Literature review

Journal of Climate
October 2012 – April 2013

Papers at: /home/gcorbetta/Literature_review/

Citation

- Aumann, Hartmut H.; Ruzmaikin, Alexander; Behrangi, Ali. **On the Surface Temperature Sensitivity of the Reflected Shortwave, Outgoing Longwave, and Net Incident Radiation.** Journal of Climate. Oct2012, Vol. 25 Issue 19, p6585-6593. DOI: 10.1175/JCLI-D-11-00607.1.

- Baughman, E.; Gnanadesikan, A.; Degaetano, A.; Adcroft, A. **Investigation of the Surface and Circulation Impacts of Cloud-Brightening Geoengineering.** Journal of Climate. Nov2012, Vol. 25 Issue 21, p7527-7543. 17p. 1 Chart, 2 Graphs, 9 Maps. DOI: 10.1175/JCLI-D-11-00282.1.

- Sokolov, Andrei P.; Monier, Erwan. **Changing the Climate Sensitivity of an Atmospheric General Circulation Model through Cloud Radiative Adjustment.** Journal of Climate. Oct2012, Vol. 25 Issue 19, p6567-6584. 18p. 3 Charts, 4 Graphs, 8 Maps. DOI: 10.1175/JCLI-D-11-00590.1.

- Morak, Simone; Hegerl, Gabriele C.; Christidis, Nikolaos. **Detectable Changes in the Frequency of Temperature Extremes.** Journal of Climate. Mar2013, Vol. 26 Issue 5, p1561-1574. 14p. DOI: 10.1175/JCLI-D-11-00678.1.

Citation

- Guemas, Virginie; Corti, Susanna; García-Serrano, J.; Doblas-Reyes, F. J.; Balmaseda, Magdalena; Magnusson, Linus. **The Indian Ocean: The Region of Highest Skill Worldwide in Decadal Climate Prediction.** Journal of Climate. Feb2013, Vol. 26 Issue 3, p726-739. 14p. 1 Chart, 5 Graphs, 2 Maps. DOI: 10.1175/JCLI-D-12-00049.1.

- Voigt, Aiko; Stevens, Bjorn; Bader, Jürgen; Mauritsen, Thorsten. **The Observed Hemispheric Symmetry in Reflected Shortwave Irradiance.** Journal of Climate. Jan2013, Vol. 26 Issue 2, p468-477. 13p. 1 Chart, 6 Graphs. DOI: 10.1175/JCLI-D-12-00132.1.

- Adams, Aaron M.; Prospero, Joseph M.; Zhang, Chidong. **CALIPSO-Derived Three-Dimensional Structure of Aerosol over the Atlantic Basin and Adjacent Continents.** Journal of Climate. Oct2012, Vol. 25 Issue 19, p6862-6879. 18p.

  Graphs. DOI: 10.1175/JCLI-D-11-00672.1.

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CALIPSO-Derived Three-Dimensional Structure of Aerosol over the Atlantic Basin and Adjacent Continents.

OVERVIEW

- CALIPSO Vertical Feature Mask used to investigate 3D frequency of occurrence distribution of different types of aerosols over Atlantic Ocean, Africa, Europe, Americas.
- Seasonal cycle in zonal and meridional vertical variability of 4 aerosol species (dust, smoke, polluted dust and polluted continental aerosols)
- Evaluation of ITCZ effect on northward/southward aerosol transport (location of ITCZ from TRMM 3B42 precipitation data)

