

Cloud Feedbacks Session Summary

Chris Bretherton



Talks

Khairoutdinov: Cloud-resolving Modeling of Aerosol Indirect Effects in Idealized RCE with Interactive and Fixed SST

Sensitivity of RCE to CCN changes; ΔCCN 100-1000 can produce TOA radiative effect that cancels $4\times\text{CO}_2$ with significant Twomey effects.

Bretherton: Cloud Response to Climate Change in SP-CAM

Fast adjustment ($4\times\text{CO}_2$ with fixed SST) increase-Wyant et al 2012

- Shift of cloud, ascent from ocean to land, lower trade inversion
T-mediated (+2K SST increase): Wyant et al. 2006,9
- Subtropical & polar low cloud increase, negative global cld feedback
Column CGILS sensitivity with SP-SAM
- Underresolution makes cld too thick, grid-locking issues, but Sc, Sc/
Cu and Cu cases all qualitatively OK and show positive cld feedbacks.

Discussion: Coupled model cld feedback strategy

Short term:

Cristiana retunes her SPCAM3.5fv control simulation into radiation balance by modifying autoconversion and does new ctrl/4CO2 run pair.

Use this for cloud feedback analysis (use ISCCP simulator output for this a la Zelinka et al. if possible), looking both at fast and T-mediated adjustment. UW & others will help.

~31 Jan: Telecon organized by Bretherton with Krueger, Morrison, Pritchard, Randall, Stan, Xu to discuss next steps toward implementing a coupled SP-CAM with PNNL uphys and HOC SGS turbulence

Long range (6 months): Start coupled cloud feedback runs with advanced SP-CAM, ideally in CESM1 framework.