10:45am – 12:45pm

Biomass Burning Aerosol Breakout Session: Variability in absorption efficiency and radiative effects

- *What are the major uncertainties in modeling BB aerosol radiative effects?*
- *Where do we stand now in observations and what key observations are needed?*

"***Biomass*** *and biofuel combustion is a major source of AA that still* ***lacks key understanding*** *…* ***High priority****: develop an integrated understanding from the in situ and remote sensing measurements to address the source-specific absorbing aerosol processes*", quote from Shaima on the Absorbing Aerosols Workshop summary

10:45 Welcome – uncertainties i deling of BB aerosols (Yan Feng)

10:53 Impacts of mixing state on BB aerosol optical properties (Nicole Riemer)

11:00 Chemistry and optical prop nass burning during BBOP (Tim Onasch)

11: 08 Formation and characterist bsorbing tar balls in BB (Art Sedlacek)

11:15 Ground-based aerosol opti on McComiskey)

11:22 Observations of vertical dis errare/Tyler Thorsen)

11:30 BB aerosols aloft and the lo

11:37 An update on LASIC (Amon Haruta/Stephen Springston)

11:45 5-minute summary of Absorbing Aerosol workshop with a focus on BB (Art Sedlacek)

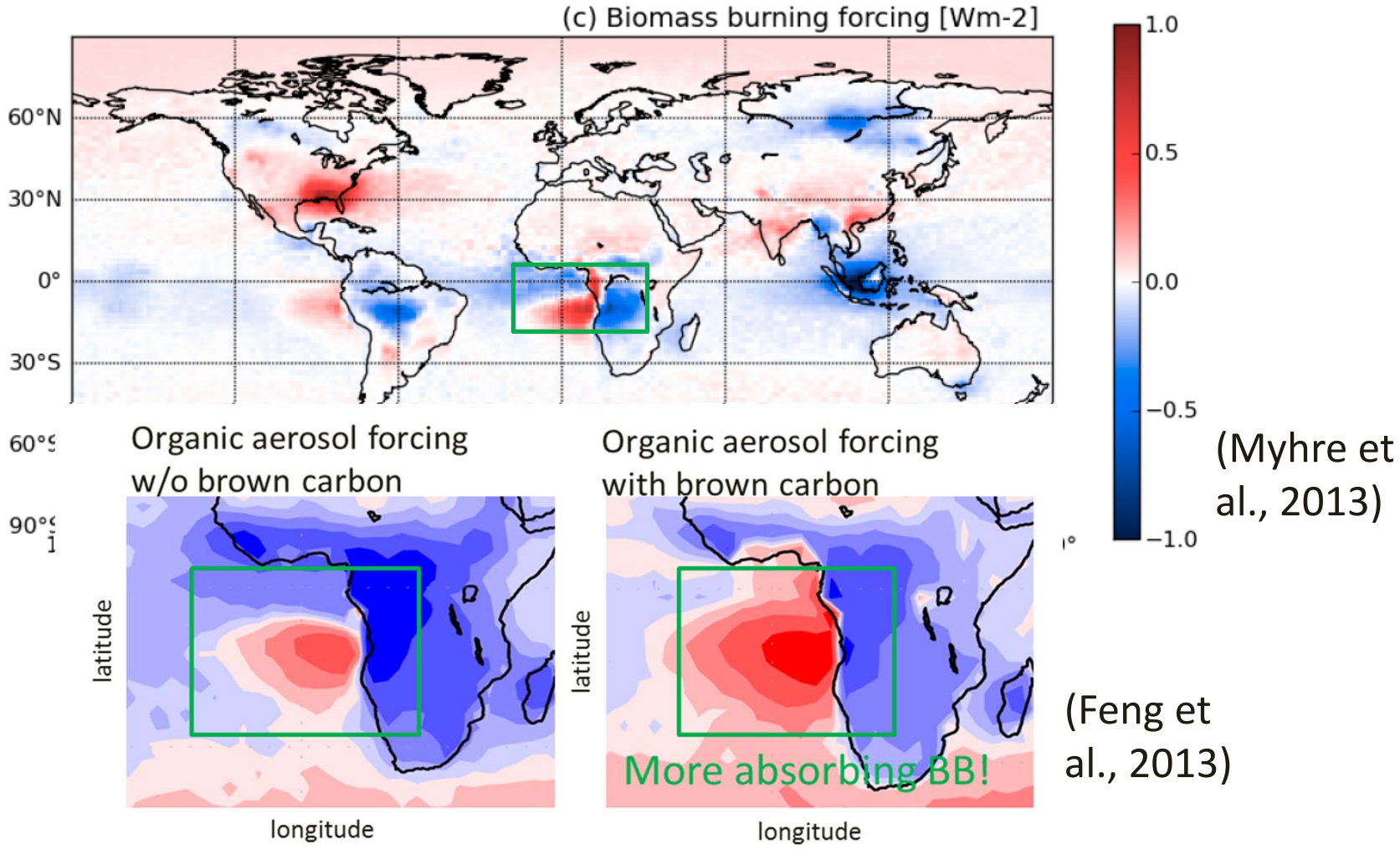
Model

In situ

Remote Sensing

aerosol-cloud interaction

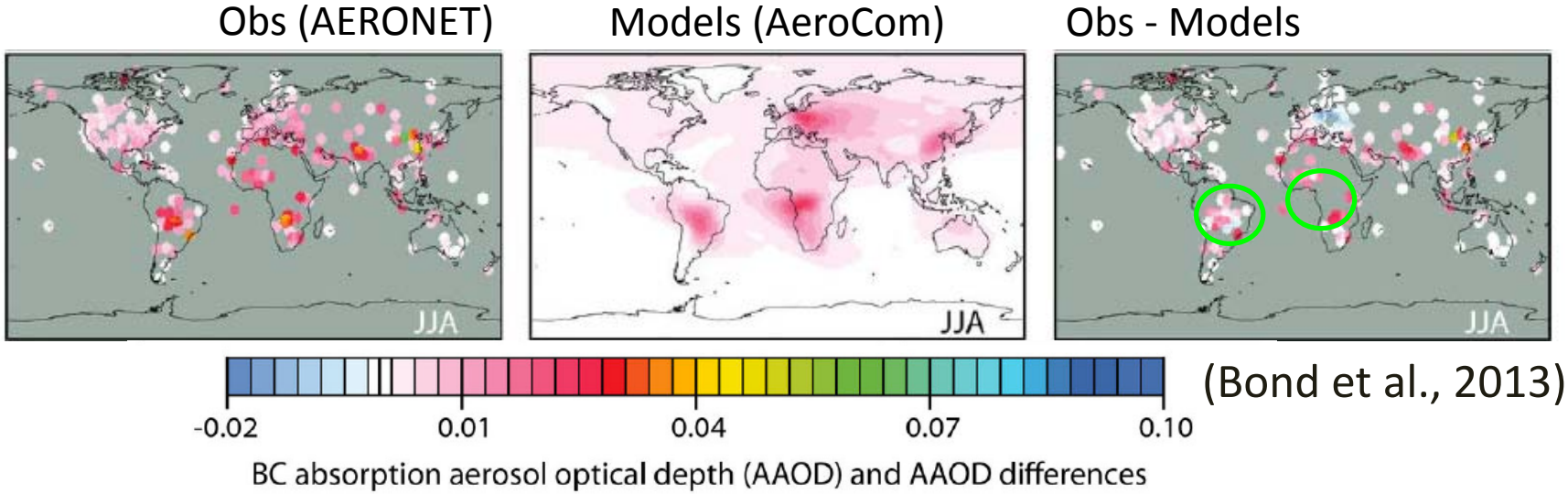
Large positive or negative BB radiative forcing on the regional scale



(Myhre et al., 2013)

(Feng et al., 2013)

Priority: Resolve differences in obs vs model aerosol absorption optical depth (AAOD) over BB regions



(Bond et al., 2013)

ARM/ASR data -> model improvement of AAOD:

