CGD SEMINAR

DATE: Thursday, 22 October 2015

TIME: 11 a.m.

LOCATION: NCAR, 1850 Table Mesa Drive
Mesa Lab, Main Seminar Room

TITLE: Energy cascades in rotating stratified flows: large scale transfer and small scale dissipation in the ocean

SPEAKER: Raffaele Marino, Berkeley/École Normale Supérieure de Lyon (France)

ABSTRACT:

Fluids with rotation and stratification are anisotropic and support (inertia-gravity) waves. Thus, unlike the homogeneous isotropic case, in these systems turbulence has to compete with waves in transferring the energy across scales and new controlling parameters and characteristic lengths identify regimes where different physical phenomena dominate. One common modelling approach to describe these flows is to construct a succession of systems with increasing degrees of complexity, but together with the use of models one also needs to try the opposite approach: simplifying the physics and studying in detail the effects of all dimensionless parameters to achieve fundamental understanding of dynamics and energetics. It is this latter approach that will be taken in this seminar focusing the problem on the study of the stably stratified Boussinesq flows with rotation by means of direct numerical simulations (DNS). In this framework results from high-resolution DNS performed at NCAR and DoE will be presented to describe characteristics of the energy cascades in rotating stratified flows and investigate energy transfer processes in the Ocean. First unambiguous evidences on the existence of a dual constant-flux energy cascade will be provided and a simple scaling model for the ratio of the fluxes to large and to small scales will be presented. This sheds new light on the apparent paradox of the coexistence of large-scale balanced dynamics and small scale dissipation in the global ocean.

Seminars are live webcast: http://www.fin.ucar.edu/it/mms/ml-live-chat1.htm

For more information, contact Gaylynn Potemkin, email potemkin@ucar.edu, phone: 303.497.1618