Equilibrium statistical mechanics of the shallow water model

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Abstract

The shallow water equation with rotation is an essential model of geophysical turbulent flows. In this talk, we will define for this model the microcanonical measure and its discrete approximations. Then we will perform an exact computation of the macrostate entropy using large deviation theory. Finally I will present the equilibrium states, solutions of the variational problem defining the macrostate entropy. These equilibrium states should describe and predict the self-organization of turbulent flows into large scale structure and predict the ratio of energy that flow to small scales through wave motions.

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