Table 2.4.1. *Summary of wave characteristics and the filtering approximations (adapted from Zhang, personal communication, 1996).*

Type of wave (typical amplitude)	Phase speed	Restoring force	Filtering approximations
Acoustic (less than 0.1 hPa, noise level)	$\sqrt{\gamma RT}$ (320 m/s)	Compression	Hydrostatic anelastic quasi-geostrophic
External gravity (if initial conditions are not balanced, 10 hPa)	$\sqrt{gH}$ (320 m/s for $H = 10$ km)	Gravity	No free surface at the top or the bottom, or no net column mass convergence
Internal gravity (0.1–1 hPa)	$\sim \frac{1}{k}\sqrt{\frac{N^2k^2}{k^2+n^2}} \sim N/k$ (50 m/s for $L =$ 30 km)	Buoyancy (gravitational acceleration within fluid)	Neutral stratification ($N = 0$), or $\frac{\partial \nabla \cdot \mathbf{v}_H}{\partial t} = 0$
Inertia	f/k (15 m/s for $L = 1000$ km)	Coriolis force (f)	No rotation ($f = 0$)
Rossby (20 hPa)	$U - \beta/k^2$ (relative phase speed $\sim$ 20–50 m/s depending on L)	Variation of f with latitude (β effect) $d\varsigma/dt = -\beta v$	Constant f ($\beta = 0$)