Initial and boundary value problems for the equations of the climate without viscosity: primitive equations and shallow water equations.

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Abstract

In this lecture we will first briefly show how the inviscid two-dimensional Shallow Water (SW) equations relate to the Primitive Equations of the atmosphere and the oceans, in the context of the so-called Limited Area Models (LAM). We will then survey a number of very recent results of existence and uniqueness of solutions for linearized versions of the SW, and for the full nonlinear SW equations. Although the (linear or nonlinear) SW equations are fully hyperbolic, their time independent part can be fully hyperbolic or partly hyperbolic and partly elliptic. This gives an idea of the complexity of the problem and of the diversity of tools which are necessary.

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