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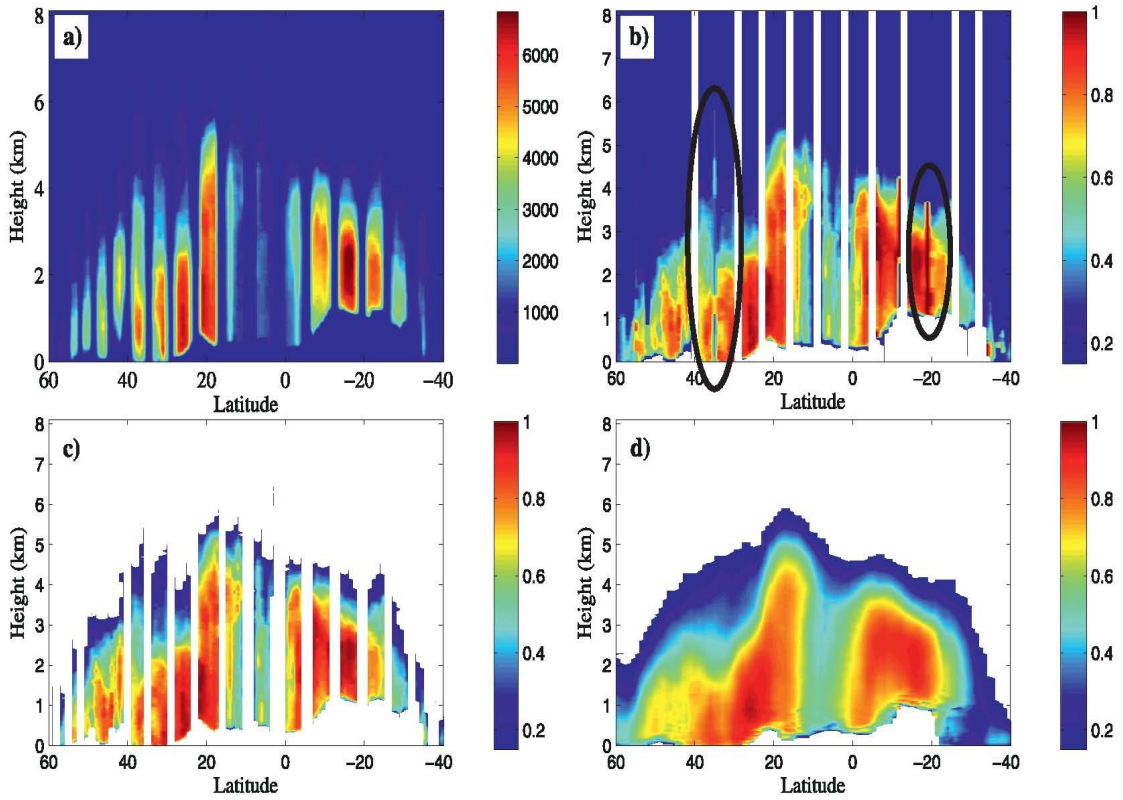

FIG. 1. Total aerosol FoO at 20°E in JJA. (a) Step 1: initial tally of aerosol identification. (b) Step 2: as in (a), but normalized by the number of valid satellite passes. Circles highlight examples of anomalously high probabilities due to a limited number of satellite passes. (c) Step 3: impose a minimum number of satellite passes and remove values <0.15. Step 4: smooth.

- VFM swath data gridded into a 1° x 1° x 30m matrix (290 levels up to 8km)
- Total occurrence normalized by total number of satellite passes at each grid point
- Averaged data discarded if number of satellite passes < 15% of greatest number of passes in the domain
- Smoothing with 13-point latitudinal running mean + 3-point longitudinal running mean

