Workshop on Reducing Biases in Coupled Model Simulations of the Tropical Oceans on Seasonal and Longer Timescales

May, 28-30, 2003, GFDL/Princeton University, Princeton, NJ, USA

1 Objective of the workshop

The prime objectives of the workshop are to:

1. Brainstorm the issue of how to confront and overcome systematic model biases in the tropics on seasonal and longer timescales
2. Identify how general these biases are across the current generation of leading coupled models, the role of model resolution vs. parameterized physics, and diagnose how individual parameterized processes may be contributing to these biases
3. Propose hypotheses, strategies and possible solutions for addressing these problems

2 Scope of the workshop

Although the notorious "double ITCZ" problem is a primary target, the scope of the workshop include broader issues concerning ENSO, tropical ENSO-related variability and the seasonal cycle. Studies exclusively aimed at monsoonal variability, diurnal variability, MJO, etc, however, will not be emphasized, unless they sow a clear link to impacts on long term means or variability. We are particularly interested in studies in following areas that relate to bias identification, diagnosis and correction:

1. GCM sensitivity experiments
2. Model intercomparison studies
3. Innovative diagnostic and modeling studies
4. Small-scale modeling studies
5. in situ/satellite observational studies

To facilate the discussion and exchange of information at the workshop, a mini-CMIP is envisioned. Specifically, 20 years of monthly means of AGCM-only (AMIP) and, if available, coupled model output (control run with unchanging climate forcing) , including global fields of precipitation, winds, surface and TOA flux components, as well as some subsurface T,S and zonal current cross-sections at a few representative locations on a common grid are requested in a standard netcdf format for intercomparison. Details about data request are provided in the appendix B.

3 Participants of the workshop

In order to effectively brainstorm and maintain an informal atmosphere, it is necessary to limit attendance to 50 invited participants. A balance between atmospheric and oceanic experts is sought and a mix of model developers, diagnosticians and observationalists is expected. The invited participants are either from (a) major coupled modeling center/groups in the US and other countries, e. g. CCSM/NCAR, GFDL, NSIPP, COLA, IRI, UCLA, SIO, MPI, Hadley Center, IPRC, ... , etc., or b) leading observationalists and small-scale modelers interested in coupled modeling, e. g. those involved in EPIC, TAO, PIRATA. Because of budget constraint, most domestic invitees are expected to come on their own support. Limited financial support for travel and other expenses are available for those who have no travel support and for international participants. If you would like to attend the meeting, but will not be able to do so without financial assistance with travel, please send an email by 15 March to Ping Chang (ping@ocean.tamu.edu) detailing your circumstances. The Organizing Committee will then let you know by 1 April who can be supported.

For the education and training of the next generation of climate modelers, we are pleased to offer limited travel support for five postdocs and advanced graduate students. All invitees are encouraged to nominate any postdocs and graduates for whom this workshop would be particularly beneficial to their research. A brief description of their research topic and justification of the relevance of the workshop to their research should be included in the nomination letter. The Steering Committee will evaluate these applications and make the final selection.

4 Logistics of the workshop

Ms. Anna Valerio at Princeton University, together with Ms. Cathy Clark at JOSS/ UCAR, will be handling the workshop logistics. A block of non-smoking rooms has been reserved for dates of May, 27-30 in the the Holiday Inn at a rate of $95.00 per night. The Holiday Inn is a 5 minute drive from GFDL and a shuttle is available for transportation to and from GFDL. Please note that this rate is good only for checking out on the 30th. For anyone who needs to stay on the night of the 30th, please note that the rate will jump to $169.00 per night. The cut-off date for reserving the room is April 15 and the block name is CLIVAR/CCSM. We strongly encourage you to contact Ms. Anna Valerio (apval@splash.princeton.edu, phone: 609-258-6677, fax: 609-258-2850) for making the hotel reservation as soon as you decide to attend the workshop. For those who will be receiving travel support for the workshop, Ms. Cathy Clark (clarkc@ucar.edu) will be getting in touch with you for travel arrangment.

5 Organizing committee

Chris Bretherton, U. Washington (co-chair)
Ping Chang, Texas A&M (co-chair)
Leo Donner, GFDL
Jeff Kiehl, NCAR
Paul Schopf, George Mason U.

Max Suarez, NASA/GSFC

APPENDIX A A List of Confirmed Attendees

A/CGCM:
Julio Bacmeister, NASA/NSIPP, bacmj@janus.gsfc.nasa.gov
Bill Collins, NCAR, wcollins@ucar.edu
David Dewitt, IRI/Lamont, daved@iri.ldgo.columbia.edu
Leo Donner, GFDL, ljd@gfdl.noaa.gov
Jim Hack, NCAR, jhack@cgd.ucar.edu
Isaac Held, GFDL, ih@gfdl.noaa.gov
Jeff Kiehl, NCAR, jtkon@ncar.ucar.edu
Ben Kirtman, COLA, kirtman@cola.iges.org
Tim Li, IPRC, li@soeat.hawaii.edu
Roberto Mechoso, UCLA, mechoso@atmos.ucla.edu
Ed Schneider, COLA, schneide@cola.iges.org
Max Suarez, NASA/GSFC, Max.Suarez@gsfc.nasa.gov

O/CGCM:
Mark Cane, LDEO/Columbia, mcane@ldeo.columbia.edu
Alexey Fedorov, Princeton, alexey@splash.princeton.edu
Ben Giese, TAMU, b-giese@ocean.tamu.edu
Stephen Griffies, GFDL, smg@gfdl.noaa.gov
Matthew Hecht, LANL, mhecht@lanl.gov
Ron Pacanowski, GFDL, rcp@gfdl.noaa.gov
George Philander, GFDL/Princeton, gphlder@princeton.edu
Kelvin Richards, IPRC/SOEST, rkelvin@hawaii.edu
Michele Rienecker, NASA/NSIPP, michele.rienecker@gsfc.nasa.gov
Toni Rosati, GFDL, ar@gfdl.noaa.gov
Paul Schopf, COLA, schopf@cola.iges.org

