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Structure of internal wake past a drifting iceberg

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The Kelvin wave pattern (both steady and unsteady) past different sources and solid bodies on the surface of both deep and shallow water has been thoroughly studied during last century. Theory of both steady and transient “ship” internal waves is also well studied. Experimental works in this field has been performed since 70-th, but are more rear relatively to theoretical and numerical studies.

The phase structure and the amplitude of the resulting internal wave system was investigated versus relative directions of wake and background waves, the frequency of background waves, the velocity and the draught of the cylinder.

Both favourable and opposite regular background internal waves of two frequencies ω = 0.3N$_{max}$ and 0.5N$_{max}$ ($N_{max}$is the value of the buoyancy frequency in the center of the thermocline) were generated. After the recording of the stationary background internal waves the cylinder was towed along the tank and the resulting internal wave profiles were fixed. Almost plane stationary lee waves provide intense interaction between the lee and background wave systems.

The phase structure of the combination of the wake and background systems depends on the correlation of the cylinder’s velocity U, the maximum value of the phase velocity of the internal mode C$_i$ and the phase velocity of the background wave C$_w$. The relation * =U/C$_w$ plays the role of the resonant parameter.

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