Atmospheric State Breakout Summary

- Fractional sky cover from MFRSR (Q. Min)
  - Matches well with other methods
  - How do you compare ‘sky cover’ to model ‘cloud fraction’?
- 2D/3D Radiative transfer modeling (B. Ellingson, T. Varnai, J. Cole)
  - How large are 2D/3D effects (in LW/SW) on fluxes and heating rates under various cloud conditions and how do they effect cloud dynamics microphysics?
    - Depends on details of clouds, but 3D effects on HR can be large
    - Effect on dynamics/microphysics depends in part on importance of large-scale forcing to cloud field
    - Is 2D effect significant compared to changes associated w/ microphysics codes?
  - Developing parameterization of 2D/3D RT effects in CRMs
- CIRC – Continuous Intercomparison of Radiation Codes (L. Oreopoulos)
  - Use observationally-based (rather than theoretical) cases to assess radiation codes
  - What are the errors in current GCM-type radiation codes in clear/cloudy skies?

Atmospheric State Breakout

- Heating rate studies (L. Moy, J. Mather)
  - Use of radar+lidar (at SGP during 2004-2007) greatly affects cloud amount and heating rates due to problem in MMCR cirrus mode; during this period – be cautious of using radar-only retrievals in comparisons
  - Radiative heating rates in terms of ‘modes’ or cloud classes – may make it ‘easier’ to compare to models rather than aggregate/average comparisons;
- Satellite radiation studies (L. Moy, M. Khaiyer)
  - Clear sky OLR comparisons using AERI/AIRS do very well
  - Improvements in GOES NB-BB fits by creating seasonal fits and using GERB to get information on SZA dependence
- Global Dimming and Brightening (C.Long)
  - Significant trend in continental US site; half associated with clear sky
  - For clear sky - no change in direct SW – all in diffuse
  - ARM data is ideally useful to explore reasons for GDB trends

Atmospheric State: Microwave Radiometers

- 3-channel radiometers
  - on order; first units expected fall 2009
  - Improved precipitation detection & mitigation
  - Update MWRRET for 3-channel?
- Profiling from passive MWR (D. Turner)
  - Atmospheric temperature/water vapor is possible; LWC is not
- 183 GHz comparisons (D. Turner)
  - GVRP & CSR Compared well; 4-channel (GVR) did not track as well with others
  - Found dependence of residuals on distance from center of spectral line – likely due to height dependent RH bias in radiosondes
- Water vapor continuum – 150 GHz (D. Turner, E. Mlawer)
  - Compared 4 microwave RT models and observations (at COPS, and other sites)
  - Liebe93 model is not good – large WV-dependent bias
  - Comparing models and observations – allows derivation of correction factors to self and foreign continuum
  - These corrections can then impact LWP retrievals
- RHUBC-II; Chile – Fall 2009 (E. Mlawer)
  - Will provide datasets to improve far-IR; very important to heating rates in upper troposphere
  - Planning is going forward and on track