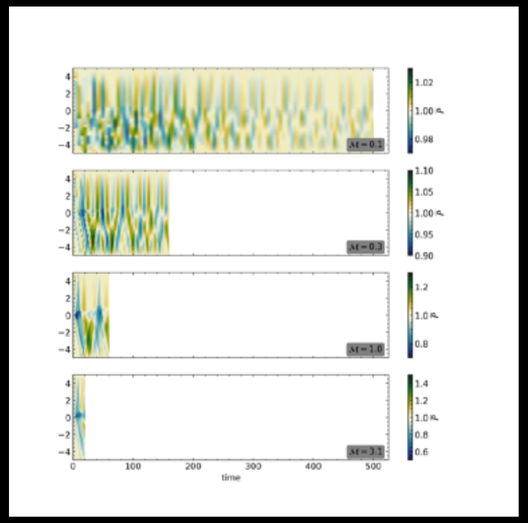
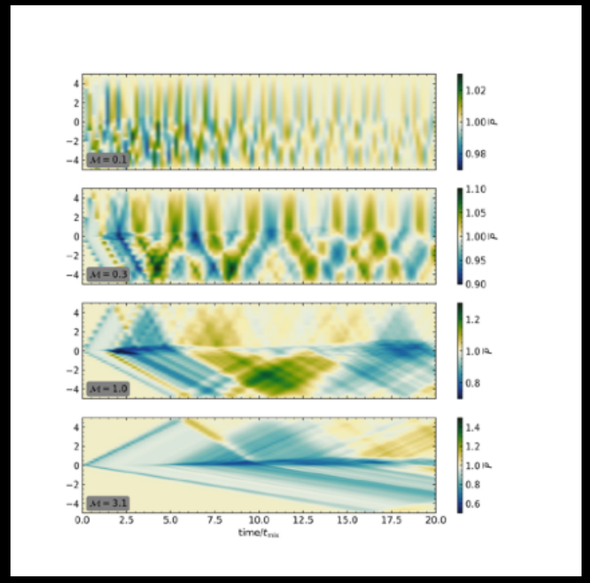
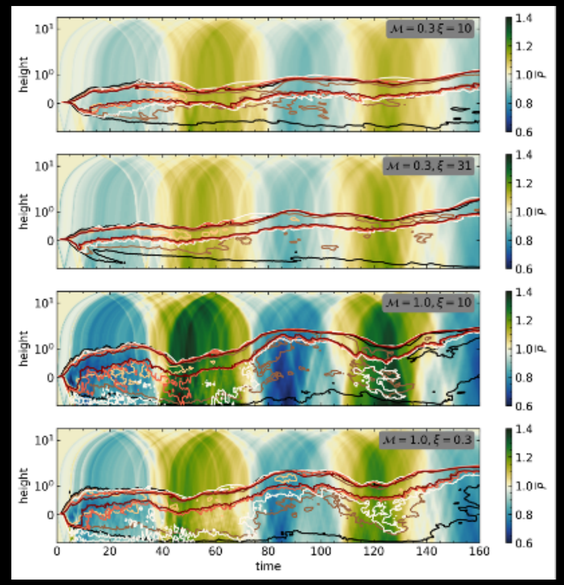
Turbulence and the kinetic energy budget

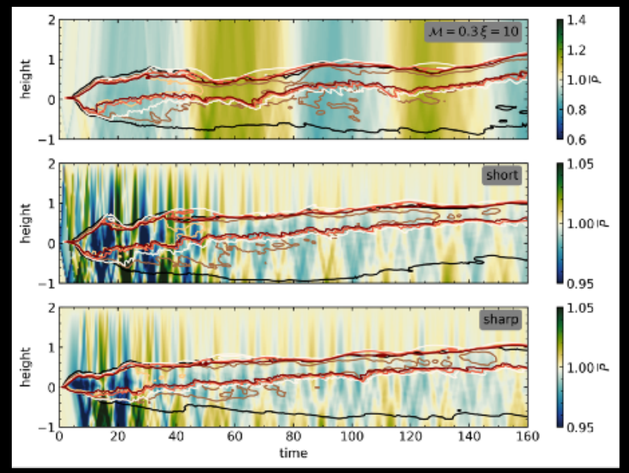
The horizontal velocity profile is for the most part independent of cooling, but the density profile approaches a step function in the limit of very rapid cooling. The required kinetic energy & x momentum to accelerate so much mass to fulfill the velocity profile may exceed the accreted KE and momentum if the step function is all the way at the leading edge of the velocity profile. Possibly the density profile adjusts where it crosses the velocity profile to satisfy the KE budget, but I think cooling will always want the hot cold transition as close to the leading edge as possible, so this imbalance may lead to the fluctuations in the hot-cold interface and explain why A/L^2 ~ (vrel tcool)^(1/4)

