

MAST-806: Geophysical Fluid Dynamics Student presentations

Goal:

Connect theoretical in-class GFD ideas, concepts, and dynamics to applied problems and observations of primary GFD literature. I expect every student to have an answer or argument with regard to the study guide questions.

Guide:

Unlike a text book the primary literature assumes general knowledge of prior work that is briefly referenced in much condensed form. In your presentations, please demonstrate that you can connect materials covered in-class to their concise treatment in the primary literature. You will not be able to cover all aspects of the assigned paper in your 50 minutes, so you will need to decide which material to ignore while being prepared to answer questions as they come up. Also, it sometimes helps to uncover how a particular paper relates to prior and subsequent work. This last task is greatly facilitated by the careful use of graphics and other web materials. Modern observations on ENSO are posted on web by NOAA and its TOGA/TAO array of equatorial moorings that have covered several ENSO cycles discussed in the paper.

Paper (Dec.-6, 2005):

McCreary, J.P., 1983: A model of tropical ocean atmosphere interactions. Mon. Weath. Rev., 111, 370-387.

Study Guide Questions:

What are the atmospheric Hadley and Walker circulations and how are they represented in the model?

What time-dependent process causes the oscillations? Does the atmosphere have a governing vorticity or momentum equation?

What physical processes does the ocean model include? Which terms are included in the oceanic vorticity equation?

What does the equilibrium (steady state) solution represent and how does it relate to what we discussed in class?

How is the equilibrium established and what role do equatorial Kelvin and low-latitude Rossby wave play in establishing this equilibrium?

What feedback processes cause the persistent 4-year oscillations in the model?

How can you determine the phase speed of the dominant Rossby wave from the figures presented in the study?

In this study, which mechanism caused teleconnections over spatial scales in excess of 5000-km? Are these waves dispersive?