Diagnostician/CGCM:
Mike Alexander, CDC, maa@cdc.noaa.gov
Jim Carton, U. Maryland, carton@cola.umd.edu
Ping Chang, TAMU, ping@ocean.tamu.edu
John Chiang, Berkeley, jchiang@atmos.berkeley.edu
Tim DelSole, COLA, delsole@cola.iges.org
Y. Kushnir, LDEO/Columbia, kushnir@ldeo.columbia.edu
Eric Maloney, OSU, maloney@coas.oregonstate.edu
Ken Sperber, PCMDI, sperber@pcmdi.llnl.gov
Dezheng Sun, CDC/NOAA, ds@cdc.noaa.gov
Bin Wang, bwang@soeat.hawaii.edu
Shangping Xie, IPRC, xie@soeat.hawaii.edu
Steve Zebiak, IRI/LDEO, steve@iri.ldgo.columbia.edu

Observationalists:
Meghan Cronin, PMEL, cronin@pmel.noaa.gov

Billy Kessler, PMEL, kessler@pmel.noaa.gov
Brian Mapes, NOAA/CDC, Brian.E.Mapes@noaa.gov
David Raymond, NMIMT,raymond@kestrel.nmt.edu
Franklin R. (Pete) Robertson, NASA / MSFC, Franklin.R.Robertson@nasa.gov
Lisan Yu, lyu@whoi.edu

Small-scale modeler:
Chris Bretherton, U. Washington, breth@atmos.washington.edu
Adam Sobel, Columbia U., sobel@appmath.columbia.edu
Marat Khairoutdinov, CSU, marat@atmos.colostate.edu
Wojciech Grabowski, NCAR, grabow@ucar.edu

International participants:
Swadhin Behera, JAMSTEC/NASDA, behera@jamstec.go.jp
Hal B. Gordon, CSIRO, Australia, Hal.Gordon@dar.csiro.au
Harry Hendon, BMRC, hhh@bom.gov.au
Masahide Kimoto, University of Tokyo, kimoto@ccsr.u-tokyo.ac.jp
Noel Keenlyside, MPI, keenlyside@dkrz.de
William Ingram, Hadley Center, william.ingram@metoffice.com

Student/Postdoc:
Maike Ahlgrim, (student, CSU/Randall), maike@atmos.colostate.edu
Eli Galanti, IRI/Columbia, eli@iri.columbia.edu

APPENDIX B Data request for the mini-CMIP project

Who: Any uncoupled AGCMs, OGCMs, or CGCMs for which data can be provided.

Data Format: NetCDF.

Deadline for Data Submission: May 1, 2003.

Where: AGCM data should be sent to Bretherton and OGCM data to Chang. FTP servers for data transfer will soon be available.

AGCM/CGCM:

A1: 30°S-30°N 2-D fields, climatological monthly means on a 2.5°× 2.5°grid: (forced with AMIP or seasonally-varying SST climatology for uncoupled models). Dimensions time (12)× lat (25) × lon (144):

surface skin temperature (= SST over ocean) [K]
precip $[mmday^{-1}]$
sea-level pressure [Pa]
zonal and meridional wind stresses $[Nm^{-2}]$
latent and sensible heat fluxes $[Wm^{-2}]$
TOA and surface shortwave and longwave radiative fluxes $[Wm^{-2}]$

TOA shortwave and longwave cloud radiative forcing [Wm^{-2}]
10 m surface wind speed [ms^{-1}]
10 m relative humidity

The last two should be derived from surface and lowest-model level output. Note that all the 2-D fields should be indexed so that longitude runs from 0°to 357.5°, and latitude from 30°S to 30°N.

A2: Zonal sections (20°S-20°N, 1000-100 hPa with 50 hPa vertical grid spacing) for

u [ms^{-1}]
v [ms^{-1}]
omega [Pa/s]
relative humidity

at (a) Zonal average, (b) 90°W, (c) 140°W, (d) 170°W, (e) 10°W, (f) 38°W. Dimensions section index(6) × time(12) × lat(9) × plev(19).

OGCM/CGCM:

O1: 30°S-30°N 2-D fields, climatological monthly means on a 1°× 1°grid: (forced with observed atmospheric forcing or climatolgoical forcing for uncoupled models. Dimensions time (12)× lat (61) × lon (360):

sea level height [m]
sea surface temperature [C]
20°C isotherm depth [m]
heat content (0-500m) [C m]
zonal and meridional wind stresses [Nm^{-2}]
net surface heat flux [Wm^{-2}]
zonal and meridional velocity at the ocean surface (first vertical grid point) [ms^{-1}]
mixed layer depth (if avialable) [m]

Again all the 2-D fields should be indexed so that longitude runs from 0.5°to 359.5°, and latitude from 30°S to 30°N.

O2: Zonal Sections (20°S-20°N, 0-500m with 20m vertical grid spacing): U, V, W, T and S along 95°W, 140°W, and 170°W in tropical Pacific and 10°W and 38°W in tropical Atlantic. These sections correspond to TAO and PIRATA arrays, so direct comparison can be made to the observations.

Meridional Sections (5°S, 0°and 5°N, 0-500m): U, V, W, T and S.

Note that these variables should be indexed so that the vertical index increases from the surface to 500m.

It is important to note that the success of this depends on everyone standardizing their datasets as closely as possible so they can be easily compared and differenced.