

The Lorenz energy cycle in simulated rotating annulus flows

R. M. B. Young

Supplementary Material

2AV run at 4320s (strongest eddies)

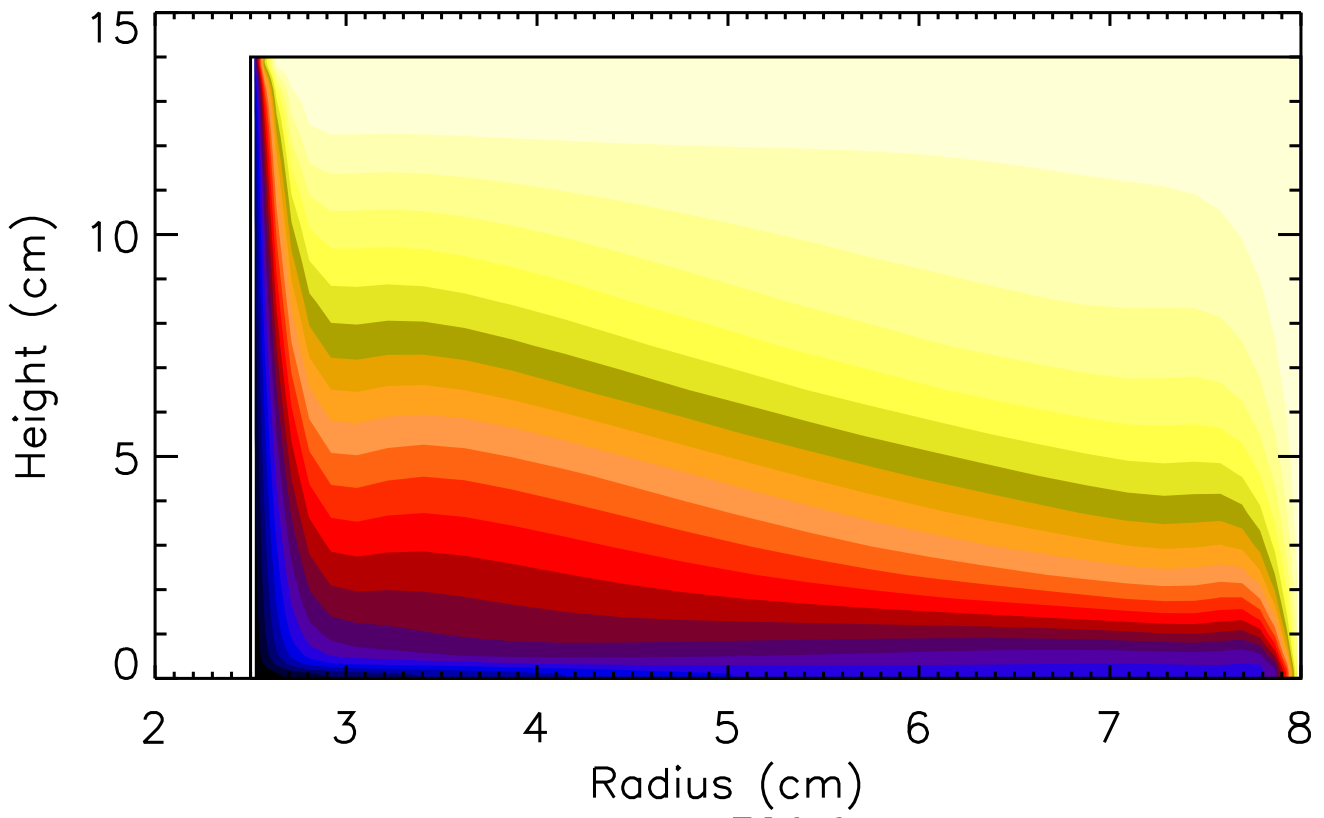
This file contains additional contour plots in the (R, z) plane, and line plots showing horizontal means as a function of z .

Because of limitations in the plotting language, the notation for means is different in this document compared with the main paper:

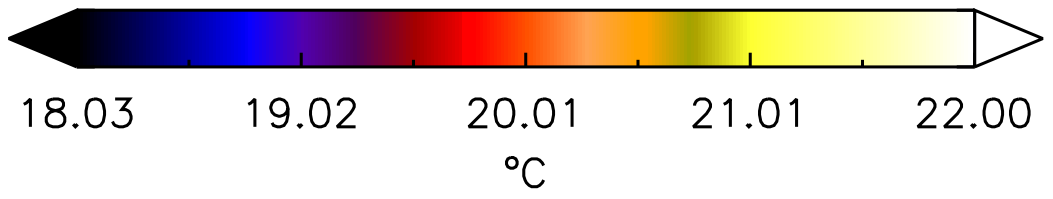
- A zonal or azimuthal mean is displayed as $\langle x \rangle$
(\bar{x} in the main paper).
- A horizontal mean is displayed as $|x|$
(\tilde{x} in the main paper).

