For the simplest (but not necessarily the best) choice of a = b = α = β = 1/2,

$$\frac{\partial\omega}{\partial p} \text{ for (1)} \approx \left(1+\frac{1}{24}(\Delta p)^2\frac{\partial^2}{\partial p^2}\right)\frac{\partial\omega}{\partial p} \approx \left(1-\frac{1}{24}(m\Delta p)^2\right)\frac{\partial\omega}{\partial p}$$

$$\frac{\partial\omega}{\partial p} \text{ for (2)} \approx \left(1+\frac{7}{24}(\Delta p)^2\frac{\partial^2}{\partial p^2}\right)\frac{\partial\omega}{\partial p} \approx \left(1-\frac{7}{24}(m\Delta p)^2\right)\frac{\partial\omega}{\partial p}$$

Here m is the *local* vertical wavenumber (real for intrnal waves).

The ratio (6) / (5) : $\delta \equiv \dfrac{1-(7/24)(m\Delta p)^2}{1-(1/24)(m\Delta p)^2} \approx \left(1-\dfrac{1}{4}(m\Delta p)^2\right) < 1$ (5)

(6)