Climate Dynamics Seminar

INSTRUCTORS AND CONTACT INFORMATION

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DESIGN AND OBJECTIVES

This course includes conceptual introductions to a wide variety of topics in climate research. The course will be structured as a seminar, and students will take turns presenting and leading classroom discussions. The primary objective of the course is for students to gain experience reading and presenting scientific material in English and to become more comfortable leading and actively participating in scientific discussions. In particular, students should practice identifying and asking questions about unfamiliar topics.

COURSE MATERIALS

http://www.gfdl.noaa.gov/blog/isaac-held/

The course centers on a climate dynamics blog created and maintained by Prof. Isaac Held, which covers some of the key questions and challenges currently facing climate scientists and touches on many fundamental aspects of large-scale climate dynamics. Prof. Held is the head of the Weather and Atmospheric Dynamics Group at the NOAA Geophysical Fluid Dynamics Laboratory, a member of the United States National Academy of Sciences, and lecturer in the Atmospheric and Oceanic Sciences Program at Princeton University.

EVALUATION

Students are evaluated based on participation, with three main aspects: presentation clarity, effectively facilitating a discussion, and contributions to discussions led by other students. The following guidelines may be helpful when preparing presentations:

1. Presentations should be approximately 15–20 minutes, followed by 25–30 minutes of discussion.
2. The content and form of the presentation are up to you, but should be clear and engaging.
3. You do not need to understand the material completely (or at all) — focus on explaining the parts that you do understand and identifying questions that might help you to improve your understanding.
4. If possible, look at and discuss some of the published papers linked to within the post.
5. Look through the comments on the post (if any) for related topics and ideas.
6. Be prepared to answer questions and facilitate a discussion. Consider creating extra slides for this.

Students who are not presenting should read the blog posts and post at least one question or comment about each post online before the start of class. These will count toward the participation grade.

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COURSE SCHEDULE

Week 1 23 February	Why focus so much on global mean temperature? (post 7) Summer is warmer than winter (post 9)
Week 2 2 March	The simplicity of the forced climate response (post 3) Transient vs equilibrium climate responses (post 4)
Week 3 9 March	Transient response to the well-mixed greenhouse gases (post 6) The recalcitrant component of global warming (post 8)
Week 4 16 March	Heat uptake and internal variability, pt. 1 (post 16 and post 17) Heat uptake and internal variability, pt. 2 (post 44)
Week 5 23 March	Is continental warming a slave to warming of the ocean surface? (post 11) Tropical ocean warming and heat stress over land (post 56)
Week 6 30 March	Dynamic retardation of tropical warming (post 45) Disequilibrium and the AMOC (post 64)
Week 7 6 April	The strength of the hydrological cycle (post 13) Surface salinity trends (post 14)
Week 8 13 April	Relative humidity over the oceans (post 47) Increases in column water vapor over the oceans (post 48)
Week 9 20 April	Fixed anvil temperature (post 39) Warming and reduced vertical mass exchange in the troposphere (post 52)
Week 10 27 April	The moist adiabat and tropical warming (post 20) Temperature trends: MSU vs. an atmospheric model (post 21)
Week 11 11 May	Tropical tropospheric warming revisited (post 54, post 55, and post 61)
Week 12 18 May	Clouds are hard (post 66) Forcing, feedback, and clouds (post 71)
Week 13 25 May	Hurricane-like vortices (post 2) More on tropical cyclones and the ITCZ in aquaplanet models (post 67)
Week 14 1 June	A diffusive model of atmospheric heat transport (post 36 and post 40) Poleward atmospheric energy transport (post 62)
Week 15 8 June	How (not) to evaluate climate models (post 12 and post 59) The quality of the large-scale flow simulated in GCMs (post 60)