# Aerosol-cloud discussions

Summary prepared by Bretherton (S)/ Feingold (R)

- Cloud-aerosol-precip treatments at NCAR, GFDL evolving rapidly and need multivariate constraints.

- POC simulation will be a 'grand challenge' problem for our LES groups (Bretherton/Wood, Feingold, S. Wang).

  Feingold emphasis:bin microphysics, careful treatment of aerosol/cloud interactions in limited domains (L~10 km)

  UW emphasis: larger domain, bulk microphysics, highly idealized aerosol/cloud feedbacks, diurnal cycle.

  NRL emphasis: Nested LES plus hi-res regional modeling of POCs

- Interest in REx observing 'dirty' vs. 'clean' downstream evolution of MBL clouds and aerosols.

- Regional models:  Reasonable clouds/PBL structure/aerosols compared to x-sect flights? Sensitivity of clouds to aerosols and vice versa?

- Pre-REx forecast/analysis-mode model intercomparison (in prep for similar REx intercomp.)

# Pre-VOCALS atmospheric model forecast/analysis assessment (PreVOCA)

**GOAL: To critically assess the ability of global/regional models (atmospheric, chemical transport….) to simulate salient synoptically-varying characteristics of the VOCALS region**

**WHY?  Learn more about model biases, current ability of CTMs to forecast for REx etc. A means for leveraging REx data.  More tightly controlled sequel after REx.**

**WHAT?  Oct. 2006?, 4xdaily VOCALS-region outputs**

**WHEN?  Submissions to Rob/Chris by this October?**

**NOT: An intercomparison. You may use your favorite forecast/analysis approach as a first cut.**

# What to compare

[**bold = potential satellite observational comparisons**]

3D Fields:

    meteorology (T,q, u, v, w)

    clouds (LWC, fraction, microphysics, radiative $r_{eff}$)

and/or (for chemical transport models)

    emissions/concentration of major aerosol species

    and precursors [how to compare with obs?]

2D fields:

    $T_{sfc}$, $z_{sfc}$, land fraction, SLP

    **LWP, low cloud fraction,** precip, **low-cld-top z**, $r_{eff}$ **& T.**

    **10m vector wind**, 2m T, q

    LHF, SHF, **TOA**/sfc **radiative fluxes.**

**Surface flux/met at stratus buoy location**

# Satellite data sources

GOES (diurnal cloud-top T)

MODIS (clouds, microphysics)

Quikscat (surface winds)

AMSR (WVP, cloud LWP)

CloudSat/CALIPSO (drizzle, MBL depth, aerosol scattering…)

TRMM (TMI SST)

WHOI stratus buoy also provides surface flux/met obs.

# Who?

- NCAR CAM (Rasch/Breth)
- NASA GMAO (Bacmeister)
- GFDL (Ramaswamy)
- ECMWF (Koehler)
- NCEP GFS (Pan)
- iROAM (Y. Wang)
- U. Chile WRF (Garreaud)
- COAMPS (S. Wang)
- MMF (Khairoutdinov)
- Others?

# Timeframe

- Previous experience tells us that a two-stage process works (first stage acts as a trial period to refine the process, fields, etc.)
- First stage prior to REx, second stage after REx