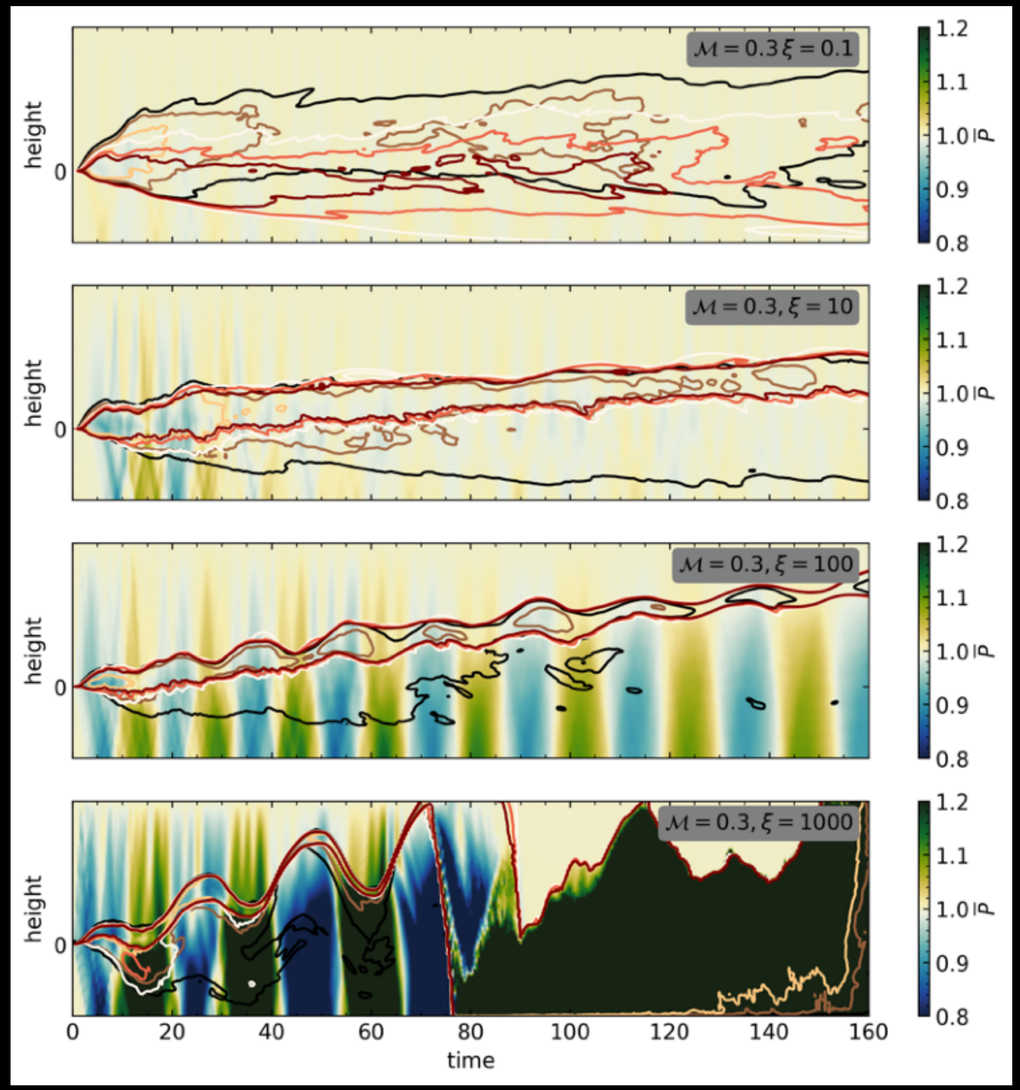
Pulsations


$\mathcal{M} = 0.1$
$\mathcal{M} = 0.3$
$\mathcal{M} = 1.0$
$\mathcal{M} = 3.1$
time


$\mathcal{M} = 0.1$
$\mathcal{M} = 0.3$
$\mathcal{M} = 1.0$
$\mathcal{M} = 3.1$
time/$t_{\rm min}$


$\mathcal{M} = 0.3, \xi = 10$
$\mathcal{M} = 0.3, \xi = 31$
$\mathcal{M} = 1.0, \xi = 10$
$\mathcal{M} = 1.0, \xi = 0.3$
height
time


$\mathcal{M} = 0.3 \xi = 10$
short
sharp
height
time


$\mathcal{M} = 0.3 \xi = 0.1$
$\mathcal{M} = 0.3, \xi = 10$
$\mathcal{M} = 0.3, \xi = 100$
$\mathcal{M} = 0.3, \xi = 1000$
height
time