ATS 681 (soon to be 608)
Introduction to Climate Variability - Fall 2017

Instructor:
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TA:
None.

Office Hours:
Anytime.

Class Schedule:
Tuesday/Thursday 11:00-11:50 ATSW 121

Student Learning Goals and Objectives:
The successful student will gain a detailed graduate level process-oriented understanding of key aspects of climate variability in Earth’s climate system.

Text:
Books that everyone in climate science should have on their shelves. None are required for the course.

Format:
The format of the class is lecture/discussion. The course will focus on the fundamentals of climate dynamics, with an emphasis on current themes and problems in climate research.

Evaluation:
Reading research papers/participation in class discussion: 50%
Term project: 50%

Course Outline:
- Atmospheric-ocean interaction in the tropics and extratropics
- Current topics in climate change
To be determined:
Patterns of variability in the large-scale tropical circulation, including the MJO
Patterns of variability in the large-scale extratropical circulation
Stratospheric variability, including the QBO and sudden warmings
Atmosphere-ocean interaction in the tropics and extratropics.
1. ENSO
2. Pacific decadal variability
3. Tropical Atlantic decadal variability/meridional modes
4. Extratropical atmosphere/ocean interaction

ENSO

Overview (recent review)

Observations of ENSO (synopsis of classic work in the 80s and 90s)

Tropical atmospheric response to heating

ENSO theory

Link to extratropics

Pacific decadal variability
Tropical Atlantic/meridional modes
Xie, Shang-Ping, 1999: A dynamic ocean–atmosphere model of the tropical Atlantic decadal variability.” Journal of Climate 12, 64-70.
Xie, Shang-Ping, and James A. Carton, 2004: Tropical Atlantic variability: Patterns, mechanisms, and impacts. Earth’s Climate, 121-142.

Extratropical atmosphere/ocean interaction