Black carbon and AeroCom

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Current foci of interest:
• Mid/Upper tropospheric variability –
• Time scales for change –
  -> Mechanisms that control m/uT loads

Future datasets:
• ATom
• KORUS-AQ
• ONFIRE/ORACLES/CLARIFY
Trans-Atlantic Model/Measurement BC Analysis

- Expanding beyond Pacific remote profiles
- DLR and NOAA data from 2011 – 2013
- Focus on source regions, and assessing longitudinal variability, mixing
- Model/Measurement comparison
• Data from 2012 Deep Convective Clouds and Chemistry (DC3) campaign: May/June and SEAC4RS 2013 Campaign: August/September

• Order of magnitude difference in mid/upper trop loads

• BC MMR decreases at ~450 hPa hard to capture in models
• >500 Vertical profiles
• 5 flight series over three years
• Reasonable calendar year coverage
Relevant Latitude band: models don’t echo measured seasonality
IN THIS LATITUDE BAND YOU SEE SOME CLEAR SEASONALITY CAUGHT BY MODELS
Can these issues be addressed via:
Conserved and aerosol tracer experiments?
1) time scales of mixing - “Delta-function” injection at altitude, at surface

2) time scales of removal: abrupt reduction in steady-state emissions of tracers, or of BB emissions?

Dependence on time of year, location?
Atmospheric Tomography Mission (ATom)
4 Sequences 2016-2018
NASA DC-8

All profiles to 12 km
KORUS-Air Quality Mission, May/June 2016: NASA DC-8

Question 1: Satellite observations of air quality
Question 2: Ozone photochemistry and aerosol evolution?
Question 3. Model performance and necessary improvements?
  Question 3a. Are modeled gradients across the Korean peninsula consistent with local/upwind sources, transport, and chemistry?
  Question 3b. Are air quality and atmospheric chemistry forecasting systems prepared to utilize GEO observations?
Focus on aerosol in the SE Atlantic:

- ObseRvations of Aerosols above CLouds and their interactions, ORACLES: NASA P3 and ER-2

- ObservatioNs of Fire’s Impact on the southeast atlantic REgion (ONFIRE) – 2017, NSF C130

- CLouds and Aerosol Radiative Impacts and Forcing: (CLARIFY) - FAAM BAE-146