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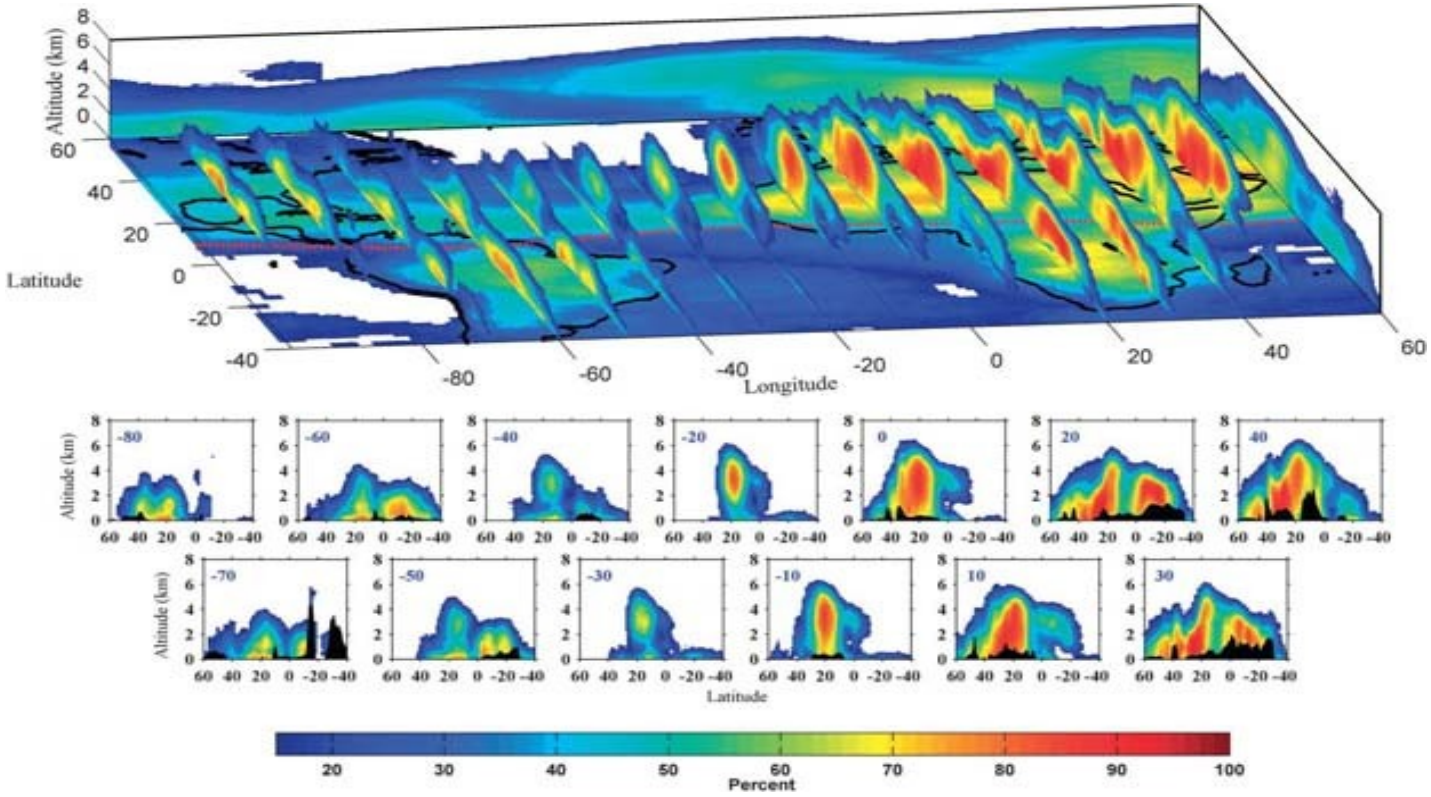

Total aerosols, JJA. ITCZ (red line) demarcates north/south profiles of vertically averaged FoO.

