Center for Multiscale Modeling of Atmospheric Processes (CMMAP), Colorado State University - A National Science Foundation (NSF) Science and Technology Center

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Workshop on Tropical Dynamics and the MJO
January 17-19, 2012
East-West Center on the University of Hawaii Campus, Oahu, Hawaii

About 50 researchers, including senior scientists, graduate students, and postdocs from the United States, Japan, China, and Europe came together on January 17-19, 2012 at the East-West Center on the University of Hawaii campus for a meeting on Tropical Dynamics and the MJO. The workshop was initially motivated by research detailed in the paper Intraseasonal Variability in an Aquaplanet General Circulation Model, written by Eric Maloney and a team of scientists, which was published in April, 2010 in the Journal of Advances in Modeling Earth Systems.[1] Workshop funding was provided by the U.S. National Science Foundation (NSF) and the Center for Multiscale Modeling of Atmospheric Processes, an NSF science and technology center. The International Pacific Research Center at the University of Hawaii provided local logistical support.

Some recent atmospheric general circulation models have demonstrated substantial improvements in the simulation of the Madden-Julian oscillation (MJO) simulation (e.g. SP-CAM, ECHAM5; Kim et al. 2010), although other models still have substantial difficulty in producing realistic intraseasonal variability. Aquaplanet* simulations that have produced incredibly strong and clean MJO-like activity have recently been produced (e.g. Maloney et al. 2010; Andersen and Kuang 2011). However, some models that produce a realistic MJO exhibit somewhat troubling sensitivity of their simulations to modest changes in physical parameters and basic state. Further, recent aquaplanet experiments that have been conducted with various conventional and superparameterized Global Climate Models demonstrate profoundly different sensitivities of their MJO simulation to mean climate (Kiranmayi and Maloney 2011; Maloney et al. 2010; Blackburn et al. 2012).

The goals of the workshop were to:

- Share preliminary aquaplanet results across a suite of climate models that provide insight into their MJO sensitivity to basic state
- Cement plans for future moist benchmark experiments across multiple GCMs that examine sensitivity of the MJO and convectively coupled waves to basic state and physical construction

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[1] Eric D Maloney, Adam H Sobel, Walter M Hannah, 2010: Intraseasonal Variability in an Aquaplanet General Circulation Model, *J. Adv. Model. Earth Syst.*, **Vol. 2**, Art. #5, 24 pp., doi:10.3894/JAMES.2010.2.5 Published 7 Apr. '10

- Discuss other recent modeling breakthroughs on the MJO

Further topics of discussion at the recent workshop included boreal summer intraseasonal oscillation dynamics, ENSO-mean state interactions, MJO initiation, examination of tropical cyclones in climate models, intraseasonal prediction, and tropical dynamics changes under climate change. The three day meeting included half-hour talks, a dedicated poster session, discussion, and a Wednesday night workshop meeting.

This effort will build upon previous aquaplanet intercomparison efforts that have been conducted, as featured in a special issue of Journal of the Meteorological Society of Japan to be released in 2012 (e.g. Blackburn et al. 2012). After initiation of this effort, we anticipate having another workshop one and a half to two years later to compare results from our common framework and lay the groundwork for follow-up experiment design.

A tentative proposed common experiment design to be used for all models has been fomulated. Modeling group participation using as many of the proposed experiment configurations as possible is welcome. Two levels of experiment configurations are proposed, with the first set designed to test basic sensitivities to basic state, and the second level designed to test climate change responses and the importance of various physical processes to the MJO.

*Aquaplanets are Earth-like planets with a completely water-covered surface.