

November 9, 2004

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The CCSM Advisory Board

Dear Members of the CCSM Advisory Board:

This CCSM Scientific Steering Committee (SSC) would like to thank you for your letter based upon our discussions at the 9<sup>th</sup> Annual CCSM Meeting. We would also like to comment and respond to several of the issues and opportunities you raised.

We appreciate your kind remarks regarding the teamwork responsible for the release of CCSM3 and its application for the IPCC Fourth Assessment. We agree that the contributions of our partners from DOE, NASA, and NSF have been essential in developing new scientific and technical capabilities of CCSM. We look forward to continuing and strengthening those collaborations in the future.

At the 10<sup>th</sup> Annual Meeting, the SSC will experiment with a new format to foster interdisciplinary discussions among the working groups<sup>1</sup>. We plan to spend most of the meeting in several plenary sessions devoted to analysis and discussion of systematic biases. The plenary speakers will be asked to address topics related to each of these biases. We will reintroduce the “wrap-up” session to summarize the next steps and further experimentation that emerged from the plenary discussions. Since this is the 10<sup>th</sup> anniversary of the CCSM meetings, the SSC chair will devote his introductory presentation to the progress made over the last ten years and to the scientific challenges and opportunities in the near future. We would like to thank Jay Fein for his generous support of these meetings.

The SSC is taking several steps with respect to the biases in the simulated climate. First, we will prepare a quantitative summary of the issues based upon the articles in the upcoming special issue of the *Journal of Climate* on CCSM3. We will present this summary to the CAB at the next CAB meeting in January 2005. Second, we are focusing the 10<sup>th</sup> Annual Meeting on analysis of and hypotheses for the most significant systematic errors<sup>2</sup>. Third, we will continue to devote a significant fraction of our computational resources to experiments on the systematic errors. Fourth, we have responded positively to the recent proposal from Prof. Shukla for COLA to host a workshop on tropical biases<sup>3</sup>. We have asked him to form a steering committee to plan for the meeting, and we have asked that the steering committee present a meeting proposal to the SSC at the

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<sup>1</sup>If we decide to focus or organize the meeting differently, I will revise this paragraph accordingly.

<sup>2</sup> Ditto.

<sup>3</sup> If we decide not to proceed with a workshop organized by COLA, I will revise accordingly.

10<sup>th</sup> Annual Meeting<sup>4</sup>. This meeting would be especially productive if the steering committee could analyze the findings from the previous biases meeting at GFDL and propose a more focused program for the second workshop.

The efforts to develop new models, participate in IPCC, and support the large CCSM community have proven quite challenging over the last four years. This work would not have been possible without the continuing strong support of the Climate and Global Dynamics (CGD) and Atmospheric Chemistry (ACD) Divisions, the NCAR Director's Office, and NSF. A number of staff have been added since the release of the CCSM business and science plans in mid-2003, including:

- a software engineer specifically for vectorization and platform portability;
- two new members of the CCSM software engineering group (CSEG) working on CAM (one a lateral transfer);
- a software engineer for web development; and
- a scientific liaison for aerosol-related research.

The SSC would like to thank CGD, ACD, the NCAR Director's Office, and NSF for these augmentations to the program.

NCAR has also hired several new younger scientists who are working on various aspects of CCSM-related research. From mid-2003 to the present, the new members of CGD include:

- Caspar Ammann (hired 10/03), studying paleoclimate and volcanic eruptions;
- Andrew Gettelman (hired 7/03), studying physics of the upper atmosphere; and
- Markus Yokum (hired 1/05), studying process-oriented ocean modeling.

It has been a pleasure working with these scientists on the development and applications of CCSM. We anticipate that they will play increasingly important roles in setting the scientific priorities of the CCSM program.

At the same time, the stresses associated with the increased scope of the program are placing a heavy burden on CCSM staff. Two managers for CSEG have departed this year, and due to budget pressures we are operating with an acting manager while reducing the size of CSEG by one position. This shortfall in CSEG staff has demonstrably impeded further development of the land model. We also regret that the AMWG liaison has decided to leave NCAR this fall. He played a very critical role in the scientific and technical development of CAM3 and its integration with CCSM3. The climate modeling section also lost its last software engineer supported under the NSF core funds to NCAR. There is little prospect of recovering these positions quickly in the current budgetary environment.

The SSC agrees with the CAB that it is urgent that we begin training the next generation of climate modelers. This is especially timely considering the group of scientists at NCAR who have been developing the atmospheric model. All but one member of that group who worked on CAM2 and CAM3 are senior scientists. The group shrank by one member in 2003, and at least one member is approaching retirement. In the considered

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<sup>4</sup> If we decide on another organizational strategy, I will revise accordingly.

opinion of the SSC, it is neither desirable nor feasible to transfer the core of this development activity outside of NCAR. We hope that it will be possible to start replenishing this group with young scientists in the very near future.

The SSC recognizes the significant computer time and software engineering effort from our DOE and SciDAC collaborators in support of our contribution to the IPCC AR4. The enhancements to our computer center by Tim Killeen and SCD permitted the CCSM project to perform extensive IPCC simulations at NCAR. Nonetheless, the resources in the Climate Simulation Lab (CSL) for experimentation unrelated to IPCC production runs have remained constant over two CSL proposal cycles. At the same time, the burden on CSEG to support a wide variety of capacity computing platforms has dramatically increased. In our opinion, it is not clear that the scientific return on this investment (outside of the IPCC simulations) has been commensurate with the effort. It is essential that the CCSM community have easy access to significant capability computing as well. Capability computing insures we can test new ideas and try novel experimental strategies as quickly as possible. We concur with the CAB's recommendation for an aggressive national strategy to address this critical need.

In response to your recommendation that we discuss a national strategy for producing IPCC models and simulations, we have scheduled time for discussion of this issue at the next CAB meeting. We concur with the recommendation to invite key leaders in the scientific and programmatic aspects of IPCC. At your request, the SSC will also prepare a progress report regarding both the science and business plans for CCSM. We will present our findings to the CAB at your meeting in San Diego.

We wish to thank you again for your advice and recommendations for the CCSM program.

Regards,