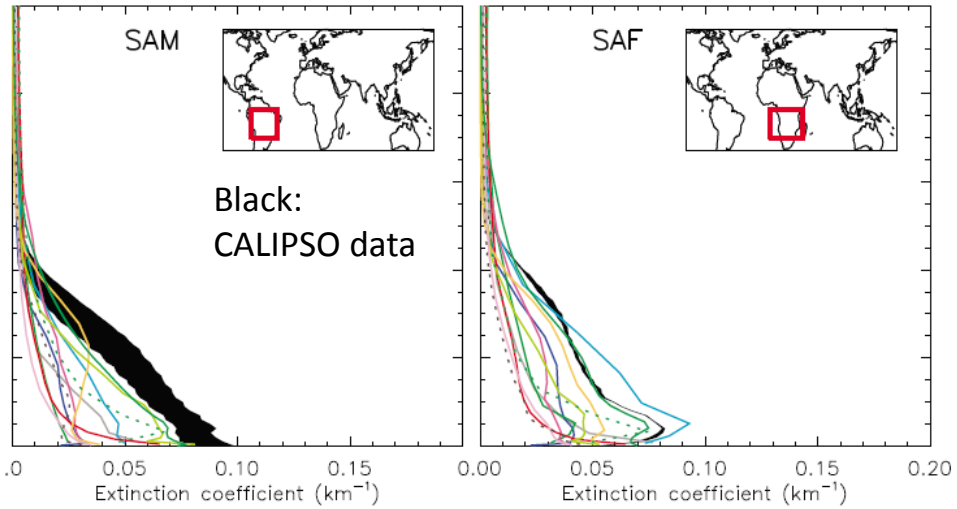
- More data in the BB regions
- Attribution of absorption (BC, BrC, or SOA, or dust influence)
- Evolution of optical properties associated with mixing and chemical transformation in aerosol aging

Model representation of BB aerosol optics

- **Fresh BB aerosols in global models are generally treated as BC and organic aerosols (OA), each of which is assigned with one set of refractive indices**
  - *Source-dependent parameterization of OA and/or BrC optical properties*
- **In CAM5, aging of BC and OA is treated with a criterion of eight monolayers by sulfate or SOA and optics are calculated assuming internally mixed with accumulation-mode aerosols (Liu et al., 2016)**
  - *Characterization of aging timescales and optics based on particle-resolved modeling*
- **SOA formation from BB includes low-yield SOA precursors**
  - *Measurements-based estimates of SVOCs and IVOCs and their multigenerational chemistry are being included, and these have much higher "effective" SOA yields compared to traditional VOCs from BB (inputs provided by M. Shrivastava/PNNL)*

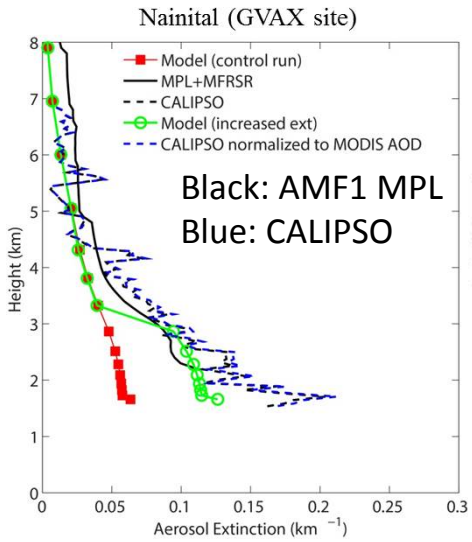
Priority: Constrain the altitude of BB aerosols
I. Extinction profile

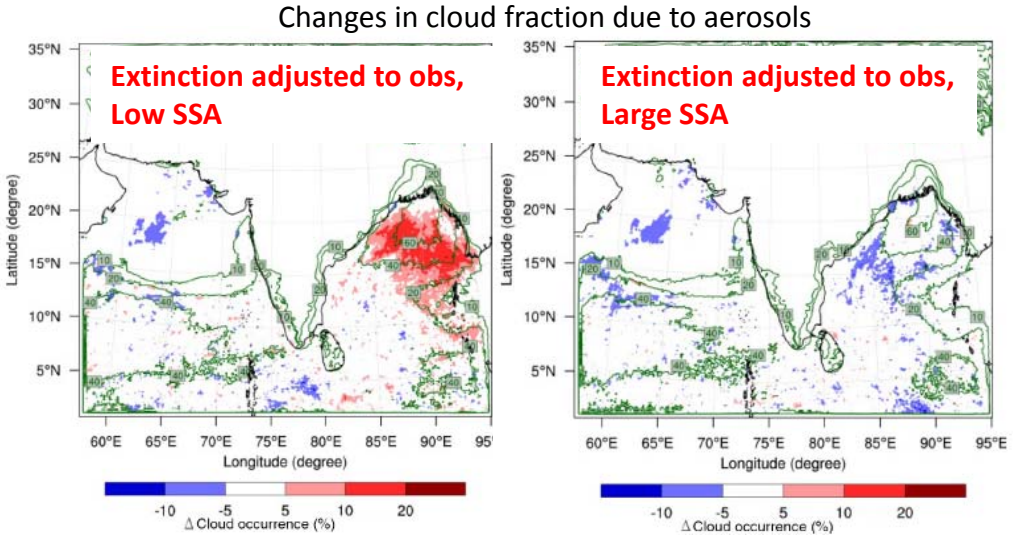
Koffi et al, 2012



- Data: CALIPSO; MPL; HSRL; Raman Lidar
- Absorption profile is needed to constrain aerosol effects on clouds

