

## **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 “google scholar” and the careful use of graphics and other materials posted on the web. For example, Dr. Rebecca Woodgate (U. Washington) maintains an extensive website related to Bering Strait flows.

### **Paper (Dec.-5, 2005):**

Kinder, T.H., D.C. Chapman, and J.A. Whitehead, 1986: Westward intensification of the mean circulation on the Bering Sea shelf. *J. Phys. Oceanogr.*, 16, 1217-1229.

### **Study Guide Questions:**

What drives the mean circulation in both the laboratory and numerical model, i.e., does a western boundary current always require a wind stress curl?

What baroclinic current speeds and directions would you expect from the section shown across Bering Strait?

What physical processes are considered in the laboratory and numerical models and how do they relate to non-dimensional parameters we derived in class?

What is the governing equation that forms the essence of the model applied to the Bering Sea and how does it relate to what we discussed in class?

What are the dominant force and vorticity balances in different parts of the domain?

Does the basic geostrophic flow follow bottom contours?

Which physical process breaks the geostrophic constraint, that is, what is the origin of the relative vorticity term in the main governing equation 4.2?

Why does the Rossby radius of deformation not enter the dynamics that are certainly dominated by rotation and ambient vorticity gradients?