

Colloquium Talk

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How do large-scale flows in the ocean become geostrophic?

Wednesday, March 7, 2018

at 13:30 h

ESI, Boltzmann Lecture Hall

Abstract: Large scale flows in the ocean are dominated by the steady geostrophic balance that provides a highly accurate estimate of the velocity field under observed pressure distribution. The way in which an initial unbalanced state becomes geostrophic (this process is termed Geostrophic Adjustment) has been studied for over 80 years in several configurations and for several initial states. In these theories the final states are determined by the application of conservation laws for e.g mass, vorticity and energy while the transformation of the initial state to the final geostrophic state occurs via the action of transient waves. Presently, a solid Geostrophic Adjustment theory exists on the f -plane in an infinitely wide channel for a "dam" initial state i.e. a discontinuous height distribution of a resting layer of fluid. In my talk I will point to recent advances made in the theory of waves, as well as in the construction of conserved quantities, on the beta-plane that can be employed to extend the theory to more general cases such as bounded domains, smooth initial conditions and latitude dependent Coriolis parameter.

A. Constantin

February 26, 2018