Weekly CEAFM Seminar: Spring 2016

JOHNS HOPKINS
Center for Environmental
& Applied Fluid Mechanics

Date: **Friday, March 11, 2016**

Time: 11:00 AM

Location: Gilman Hall # 50

Speaker: **Prof. Denny Kirwan** (Univ. of Delaware)

Title: ***"Coherent transport boundaries in 3D rotating stratified Euler flow"***

Abstract

Traditional methods for identifying transport boundaries in ocean flows attempt to identify Lagrangian Coherent Structures or LCS. These methods have been widely applied to mesoscale flows, which are presumed to be 2D and the boundaries approximately stationary. Little is known about the vertical extent and time variability of oceanic LCS. Motivated by recent observations from the Gulf of Mexico following the Deep Water Horizon disaster we began theoretical and numerical studies of transport boundaries in 3D time dependent flows. Here I report on some dynamical characteristics of LCS generated by an exact solution to the linearized 3D Euler equations on an f-plane. We find that trajectories live on both cyclonic and anti-cyclonically winding tori and that LCS boundary surfaces have super inertial oscillations. In contrast to some recent studies the LCS surfaces have significant vertical structure.

Bio

Education: A.B. Princeton University, 1956. Thesis "The role of iron in the deformation of sphalerite crystals." PhD at Texas A&M University, 1964. Dissertation "Eddy Diffusion in the Antarctic Intermediate Water". After graduation from Princeton I served three years in the Navy aboard a Destroyer. After graduation from Texas A&M University I held research scientist, program manager, and faculty positions with two private companies, the federal government, and five universities. Currently I am professor emeritus at the University of Delaware. The underlying theme of my research is to apply fundamental principles to the interpretation of observations of the transport of mass, energy and momentum in natural systems. This research is described in over 100 peer reviewed papers. Recently I have become active in quantifying complexity and the emergence of coherent structures in natural systems.