MCE summary

$\frac{\partial CAPE_\varepsilon}{\partial t} \simeq 0$

$CAPE_\varepsilon$ = entraining CAPE

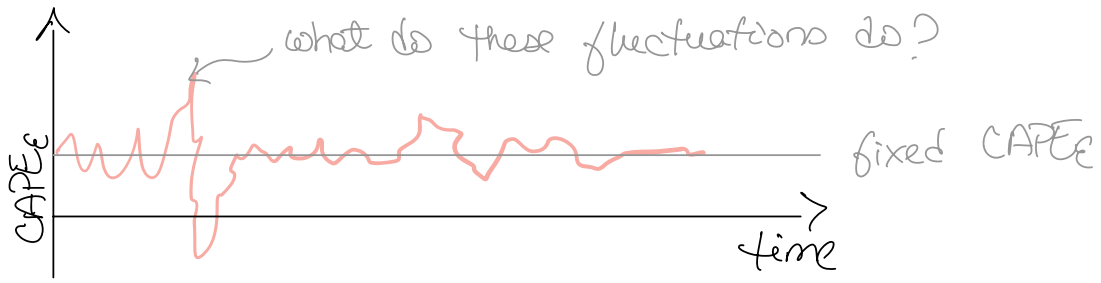
Because of entrainment $\overline{T_{em}}$ (dry env) > $\overline{T_{em}}$ (moist env.)

Hence why dry regions are more unstable

However! B change in time, and these fluctuations are important.

$\frac{\partial CAPE_\varepsilon}{\partial t} = \eta$ where η is a small value

$CAPE_\varepsilon$ has some small fluctuations in time that determine convection organization and evolution

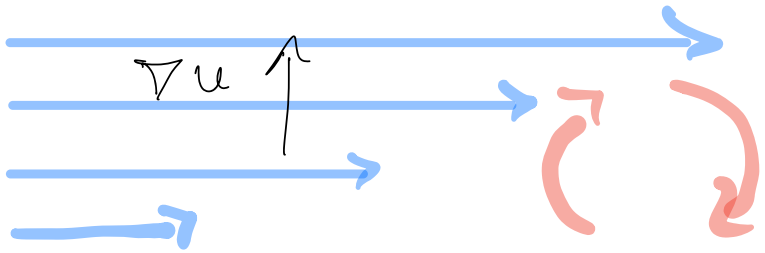


How important are these small B fluctuations?

$$\frac{D\vec{\overline{v}}}{Dt} = -\frac{1}{\rho}\nabla_h \overline{p'} - f\hat{k} \times \vec{\overline{v}} + \frac{\mu_c}{\rho}\frac{\partial^2 \vec{\overline{v}}}{\partial z^2}$$ Hor. Mom.

p' is the nonhydrostatic pressure

$$\frac{D\overline{w}}{Dt} = -\frac{1}{\rho}\frac{\partial \overline{p'}}{\partial z} + \overline{B} + \frac{\mu_c}{\rho}\frac{\partial^2 w}{\partial z^2}$$ Vert. Mom.



Eddy mixing

$$+\frac{\mu_c}{\rho}\frac{\partial^2 \bar{v}}{\partial z^2}$$

We assume $\rho\overline{u'w'} = \mu_c \frac{\partial \bar{v}}{\partial z}$

Eddy mom. transport

$$\frac{1}{\rho}\frac{\partial \rho\overline{u'w'}}{\partial z} = \frac{1}{\rho}\frac{\partial}{\partial z}\left(\mu_c \frac{\partial \bar{v}}{\partial z}\right) = \frac{\mu_c}{\rho}\frac{\partial^2 \bar{v}}{\partial z^2}$$