Name	Dispersion relation	Particle motions	Periods	Restrictions	Comments
Deep water gravity waves	$\omega = \sqrt{gk}$	Circles in the vertical plane. The radius decays with depth.	3-30s	$\Lambda < 4H$	$C_g = \frac{1}{2}C$
Shallow water gravity waves	$\omega = \sqrt{gH}\,k$	Ellipses in the vertical plane, flattening with depth	3-30s or longer (i.e. tsunamis)	$\Lambda > 20H$	$C_g = C = \sqrt{gH}$
Buoyancy oscillations	$\omega = N$	vertical	20min-1hour		Non propagating
Two layer internal waves	$\omega = \sqrt{g' H_1}\,k$ internal $\omega = \sqrt{gH}\,k$ external	Horizontal and parallel to the direction of propagation. In the same direction in both layers for the external mode, in the opposite direction for the internal mode	10min to hours		Both an internal mode and an external mode are possible $\frac{\eta}{h} \approx -\frac{g'}{g}$, $\frac{u_1}{u_2} \approx -\frac{H_1}{H_2}$ for internal wave $\frac{\eta}{h} \approx 1$, $\frac{u_1}{u_2} \approx 1$
Internal waves	$\omega^2 = N^2 \cos^2 \varphi$ where φ is the angle that the wave vector makes with the horizontal	Oscillates in the plane perpendicular to the phase propagation	10 min to hours	$\omega < N$ $N^2 = -\frac{g}{\rho}\frac{\partial \rho_\theta}{\partial z}$	$C_g \perp C$ When the group velocity is up, the phase velocity is down

Inertial oscillations	$\omega = f$	Circular motion in the horizontal plane. Particles paths are **anticyclonic**	Inertial period		Non propagating $fU = \frac{U^2}{r}$ Coriolis force balances centrifugal force
Inertia gravity waves	$\omega = \sqrt{f^2 + gHk^2}$ $\omega = \sqrt{f^2 + g'H_1k^2}$	Ellipses in the horizontal plane with major axis to minor axis ratio $= \omega / f$	10 min to inertial period	$\omega > f$	Both an internal and an external mode are possible
Internal waves with rotation	$\omega^2 = f^2 \sin^2\varphi + N^2 \cos^2\varphi$	Ellipses in the plane perpendicular to the phase propagation	10 min to inertial period	$N > \omega > f$	$C_g \perp C$
Kelvin waves	$\omega = \sqrt{gH}\,k$ $\omega = \sqrt{g'H_1}\,k$	Back and forth in the direction of phase propagation. Velocity is parallel to the coast.	Hours to weeks		Propagation with the coast on the right in the Northern Hemisphere. Decays offshore with the deformation radius. $R_D = \frac{\sqrt{gH}}{f}$ external $R_D = \frac{\sqrt{g'H_1}}{f}$ internal $L_D = (\sqrt{gH}\ /2\beta)^{1/2}$ equatorial