Low Cloud Breakout Report

Progress reports

Analysis of low clouds and feedbacks in SP-CAM are underway in both Earth-like and aquaplanet settings, using a variety of diagnostics. (UW/UCLA)

GCSS PBL cases are being evaluated for sensitivity to resolution. (Anning)

NICAM low clouds are being evaluated in seasonal runs with realistic geography, including effects of different PBL and cloud assumptions.

Observational constraints are being developed, for example statistical analysis of cloud objects. (Zach & Kuan-Man)

Initiatives

‣ Understanding low-cloud feedbacks in (Earth-like) SP-CAM

(& aquaplanets)

‣ Use GCSS approach to develop an a priori SAM/SCM

‣ Model Reformulations:

delocalized physics, high vertical resolution, embedded LES

‣ Connecting to observations

‣ Aerosol and Microphysical impacts

Past milestones (from Kauai)

‣ Forcing time-series from aquaplanet output

‣ Aquaplanet SP-CAM sensitivity run

‣ Both done.

Future Work (1)

▸ **UW low-cloud plans**

    Climate sensitivity runs with 2D and 3D CRM & LES

    Create intercomparison case from SP-CAM (SCM/LES/CRM)

    polar low-clouds & climate sensitivity

▸ **Aquaplanet plans**

    extend CAM-AM comparison

    include SP-CAM in comparison

    Continue development of forcing datasets, including distribution to interested parties

    Begin SCM/LES/CRM experiments using forcing dataset

Future Work (2)

▸ **GCSS-related plans (Anning)**

include more GCSS cases

further analysis (updraft/downdrafts, entrainment rate, circulation)

improving subgrid-scale parameterizations in CRMs

▸ **Model Reformulation**

Delocalized physics (Bjorn)

Embedded LES & SAM testbed (TBD by Bjorn, Chris, Peter?)

▸ **Microphysics and aerosol effects**, not being directly pursued by the theme right now (revisit in February?)

Discussion topics

▸ **Why low clouds?**

▸ **Aquaplanet forcing dataset challenges:**

How to choose which GCM to use?

Who will use it? -- contact with GCSS?

▸ **Need to develop observational constraints for low cloud feedbacks.**