$$M\ddot{z} = (P_{bag} - P_{atmo})A - Mg \tag{1}$$

$$\dot{P}_{bag} = \frac{\gamma RT}{Az}(\dot{m}_{in} - \dot{m}_{escape} - \frac{P_{bag}A\dot{z}}{RT}) \tag{2}$$

$$\rho_{atmo}\frac{\partial P}{\partial x} = \beta(\frac{\dot{m}_{escape}}{A_e})^2 + \mu(\frac{\dot{m}_{escape}}{A_e}) \tag{3}$$

$$A_e = Per * z \tag{4}$$

$$\frac{\partial P}{\partial x} = \frac{P_{bag} - P_{atmo}}{\ell} \tag{5}$$