Eddy fields use the same notation as the main paper.

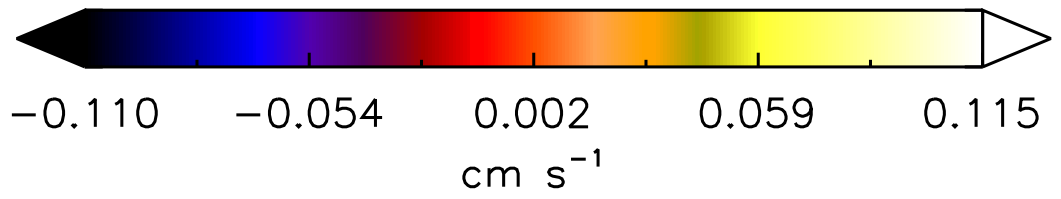
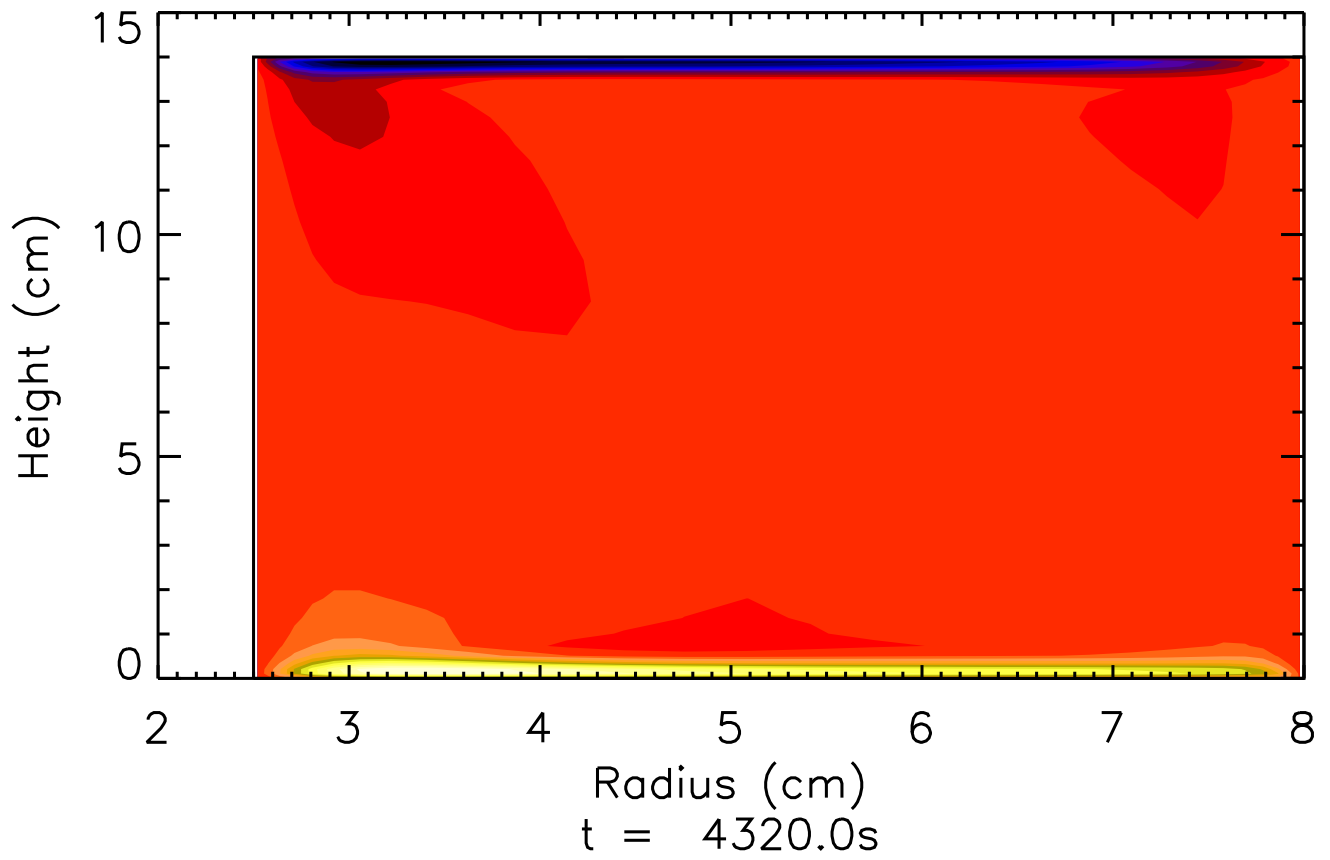
$\langle T \rangle$



