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PREPARATIONS FOR THE FOURTH ASSESSMENT REPORT

Proposal for an IPCC Working Group I Workshop on Climate Sensitivity

(Submitted by the Co-Chairs of Working Group I)

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Proposal for an IPCC Working Group I Workshop on Climate Sensitivity

IPCC Working Group I (WG I) proposes to hold a workshop on the topic of Climate Sensitivity in 2004 as a major keystone in activities preparing for the WG I contribution to the IPCC Fourth Assessment Report (AR4).

Background

One of the most important parameters in climate science is the 'climate sensitivity', broadly defined as the global mean temperature change (°C) for a given forcing, often that of a doubling of atmospheric carbon dioxide. Climate sensitivity has played a central role throughout the history of IPCC in interpretation of model outputs, in evaluation of future climate changes expected from various scenarios, and it is closely linked to attribution of currently observed climate changes. An ongoing challenge to models and to climate projections has been to better define this key parameter, and to understand the differences in computed values between various models. Throughout the last three IPCC assessments this basic parameter of the Earth's climate system has been estimated as being in the range 1.5 to 4.5°C (i.e., uncertain by a factor of three), making this parameter central to discussions of uncertainty in climate change.

WG I is concerned to sharpen understanding of the differences between general circulation models used in climate change research.

Currently the primary reason for the substantial range in model based estimates of climate sensitivity is widely believed to be differences in their treatment of feedbacks – particularly cloud feedbacks, but systematic intercomparisons have not been done to confirm that this is so for the current generation of models. Within international climate modeling projects, the development of new models together with both formal and informal model intercomparison exercises that are currently taking place by various groups suggest that a renewed focus on the reasons for different model estimates of climate sensitivity may be particularly useful at this time.

In addition, some recent studies suggest that new insights into the likely range of climate sensitivity may be possible through comparisons of models and observational data – both contemporary and historical or paleoclimatic.

Other recent studies raise issues regarding the limitations of applicability of forcing/response relationships in the climate system - such as questions regarding the predictability of climate and its relevance for estimates of climate sensitivity, and the degree to which forcings such as those due to solar, well-mixed greenhouse gases, or aerosols may produce different responses. A review of these questions about the interpretation of climate sensitivity could also sharpen scientific understanding and would hence be of benefit to the WG I AR4.

In summary, there is broad interest for a carefully planned workshop on climate sensitivity. Given the importance of the climate sensitivity parameter, it is likely that the outcome of this workshop will provide a major focus for the discussion and treatment of climate models in the WG I contribution to AR4.

Aims

The aims of the climate sensitivity workshop would be to:

- evaluate a range of climate model results so as to relate different climate sensitivity estimates to differences descriptions of physical processes, particularly those related to atmospheric water vapor, clouds, lapse rate changes, ocean heat uptake, treatment of evapotranspiration, land-atmosphere coupling, etc.;

- obtain a more comprehensive picture of the relationships between climate sensitivity and other model features such as resolution, numerical approach, radiative transfer parameters, etc.;

- consider whether current, historical, and/or paleoclimatic data aid in the determination of the likely range of climate sensitivity;

- improve the understanding of the interpretation and limits of the climate sensitivity concept, including for example possible dependencies upon different forcing agents, predictability questions, and transient and steady-state responses:

- start a process towards objective assessment as to whether the range 1.5 to 4.5°C can be reduced in the AR4 – e.g. by defining criteria that may assist in the evaluation of results from many different climate models.

Approach and Timetable

In order to include a carefully constructed intercomparison of climate model results as part of the proposed workshop it will be necessary hold a preliminary expert meeting to exchange ideas amongst modelling groups and consider results to be requested at the time of the workshop. Given the range of issues to be considered and the commitment that would be required from major modeling groups around the world, the process would be structured by a broad-based steering group. Planning for the expert meeting and the workshop will be carried out by the steering group. Organizational support for the meetings, and production of a workshop report will be carried out by the WG I TSU.

The proposal is thus to form a steering group in early 2003; to hold a subsequent expert meeting in 2003 or 2004 and to hold the planned workshop in 2004.

Request

The IPCC Panel is requested to approve the proposed Climate Sensitivity Workshop in 2004 and related work required for its success. This proposal has been communicated to the Financial Task Team (FiTT) and will be included in the IPCC budget plans if approved by the Panel.