THREE TYPES OF DISCRETIZATION ERRORS IN EULERIAN FORMULATIONS INVOLVING VERTICAL VELOCITY

First Kind : **Discretization errors for vertical deformation effect, such as**

$$Q\frac{\partial w}{\partial z}$$ Q: a quasi-constant

An example of relevant processes: potential vorticity dynamics

Second Kind : Discretization errors for vertical advection, such as

$$W\frac{\partial q}{\partial z}$$ W: a quasi-constant.

An example of relevant processes: vertical advection of tracers

Third Kind : **Discretization errors for the divergence of nonlinear vertical transport, such as**

$$\frac{\partial}{\partial z}(wq)$$