Energy partition freely evolving shallow water flows

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Statistical mechanics approach for turbulent geophysical flows is a powerful theoretical tool to predict self-organization of these flows. Previous application of this theory have been restricted to quasi-geostrophic equations. Here we consider the more general shallow water equations that include gravity waves and allow for energy transfer toward small scales through waves. We show explicit computation of statistical equilibrium states for this model. These results are used to predict the amount of energy that should be transferred into waves or into a large scale geostrophic circulation for a given initial condition.