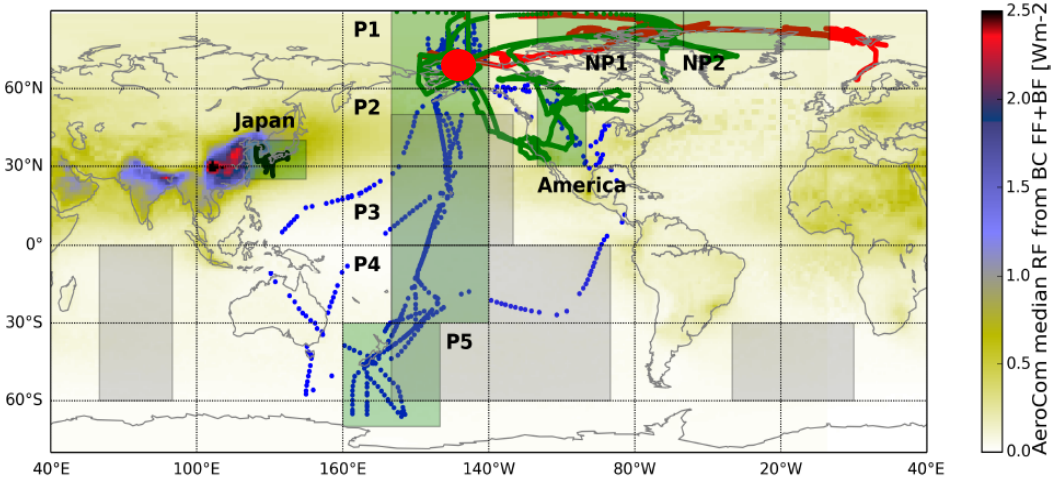
Feng et al, 2016



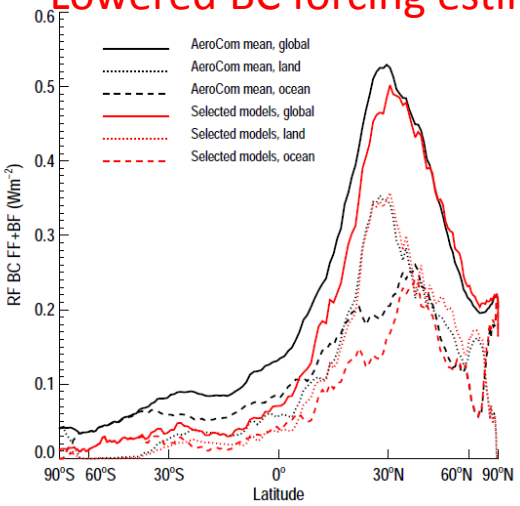


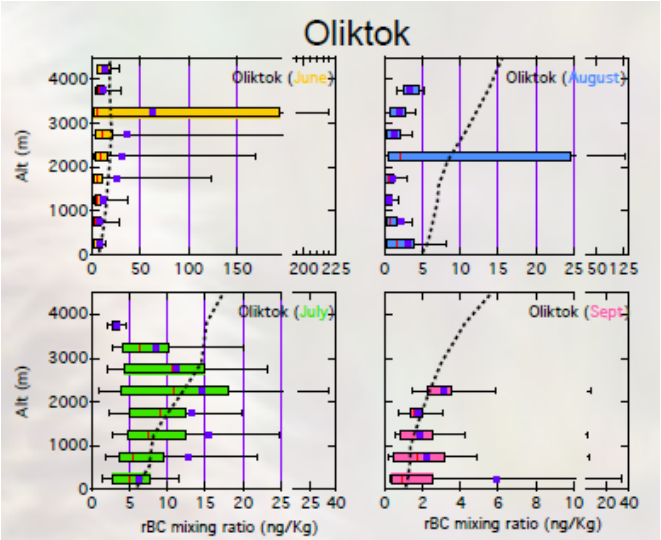
Priority: Constrain the altitude of BB aerosols
II. Vertical profiles of BC