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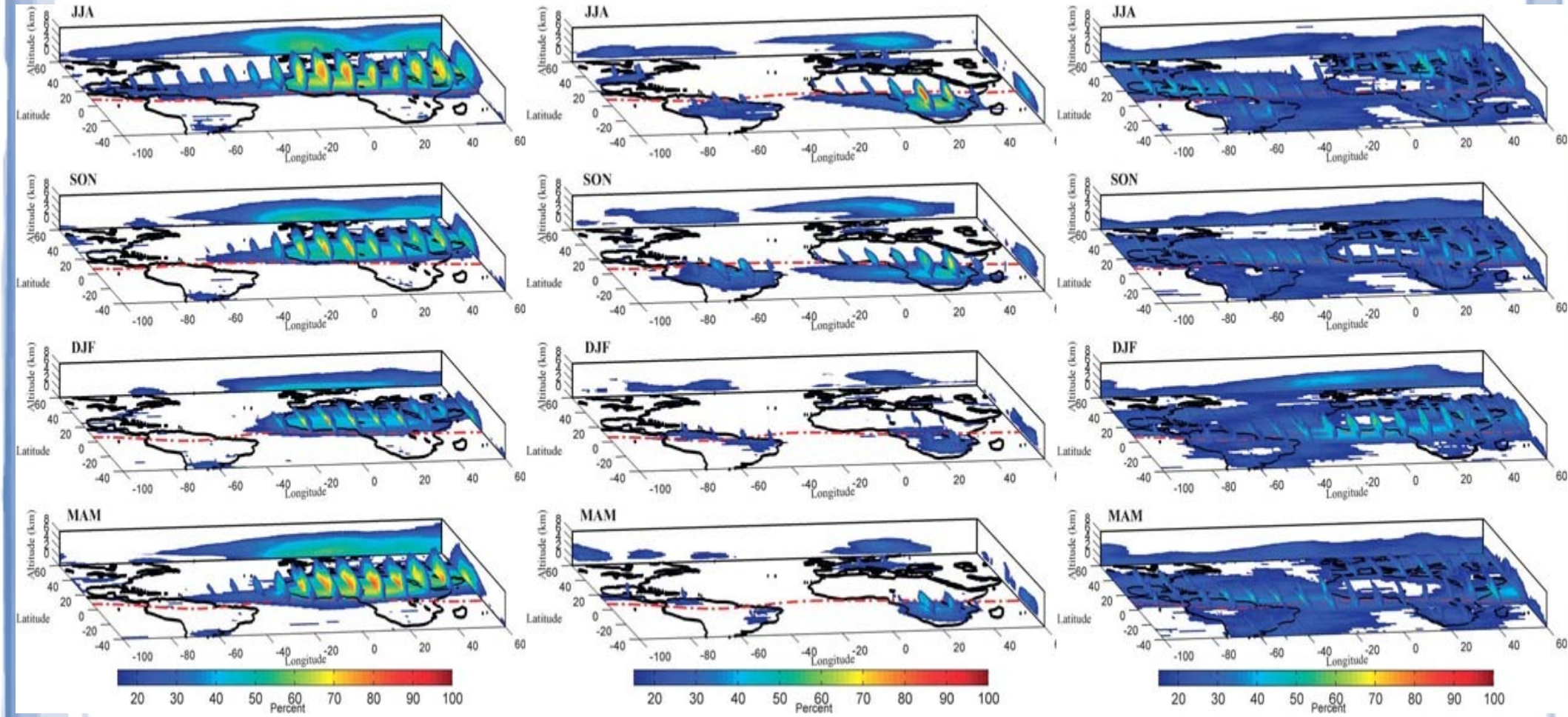

Dust

Smoke

PDA (mix dust/smoke)

