The Abdus Salam
International Centre for Theoretical Physics

United Nations Educational, Scientific and Cultural Organization

IAEA International Atomic Energy Agency

Workshop on
"*Hierarchical Modeling of Climate*"
July 18 - 22, 2011
ICTP, Trieste, Italy

Future climate projections are of enormous social-economic interest, particularly in developing countries where economies often rely heavily on agriculture that is most directly influenced by climate change. Intercomparison projects such as CMIP5 and IPCC/AR5 simulations provide an excellent framework and deliver datasets to analyze projected future climate changes. These projects depend heavily on simulations with comprehensive General Circulation models (GCMs). Some aspect of projections is "robust", meaning that a majority of models agree on them, while others are not. Our confidence in robust features is greater than our confidence in non-robust features, but in both cases we need to understand the physics of the climate signal in question.

One expects that the most robust projected changes do not depend sensitively on the details of model physics and numerics, so reduced-complexity models of the climate system should also be able to reproduce them. When such changes can be captured with a hierarchy of models of different complexity, our understanding of and confidence in the simulated changes both increase. For changes which are not robust, reduced-complexity models may be useful in understanding the nature of the sensitivities to model details, or in understanding the different mechanisms acting in subsets of comprehensive models.

The Workshop will bring together scientists and graduate students with interests in modeling and observations of all aspects of climate science including atmospheric, oceanic and land-surface processes. The primary focus of the Workshop is understanding the atmospheric general circulation and its projected future changes. As a means to this end, we will discuss results from the full hierarchy of models with different degrees of complexity. Methodological questions about what simplifications are appropriate for addressing particular problems will also be addressed.

Primary Workshop Goals:

1. Understanding the global climate system and climate variability and changes using all kinds of models ranging from comprehensive GCMs and simplified models to conceptual models based on observations.

2. Documentation and deeper understanding of those aspects of climate projections that are robust in multi-model ensembles (e.g., CMIP5, AR5 simulations) and thus targets for simpler models, with particular emphasis on those changes potentially affecting global climate.

3. Comparison of results relevant to both robust and non-robust signals from models across the hierarchy, including comprehensive GCMs as well as *idealized GCMs*-3D models with full dynamical cores but reduced physics, and often simplified boundary conditions, and *highly idealized models* such as used for theoretical studies, often with all simplifications above plus additional ones (e.g., axisymmetric, linear, reduced vertical structure etc.).

4. Development and testing ideas of a climate prediction system using hierarchical models by, e.g. generating a number of ensembles and long hind cast data.

5. Providing the intermediate complexity ICTP GCMs (*Full but simplified-physics* AGCM and CGCM, 'SPEEDY' models) to interested participants, including tutorials to aid initiatives to perform a state-of-the-art research

PARTICIPATION

The Workshop is intended for scientists and post-graduate fellows working in the areas of Climatology, Atmospheric Science and Oceanography from all countries, which are members of the United Nations, UNESCO or IAEA. The main purpose of the Abdus Salam ICTP is to help researchers from developing countries through a program based on international co-operation. The activity will be conducted in English. Limited funds are available for some applicants who are nationals of, and working in, developing countries and *will be granted only to those attending the full five days*. ***Registration is free-of-charge for all attendees.***

Call For Papers

For those interested in making an oral or poster presentation during the Workshop, a one-page abstract (size A4) should be uploaded **directly to the on-line application**. *(Please upload file attachments in* ***.pdf****).* The time available for contributed oral presentations will be very limited; some authors who submit abstracts for oral presentation may be asked to present a poster instead.

APPLICATION The "On-line Application" form can be accessed at:

ICTP activity web page: http://agenda.ictp.it/smr.php?2251

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CONFIRMED SPEAKERS INCLUDE:

S. Bony
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(GFDL, USA)

B. Hoskins
(Imperial College, UK)

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Application Deadline

March 31, 2011

Extended to

April 30, 2011

ICTP Webpage:
http://www.ictp.it/