Frequency vs. wavenumber

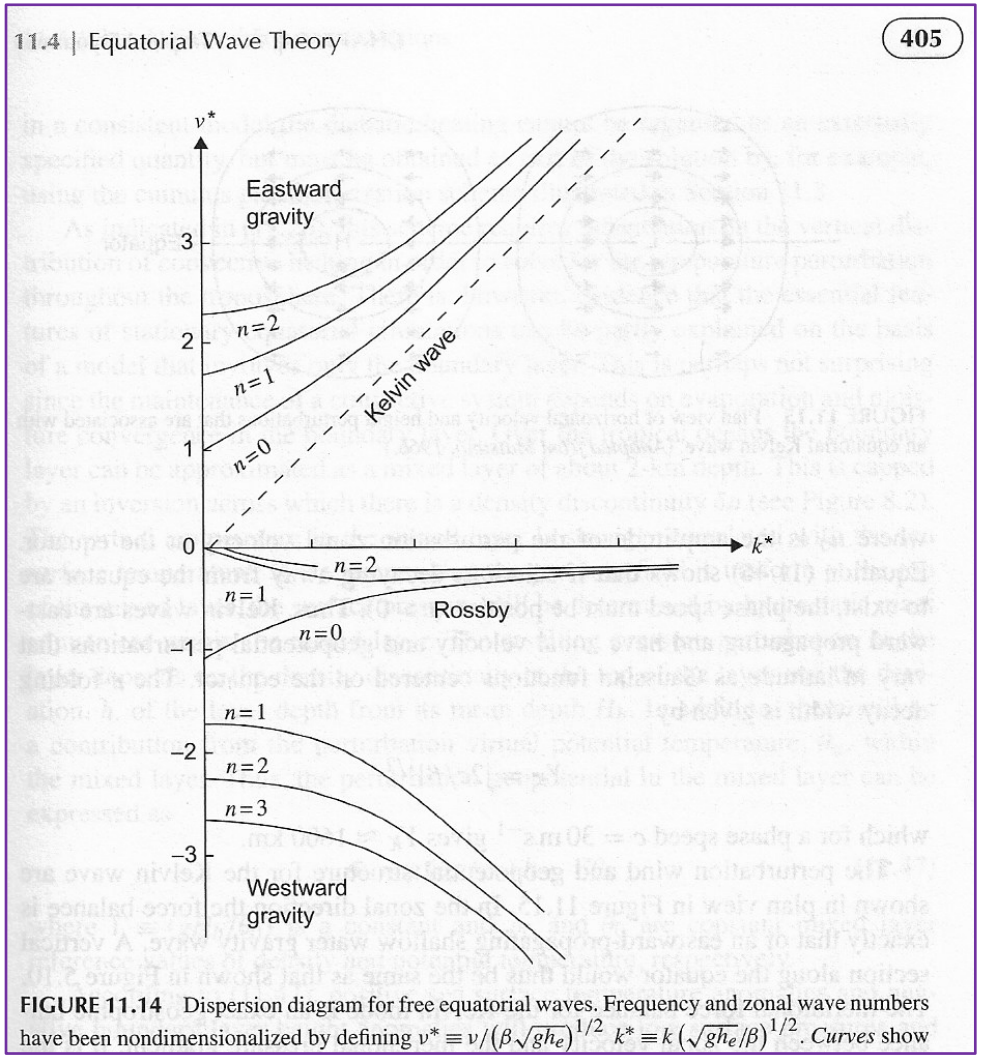

FIGURE 11.14 Dispersion diagram for free equatorial waves. Frequency and zonal wave numbers have been nondimensionalized by defining $\nu^* \equiv \nu/\left(\beta\sqrt{gh_e}\right)^{1/2}$ $k^* \equiv k\left(\sqrt{gh_e}/\beta\right)^{1/2}$. *Curves* show

