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Internal Solitary Waves and their interaction with floating bodies

Oceanic internal solitary waves (ISWs) propagate along density interfaces and are ubiquitous in stratified water. Their properties are influenced strongly by the nature and form of the upper and lower bounding surfaces of the containing basin(s) in which they propagate. Extensive research into the effect of the lower boundary exists as the interaction is crucial in both the formation and dissipation of these waves. The effect of the upper boundary condition, however, has received far less attention to date due to the difficult modelling problem it poses mathematically. In this work an experimental study of internal solitary waves (ISWs) propagating in a stably stratified two-layer fluid with a floating body at the surface will be presented.

Preliminary results from Particle Tracking Velocimetry (to track the surface body) and Particle Image Velocimetry (to measure the wave-induced velocity field) will be presented. The motion of the floating body is compared to the output of a simple numerical model, to quantify and understand how the floating body moves in response to the near-surface internal wave-induced flow.

Applications include ISW-ice interaction in the Arctic and ISW-offshore wind infrastructure interaction.