Samset et al, 2014



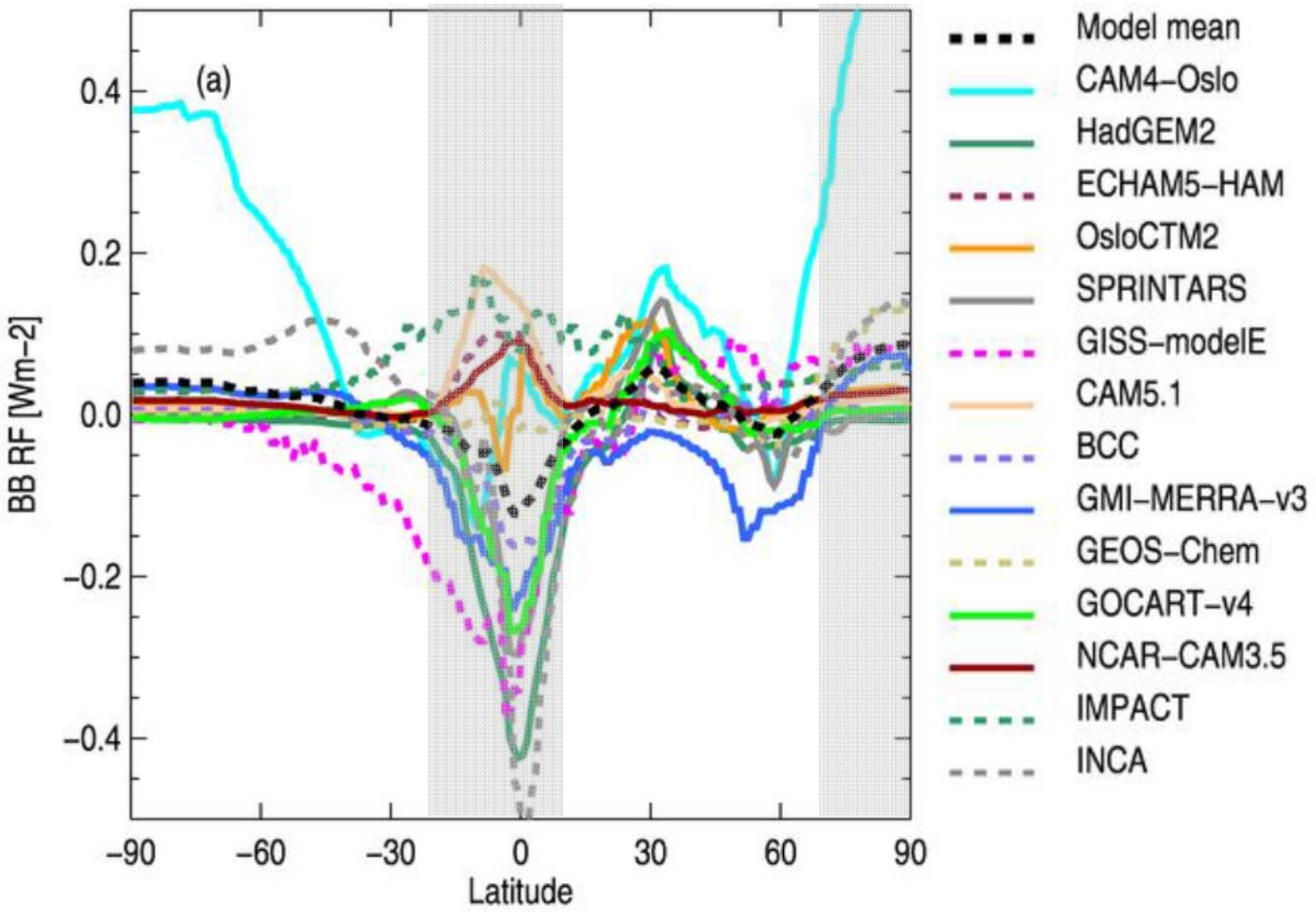
Lowered BC forcing estimate





- Data: aircraft, UAS, or tethered balloon
- BC profiling is needed over the remote areas and also near the source regions

Where does the model-estimated BB radiative forcing differ the most?



(Myhre et al., 2013)