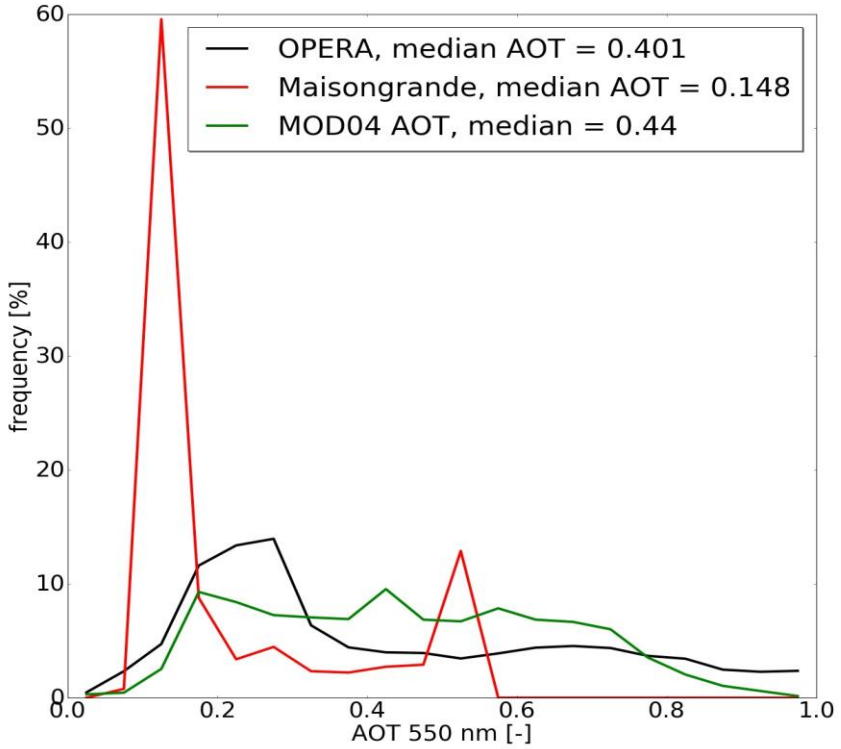
MOD 04 20140331 0610



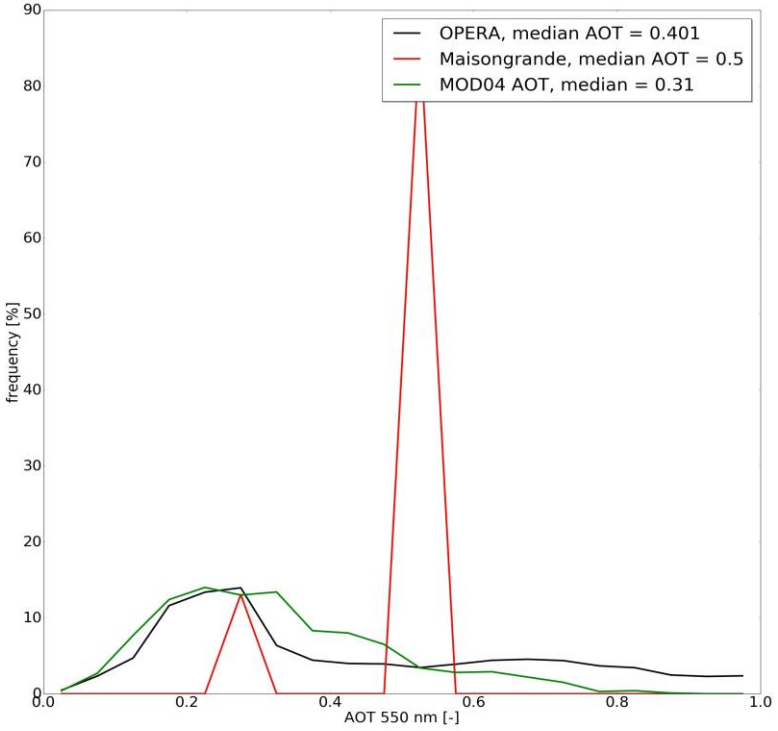
Current AOT



AOT HISTOGRAMS



Red = Maisongrande + static clim

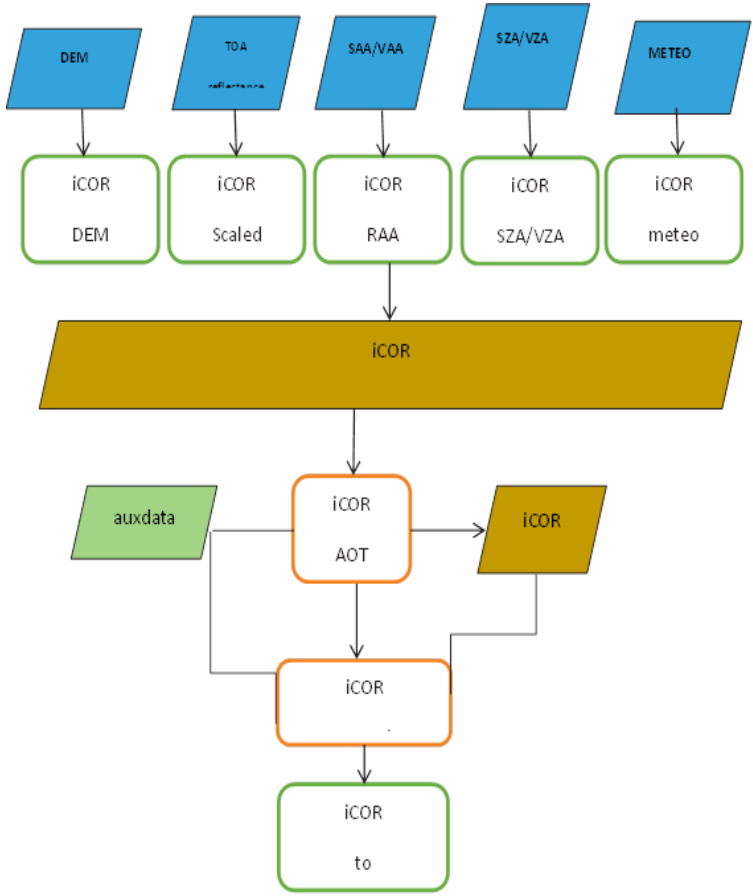


Red = Maisongrande only

Median AERONET AOT Jaipur 0.31

OPERA IMPLEMENTATION IN PROCESSING CHAIN

- **Interface changes and SW module replacement, a.o.**
