Mathematical Analysis of Geophysics Balance Models

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An analysis of an approximation to the rotating shallow-water equations is presented. The approximation removes the fast waves without introducing secular terms. In particular, the shallow-water equations are decomposed into two equations describing the slow and fast dynamics. The basic idea is one of enslaving in which the fast part of the solution is expressed as a function of the slow part yielding an approximation to the slow dynamics. Existence and convergence theorems are given.