

Model Hierarchies Workshop

2-4 November 2016

Princeton University, New Jersey, USA



PROVISIONAL AGENDA

Wednesday, November 2nd

- 13:00 Introduction and welcome
- 13:05 **Debating model hierarchies**
- Isaac Held (NOAA/GFDL)
- Tim Palmer (University of Oxford)
Climate sensitivities and feedbacks
Chairs: Chia-Ying Lee / Xavier Levine
- 14:00 – Bjorn Stevens (Max Planck Institute): A hierarchical approach to climate sensitivity
(*Invited talk*)
- 14:30 - Andrew Gettelman (NCAR): Constraining the optimized random walk of cloud modeling: Idealized frameworks in the Community Earth System Model for Parameterization Development and Understanding
- 14:45 - Joy Monteiro (Stockholm University): The Climate Modelling Toolkit (CliMT)
- 15:00 - Brian Medeiros (NCAR): Investigating the role of clouds in the climate system through the CESM modeling hierarchy
- 15:15 - Leo Donner (GFDL/NOAA): Physical Process Realism and Model Hierarchies
- 15:30 **Coffee break**
- 16:00 **Session discussion/summary**
- 17:00 – **Posters for all sessions – Drink and Hors d'oeuvres**
- 19:00

Thursday, November 3rd

- 08:00 - **Light breakfast**
- 08:30
- Tropical convection and RCE**
Chairs: Spencer Hill / Penelope Maher
- 08:30 - Michela Biasutti (Columbia University): TRAC-MIP: Tropical Rain bands with an Annual cycle and Continent - Model Intercomparison Project (*Invited talk*)
- 09:00 - Sandrine Bony (LMD-IPSL, CNRS): Thermodynamic control of anvil-cloud amount
- 09:15 - Adam Sobel (Columbia University): The Madden-Julian oscillation in idealized and comprehensive models
- 09:30 - Timothy Merlis (McGill University): Carbon dioxide's direct weakening of the tropical circulation: from comprehensive coupled climate models to axisymmetric Hadley cell theory
- 09:45 Eric Maloney (Colorado State University): Understanding MJO Dynamics Using a Hierarchy of Models and Reanalysis
- 10:00 **Coffee break**
- 10:30 **Tropical convection and RCE (continue)**
Chairs: Tim Cronin / Allison Wing
- 10:30 - Kevin Reed (Stony Brook University): Global Radiative-Convective Equilibrium Frameworks in CAM
- 10:45 - Michael Byrne (ETH Zurich): ITCZ width and its sensitivity to changes in climate: theory and a hierarchy of simulations
- 11:00 - Ruth Geen (University of Exeter): Idealized modelling of the East Asian monsoon
- 11:15 - Daniel Chavas (Purdue University): Tropical cyclone size and structure in a hierarchy of radiative-convective equilibrium simulations
- 11:30 - Masaki Satoh (University of Tokyo): Model hierarchical approaches with NICAM and some ideas for AMIP/APE/RCE inter-comparisons (*Invited talk*)
- 12:00 **Session discussion/summary**
- 12:30 **Lunch**