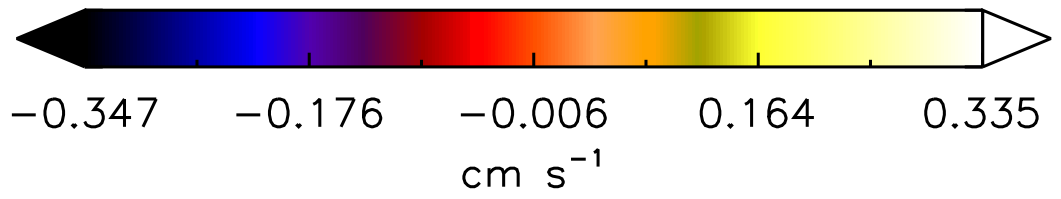
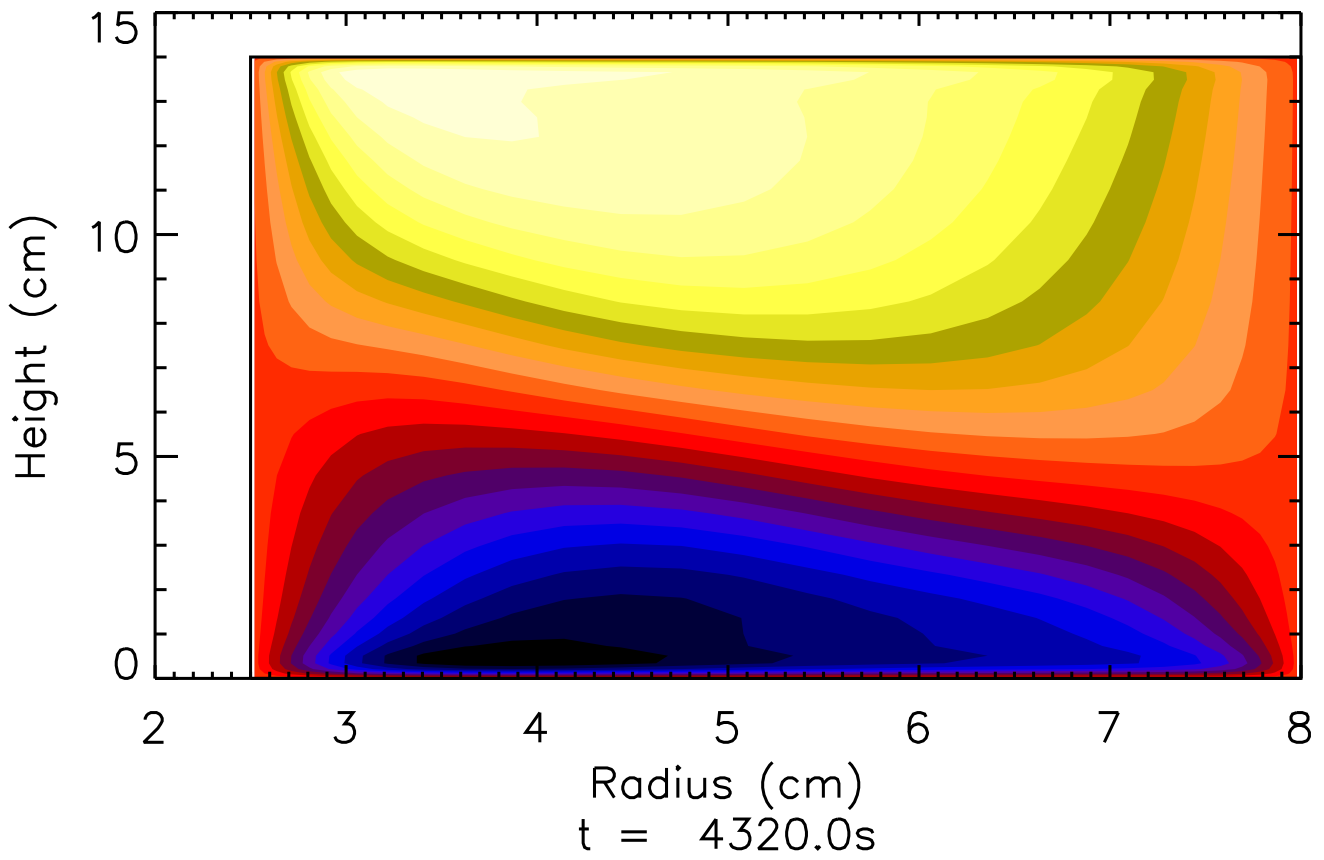
Radius (cm)
 $t = 4320.0s$



