WMO

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INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE

WORKING GROUP I TECHNICAL SUPPORT UNIT
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To: Global Coupled Climate Modeling groups

Dear Colleague,

Thanks for your interest in IPCC. This letter will bring you up to date regarding several issues relating to the model runs being coordinated by the Working Group on Coupled Models (WGCM), Coupled Model Intercomparison Project (CMIP), and Working Group 1 (WG1), in relation to the IPCC Fourth Assessment Report.

Please see previous letters regarding IPCC timetables and other issues; here we write to briefly update you regarding important developments at the recent WGCM meeting held in September, and to provide some operational information.

1) Model Runs. The three "long runs" described in our previous letters were discussed at the WGCM meeting and met with broad support (see Appendix). Ensemble runs will be particularly important given the interest in analysis of extremes expressed by many Governments. A2 has also been identified as a high priority, in view of the importance of comparing with the previous runs done for the TAR and its relatively high radiative forcing by 2100. The WGCM meeting also underscored the requirement (as in previous assessments) of CMIP-style runs employing 1%/year increases for CO_2. We would like to encourage continuing these runs to quadrupling of CO2, and holding concentrations fixed at 4x CO2 for at least an additional 150 years (see e.g., Figure 9.1 and 9.19 of the TAR). Finally, equilibrium doubled CO_2 runs with a slab ocean are also key to climate sensitivity studies needed for the AR4.

2) Sulfate Distributions. Some groups who are unable to run an interactive suphur cycle have asked for a reference set of sulfate concentrations to use in SRES runs, as in the TAR. Olivier Boucher of Univ. Lille has kindly prepared data sets that have now been tested by several groups, and Dr. Boucher has already interacted with some of you. Information about the data itself and access to it is available via:

www-loa.univ-lille1.fr/~boucher/sres/

Please note that you will need to make contact with Dr. Boucher's group to get password information and access to the data set; see the website for instructions. We would like to thank Dr. Boucher for making this information available and to take this opportunity to urge all groups that use the data to acknowledge it in any publications.

3) Data Archiving. As agreed by WGCM, forcing data for 20th and 21st century simulations as well as model outputs will be archived at PCMDI, and possibly also at other data centers. The stipulation will be that all model data must be in netCDF format and conform to the CF metadata standard. PCMDI will supply necessary software if groups need assistance fulfilling these requirements. A subset of fields will be archived, and groups will be notified when this list has been finalized. We very much appreciate the effort that this will involve on the part of PCMDI, and note that it will be a great help to the work of the AR4. Information on these issues will be forthcoming on the PCMDI web page:

www-pcmdi.llnl.gov/cmip/

4) Analysis of Model Runs. CMIP and WGCM are starting coordination of an open process for scientist involvement in analysis and evaluation of those results. Information regarding participation in the evaluation process will be posted on the PCMDI web page, and model data collection and analysis will be coordinated through WGCM by the WGCM Climate Change Simulations Panel (WCCSP), chaired by Gerald Meehl. Material on the runs and analysis has not yet been posted but shortly will be provided by WCCSP on the PCMDI web site. We wish to encourage as wide an international participation as possible in the analysis of the multi-model dataset for assessment in the IPCC AR4. It is expected that this analysis process will begin when a sufficient number of model output datasets has been collected, most likely around September, 2004, and WCCSP will be contacting modelling groups with more details. If you have any questions, please contact WCCSP chair Gerald Meehl (meehl@ncar.ucar.edu).

5) Radiative Forcing. The question of radiative forcing has also been the subject of discussions at the WGCM meeting, as well as within the WCRP working group on detection/attribution. There seems to be broad agreement that saving clear sky and all-sky shortwave and longwave downwelling and upwelling fluxes at the top of the atmosphere, surface, and 200 mbar as 2-D monthly-averaged fields will be useful (see previous letter). The WGCM discussions also considered approaches to evaluation of the differences between these estimates and the more exact definition of radiative forcing, wherein the tropospheric state is held fixed and the stratosphere is adjusted using fixed dynamical heating. It was emphasized that different approaches to the more exact type of calculations are likely to be used by different groups, so this issue may not be amenable to a standardized approach. However, some groups have volunteered to provide descriptive information regarding their own approaches, which are to be posted on the CMIP webpage listed above.

We are certainly aware of the many demands on your time and attention, and deeply appreciate your interest and commitment to IPCC's assessment process.

Kind regards

Susan Solomon, co-chair IPCC WGI Qin Dahe, co-chair, IPCC WGI

John Mitchell, chair WGCM Gerald Meehl, chair CMIP

Appendix - Synopsis of Model Runs

• A “committed climate change” run using 20th century climate simulations which groups have already performed or intend to perform that conform to the 20th Century Climate in Coupled Models (20C3M) simulations being coordinated by CMIP, but extended with constant concentrations, at contemporary levels, for the time period from 2000 to at least 2050. This run extends by at least 50 years your already-planned 100 year run. It should be considered a physics test, as its goal is to elucidate how the climate system is likely to respond in the next few decades due to what is already in the atmosphere. As the main purpose here is to extend 20C3M to evaluate the associated committed response of the next few decades, this run could be of shorter duration than others (see below). A key aspect of this run will be the ocean heat uptake and its effects on the response, so that coupled runs are needed.

• A nominal “750 ppm stabilization” run defined as above but with prescribed concentrations that would be based on the SRES A1B emissions for the period 2000 to 2100, and again extended with constant concentrations at year 2100 values, for the time period 2100 to at least 2200.

• A nominal “550 ppm stabilization” run using, as a starting point, the end of the 20th century simulations as above, followed by prescribed concentrations that would be based on the SRES B1 emissions for the period 2000 to 2100 and extended with constant concentrations, at year 2100 values, for the time period 2100 to at least 2200. The actual CO_2 values from 2100 onward are not expected to be exactly 550 ppm, however, the B1 scenario has been chosen because many modeling groups have already used it, and it is close to a doubling of pre-industrial CO_2 (as used in many studies).

• An A2 run to year 2100, for comparison to the runs analyzed in the TAR.

• As in TAR, 1%/year CO2 increase; we encourage running this out to a quadrupling of CO2 and extending beyond that point with CO2 held fixed at 4xCO2. The 1% CO2 increase run and control run of the same duration has been a standard CMIP integration for many years to at least a doubling to allow the evaluation of the transient climate response and will be important for the AR4 as in TAR (see chapter 9 of the TAR). However, the forcing at doubled CO2 is very close to other runs suggested here, and we would like to urge groups to continue to run to a quadrupling. Strongly encouraged is a continuation with CO2 fixed at 4x CO2 for an additional 150 years, thus providing a stabilization case at a high radiative forcing.

• As in TAR, contributing modelling groups should make a 2xCO2 equilibrium run with a slab ocean configuration to calculate the equilibrium climate response.