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Internal Kelvin Waves Generated by Quasi-Periodic Mesoscale Motion along the Coast

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ABSTRACT

In a two-layer model with a rigid surface and a flat bottom on an *f*-plane, an internal Kelvin wave is forced by quasi-geostrophic, mesoscale meanders of a coastal current. These meanders are assumed to be quasi-periodic along the coast, forming a cluster with an alongshore length 1/Ro times as long as the meander scale, where Ro is a small Rossby number (Ro$\ll$1).

The Kelvin wave solution has a form in which the pressure on the coast has a small ($\sim$ Ro) alongshore gradient with an $\sim$ 1 amplitude variation over many meander length scales. It is suggested that the boundary condition for a coastal current should satisfy the balance between the (ageostrophic) pressure gradient and the acceleration.

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