  - Conversion HDF5 → GeoTIFF
  - Replacement of current AOT retrieval
  - Adjustments of workflow and job codes
  - Estimated effort:
    - ✓ ~70 days for **entire AC replacement**
    - ✓ 40 - 50 days for AOT retrieval



SUMMARY OPERA VS CURRENT AOT

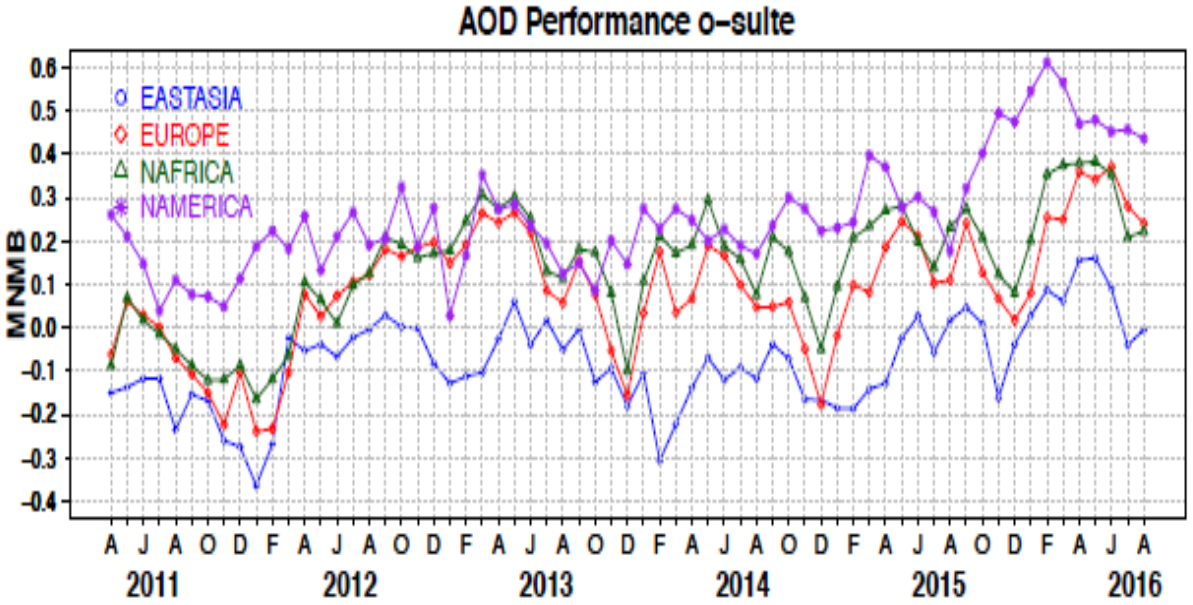
- **Validation against AERONET very promising**

