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Vortex dynamics for the lake equations

Abstract

The lake equations describe the vertical average velocity in an inviscid incompressible flow of a fluid in a basin whose variable depth $b : \Omega \to [0, +\infty)$ is small in comparison with the size of its two-dimensional $\Omega \subset \mathbb{R}^2$ projection. G. Richardson has showed by formal computations that vortices should at the leading order follow level lines of the depth function b. I will present different mathematical results showing the validity of this computation for stationary and time-dependent flows. These results are counterparts of classical results for the vortex dynamics of the Euler equation of inviscid incompressible flows.

This is joint work with Justin Dekeyser (UCLouvain, Louvain-la-Neuve, Belgium).