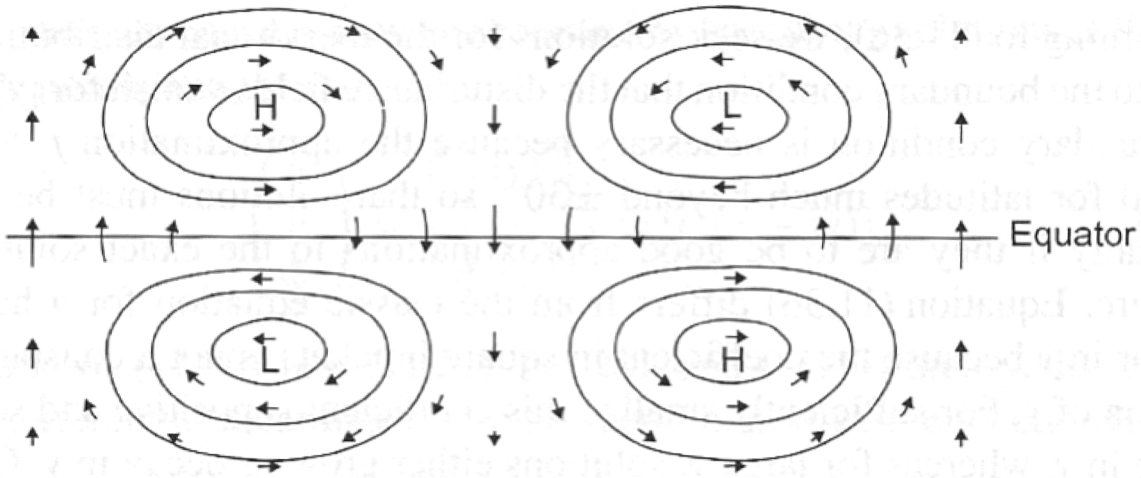

FIGURE 11.13 Plan view of horizontal velocity and height perturbations associated with an equatorial Rossby–gravity wave. (*Adapted from Matsuno, 1966. Used with permission of the Japan Society for the Promotion of Science.*)

Equatorial Rossby-Gravity Wave

$\hat{v}(\xi) = v_o\, H_n exp\{-\xi^2/2\} \quad \xi = \left(\beta/\sqrt{gh_e}\right)^{1/2} y \quad H_o = 1\,; H_1 = 2\xi\,; H_2 = 4\xi^2 - 2\,; H_3 = 48 - 12\xi$

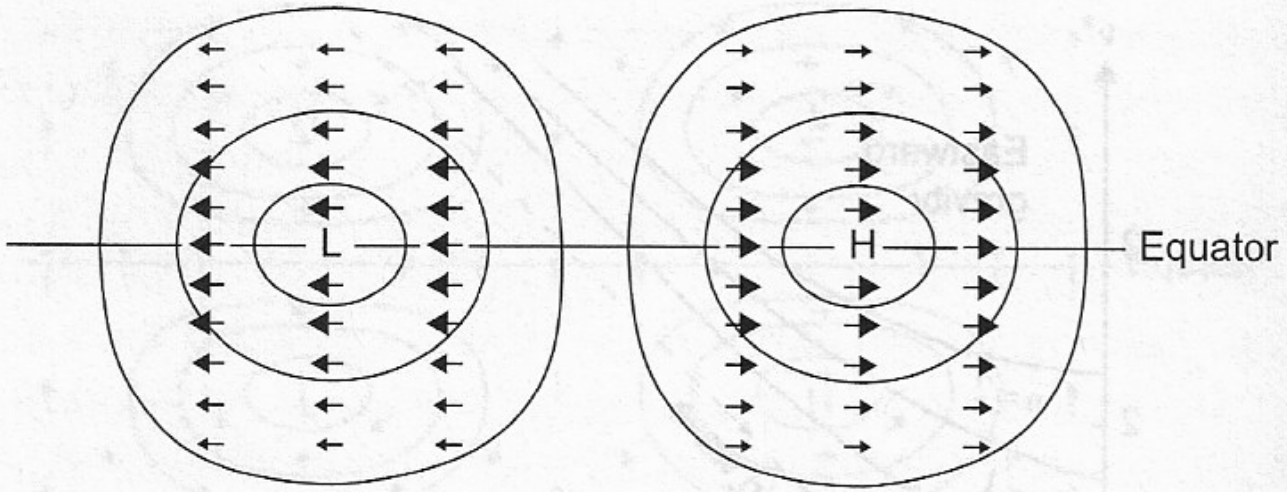

FIGURE 11.15 Plan view of horizontal velocity and height perturbations that are associated with an equatorial Kelvin wave. (*Adapted from Matsuno, 1966.*)

Kelvin Wave

$$\hat{u} = u_o exp\{-\beta y^2/2c\} \qquad c = +\sqrt{gh_e}$$