- **OPERA AOT retrieves**
  - Realistic AOT patterns
  - Continuous histograms

- **To Be Done**
  - Process additional segments
  - Assess AOT retrieval replacement impact on TOC reflectance
    - ✓ Comparison with AERONET-based TOC reflectance
  - Assess impact on computation time

CAMS NRT AOT

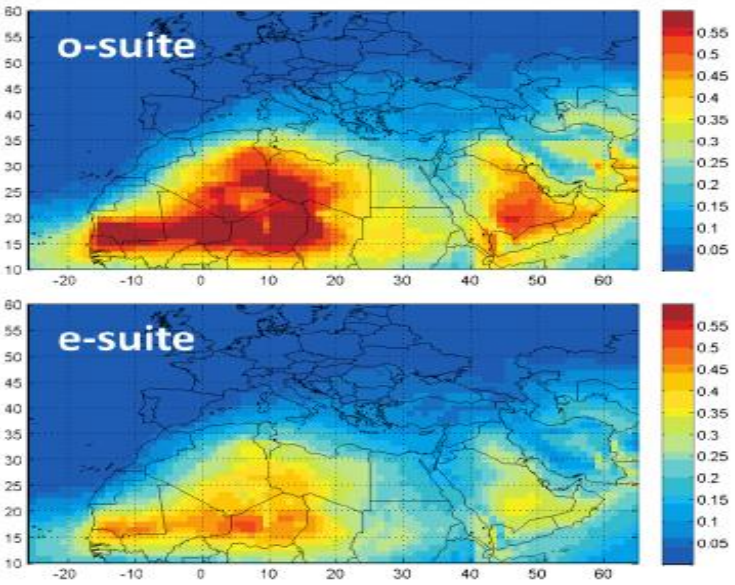
- **Previous version: positive AOT bias ~25% wrt AERONET**
  - Largest overestimations over N-America
  - AOT overestimation caused by underestimation of aerosol size



CAMS NRT AOT – MODEL UPGRADE

➢ Changes in atmospheric composition

- ~40% more organic aerosol, ~40% less sulphate
- AOT bias decreased from ~30% to 10 - 15%
- Reduced AOT over dust areas
- Product resulution increased to ~40 x 40 km^2