Midlatitudes/strat-trop interactions

Chairs: Aditi Sheshadri / Ding Ma

- 13:30 - Alan Plumb (Massachusetts Institute of Technology): What models of different complexity have taught about stratosphere- troposphere interactions (*Invited talk*)
- 14:00 - David Thompson (Colorado State University): Using simple models to understand periodic variability in the extratropical circulation
- 14:15 - Paul O’Gorman (MIT): Moist formulations of the Eliassen-Palm flux and their connection to the surface westerlies in idealized and comprehensive GCM simulations
- 14:30 - Edwin Gerber (New York University): The tropical tropopause layer in an idealized moist model: Tropical vs. extratropical control
- 14:45 - Thomas Birner (Colorado State University): Tropical tropopause temperature control in a hierarchy of models
- 15:00 **Coffee break**
- Midlatitudes/strat-trop interactions (continue)**
- Chairs: Stephen Thompson / Pedram Hassanzadeh**
- 15:30 - Ramalingam Saravanan (Texas A&M University): Beyond downscaling: The utility of regional climate models for mechanistic studies
- 15:45 - Talia Tamarin (Weizmann Institute of science): The poleward deflection of midlatitude storm tracks: from idealized GCMs to comprehensive climate model predictions
- 16:00 - Christopher Fletcher (University of Waterloo): Using a hierarchy of climate models to investigate wave-mean flow interactions
- 16:15 - L. Ruby Leung (Pacific Northwest National Laboratory): Atmospheric rivers in a hierarchy of climate simulations: Resolution sensitivity and impacts of global warming
- 16:30 – **Session discussion/summary**
- 17:00
- 17:30 – **Posters for all sessions**
- 19:30 **Workshop dinner, Jadwin Hall, Brush Gallery**

Friday, November 4th

- 08:00 – **Light breakfast**
- 08:30

ENSO/coupled modes of variability/oceans/carbon cycle

Chairs: Gabriel Chiodo / Honghai Zhang

- 08:30 - Amy Clement (University of Miami): Pacific ENSO-like variability: The timescale-dependent role of ocean dynamics (*Invited talk*)
- 09:00 - Mark Cane (LDEO): The AMO in very complex models and a very simple model
- 09:15 - Riccardo Farneti (ICTP): Pacific interdecadal variability driven by tropical-extratropical interactions
- 09:30 - Edwin Schneider (George Mason University): Understanding observed climate variability by unifying CGCM dynamics, idealized stochastic models, and observed data using the Interactive Ensemble CGCM
- 09:45 - Amanda O’Rourke (University of Michigan): Energetics of the ocean surface at low frequencies in GFDL’s CM2-O model hierarchy
- 10:00 **Coffee break**
- ENSO/coupled modes of variability/oceans/carbon cycle (continue)**
- Chairs Amanda O’Rourke / Katinka Bellomo**
- 10:30 - Mick Follows (Massachusetts Institute of Technology): Hierarchical approaches to interpreting and modeling the global carbon cycle (*Invited talk*)
- 11:00 - Robin Tokmakian (Naval Postgraduate School): How to build a traceable model hierarchy
- 11:15 - John Dunne (NOAA/GFDL): GFDL’s hierarchy of ocean biogeochemical comprehensiveness for Earth System Modeling
- 11:30 - Laure Zanna (University of Oxford): Ocean heat uptake processes and uncertainty
- 11:45 - Richard Neale (NCAR): Conclusion inconsistencies when testing physics settings in multiple model configurations
- 12:00 **Discussion**
- 12:30 **Lunch**

Climate sensitivity redux

Chairs: Martin Singh / Ying Li

- 13:30 - Marika Holland (NCAR): Investigating Antarctic sea ice change using experiments with a hierarchy of model coupling (*Invited talk*)
- 14:00 - Antje Weisheimer (Oxford University & ECMW): Representing model uncertainty – Hierarchy or heterarchy?
- 14:15 Francis Codron (Université Pierre et Marie Curie): Climate response to changes in the meridional energy transport : role of ocean dynamics
- 14:30 - Brian Rose (University at Albany): Robust non-local effects of ocean heat uptake on radiative feedback and subtropical cloud cover
- 14:45 - Xavier Levine (Yale University): A mechanism for the response of the zonally asymmetric subtropical hydrologic cycle to global warming in idealized and comprehensive climate models
- 15:00 **Coffee break**
- 15:30 **Climate sensitivity redux (continue)**
- 15:30 - Paulo Ceppi (University of Reading): Clouds and the atmospheric circulation response to warming
- 15:45 - Gabriel Chiodo (Columbia University): The impact of interactive stratospheric chemistry on climate model sensitivity
- 16:00 **Session discussion/summary**
- 16:30 – **Workshop discussion/summary**
- 17:00