

# z-p Isomorphism

Ocean (z coordinates)

$z \leftrightarrow p$

Atmosphere (p coordinates)

$$d_t \underline{v} + f \times \underline{v} + \underline{\nabla}_z P = \underline{F}$$

$$P \leftrightarrow \Phi$$

$$d_t \underline{v} + f \times \underline{v} + \underline{\nabla}_p \Phi = \underline{F}$$

$$g\rho + \partial_z P = 0$$

$$\rho \leftrightarrow \alpha$$

$$\alpha + \partial_p \Phi = 0$$

$$\underline{\nabla}_h \cdot \underline{v} + \partial_z w = 0$$

$$w \leftrightarrow \omega$$

$$\underline{\nabla}_p \cdot \underline{v} + \partial_p \omega = 0$$

$$d_t \theta = Q$$

$$\theta$$

$$d_t \theta = Q$$

$$d_t s = S$$

$$s \leftrightarrow q$$

$$d_t q = S$$

$$\partial_t \eta + \underline{\nabla} \cdot (\eta + H) \underline{v} = P - E$$

$$\eta + H \leftrightarrow p_s$$

$$\partial_t p_s + \underline{\nabla} \cdot p_s \underline{v} = 0$$