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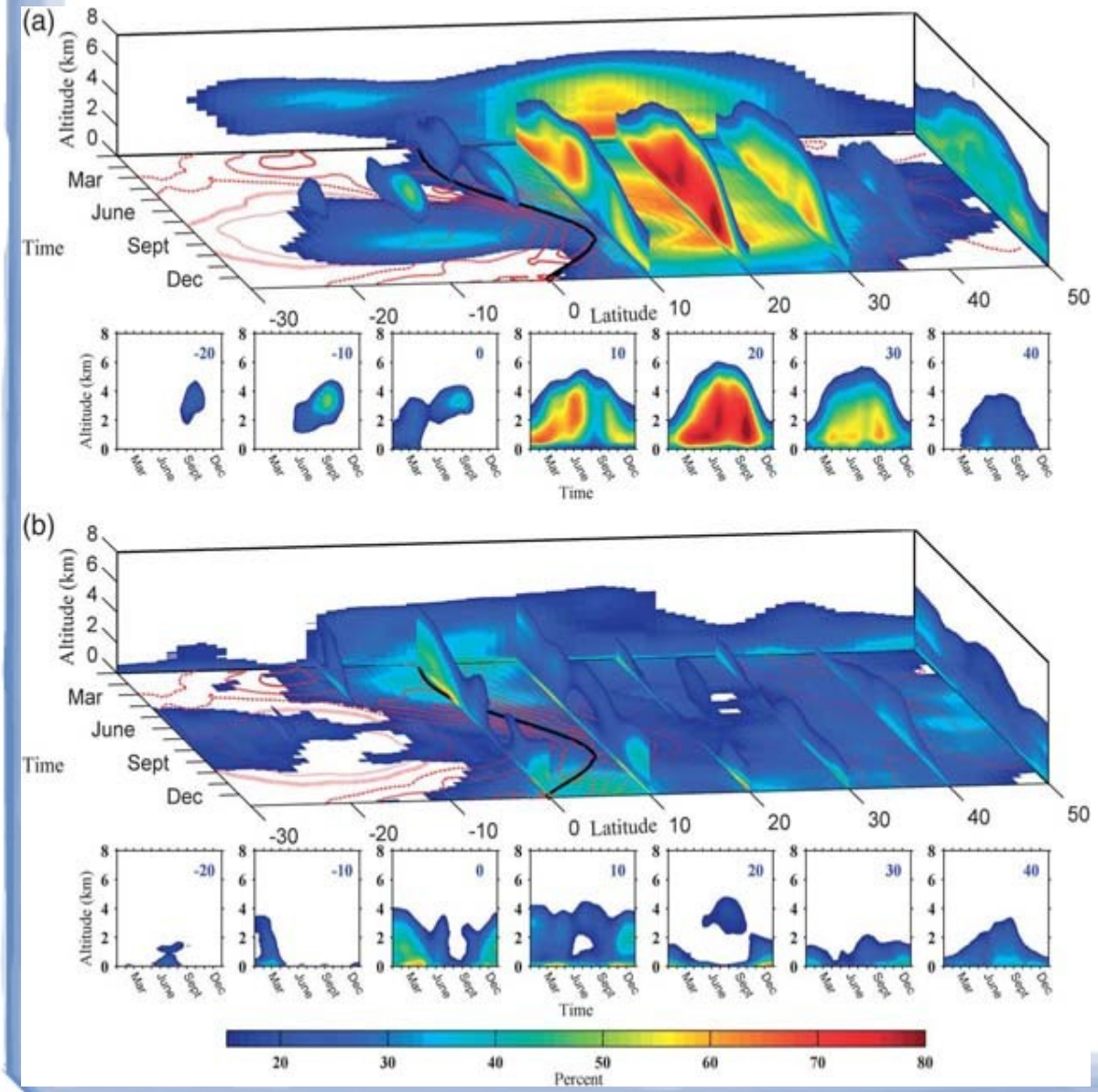

- Seasonal migration of combined dust and smoke (top) and PDA (bottom), averaged over 31° W-60° E
- ITCZ is the black solid line, red lines are TRMM precipitations
- Dust and smoke observed at minimum rainfall
- Largest PDA FoOs located close to ITCZ with inverse relationship to rainfall amount
- Altitude distribution highly variable during the year

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CONCLUSIONS

- 3D representations of aerosol occurrence over Atlantic and adjacent continents from CALIPSO VFM product. ITCZ location estimated from TRMM rainfall maxima and evaluation of its effect on north/south transport.
- Aerosol distribution chiefly determined by dust (northern hemisphere), smoke (southern hemishpere) and PDA
- ITCZ limits southern extent of dust from North Africa and northern extent of smoke from South Africa. Larger-scale wind fields responsible for mixing of dust and smoke (PDA FoO at its maximum)

LIMITATIONS

- PDA definition (based primarily on depolarization ratio)
- VFM accuracy (dust and smoke thick layers misclassified as clouds, or thin layers close to clouds misclassified as clouds)