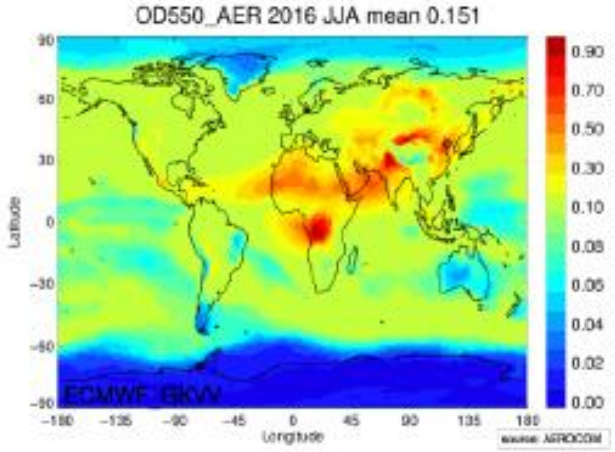


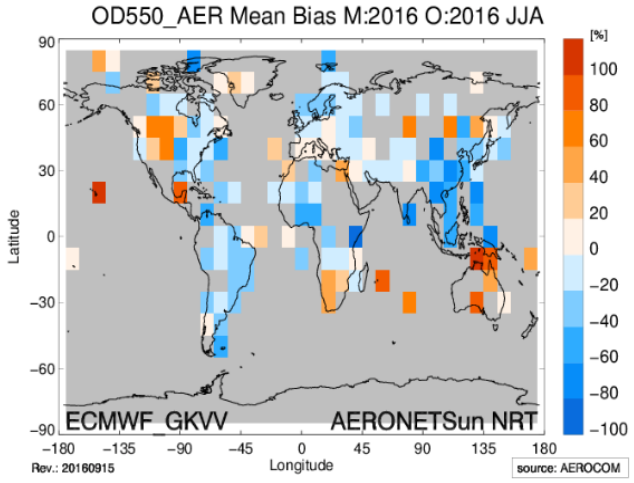
Previous CAMS NRT

Upgraded CAMS NRT

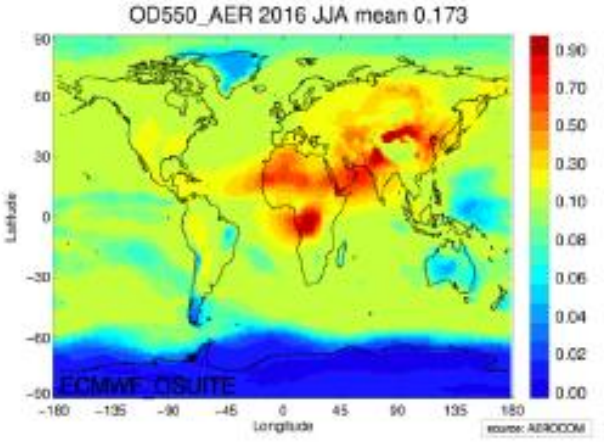
CAMS NRT AOT – MODEL UPGRADE

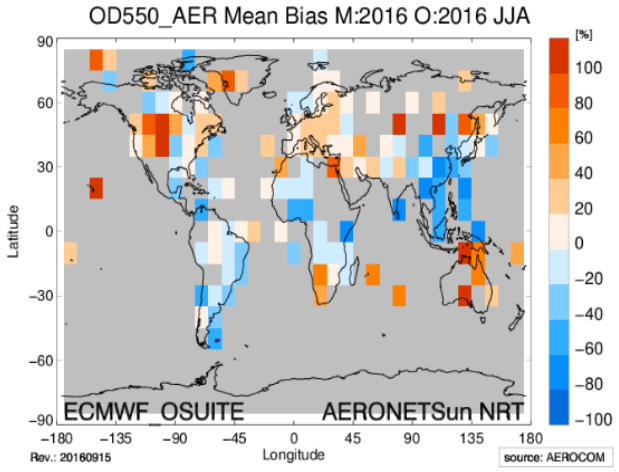
Upgraded NRT AOT





Previous NRT AOT





CAMS NRT AOT – DATA AVAILABILITY

- **98 – 99% of NRT forecasts disseminated at initial day**

- **In case of missing NRT forecast → take forecast of previous day**
  - Previous forecasts could be used to 2 – 3 days back
  - Dependent on forecast skill meteorological model

- **To be investigated**
  - Relate CAMS NRT AOT to current and OPERA AOT → TOC reflectance comparison with AERONET-based TOC reflectance
  - Implications for PF workflow → estimate effort

SUMMARY AND FURTHER ACTIONS

- **OPERA AOT retrieval is good replacement of current AOT dataset**
  - Better agreement with AERONET AOT
  - First results on PROBA-V segments promising

- **Further research:**
  - Impact assessment on TOC reflectances: OPERA, CAMS NRT AOT, current AOT vs AERONET TOC
  - Assess SMAC vs OPERA using similar AOT input
  - Write TN → distribute to QWG