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Rotation effects in long-thin lakes

While the effect of rotation on linear propagating waves and modes in closed basins (e.g. lakes) has a clear theory, the picture for nonlinear, dispersive waves is far from clear. After reviewing the effects of rotation on linear waves, I will use the example of Cayuga Lake, NY, USA during the temperature stratified season as a motivator for discussing nonlinear adjustment problems in long thin lakes. Here the idea is that the narrow dimension of the lake is smaller than than the internal Rossby deformation radius, but the long dimension of the lake is far larger compared to the internal Rossby deformation radius,. Wave trains formed by stratified adjustment thus have time for all of nonlinear steepening, short-wave dispersion and rotation to play a role in their evolution. I will discuss the results of pseudospectral simulations of an idealized lake to discuss what kinds of wave forms are spontaneously generated. I will then put these into context with respect to existing literature on stratified and geostrophic adjustment. Time permitting I will speculate on the effects of departures from an idealized geometry.