

**CCSM Atmosphere Model Working Group Report,  
22-24 March 2006  
NCAR, Boulder, Colorado**

Reports were presented on a wide range of diagnostic studies with CAM and on exploratory work with next-generation component candidates. Monday afternoon was devoted to dynamical cores. Assimilation work with CAM was reviewed. An invited presentation by Vince Larson (University of Wisconsin, Milwaukee) dealt with prospects for a new approach to cloud parameterization using PDFs of sub-grid vertical velocity. On Wednesday, a joint session with the Chemistry-Climate Working Group was held. During the latter session, early results from the microphysics initiative were presented.

With respect to development of CAM, the following results/action items are noted:

1. University of Washington boundary layer and shallow convection: High-latitude cloud problems are the chief concern in present results.
2. Microphysics: Large-scale microphysics have been provisionally upgraded.
3. Cloud macrophysics: Jim Hack and Andrew Gettelman are exploring the feasibility of using a sub-grid water PDF approach for CAM4.
4. Convection: Guang Zhang, Xiaoqing Wu, and Richard Neale all reported improvements in some aspects of model biases when alternate closures or triggers were used with CAM's current convection parameterization. Marcus Jochum reported that tropical zonal winds are important for bias reduction. Several actions will be taken as a result:
  - a. The closure reported on by Richard Neale will be evaluated against observations by Guang Zhang. The goal is to narrow the range of closures under investigation and, if possible, restrict closure options to those with a physical basis.
  - b. A protocol for examining the roles of closures, triggers, and cumulus momentum transport, including coupled experiments, will be established with a goal of providing comprehensive indications of which configuration will be most effective in addressing model biases. It is planned that these results will be made available to the community to facilitate its role in planning the next model configuration.
  - c. Convective vertical velocities remain an important issue for cold microphysics and aerosols but will be addressed on a separate track from the immediate tests aimed at bias reduction.
5. Sub-grid orography. A parameterization of the effects of sub-grid orography (Steve Ghan) is of high value for land-model activities, and its incorporation (SSC approval) will be pursued.

6. COURT radiation (community-based radiative transfer code) development is progressing.
7. Independent pixel approximation. Full implementation requires development of new radiation code. Partial implementation is under discussion.
8. Dy-core. Changes in ocean viscosity may have eliminated problems with excessive ice cover when finite-volume dy-core is employed. If so, transition to finite-volume dy-core should accelerate.

**Attendees:**

Anderson, Don	Lawrence, Peter	Wang, Honjun
Andronova, Natalia	Lin, Shian-Jiann	Williamson, Dave
Arellano, Avelino	Liu, Xiaohong	Wu, Wanli
Baer, Ferdinand	Mahowald, Natalie	Wu, Xiaoqing
Bardeen, Charles	Maloney, Eric	Zhang, Guang J.
Bretherton, Chris	Mauritsen, Thorsten	Zhang, Minghua
Buja, Lawrence	Mirin, Art	Field, Paul
Caron, Julie	Mitchell, David	Jochum, Markus
Chen, Jack	Morrison, Hugh	Kumar, Anil
Collins, William	Nair, Ram	Larson, Vince
Conley, Andrew	Neale, Richard	Moncrieff, Mitch
Dai, Aiguo	Norris, Joel	Yudin, Valery
Donner, Leo	Olson, Jerry	Barth, Mary
Eaton, Brian	Pincus, Robert	Cameron-Smith, Philip
Gent, Peter	Raeder, Kevin	Heald, Colette L.
Gettelman, Andrew	Randall, Dave	Hess, Peter
Ghan, Steven J	Richter, Jadwiga (Yaga)	Heymsfeld, Andrew
Hack, James	Rood, Richard	Liu, Hongyu
Hannay, Cecile	Rothstein, Mathew	Neu, Jessica
Jablonowski, Christiane	Sassi, Fabrizio	Rodriguez, Jose M.
Karlsson, Johannes	Shell, Karen	Vitt, Francis
Klein, Steve	Spotz, Bill	Wang, Chien
Lamptey, Benjamin	Svensson, Gunilla	Wuebbles, Don
Large, Bill	Trenberth, Kevin	Youn, Daeok
Lauritzen, Peter Hjort	Tufo, Henry	
Lawrence, David	Vertenstein, Mariana	