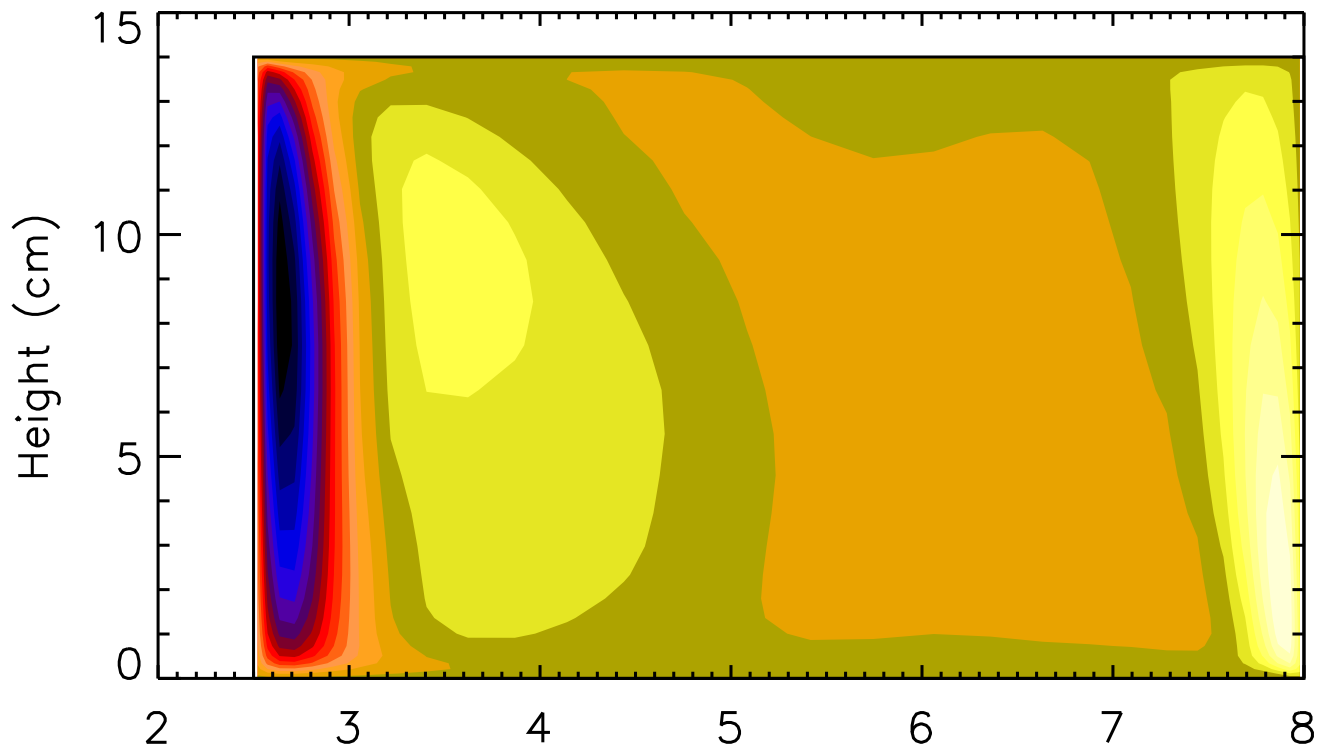
$\langle u \rangle$



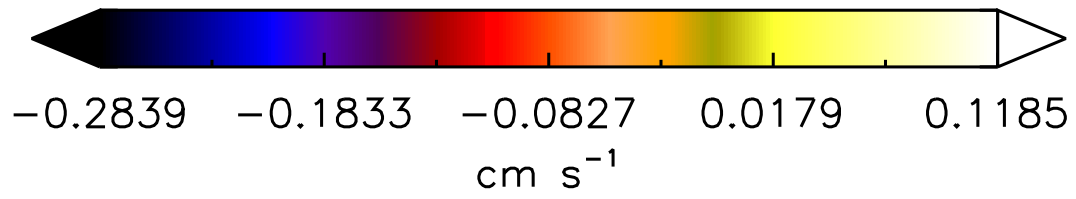
$\langle v \rangle$

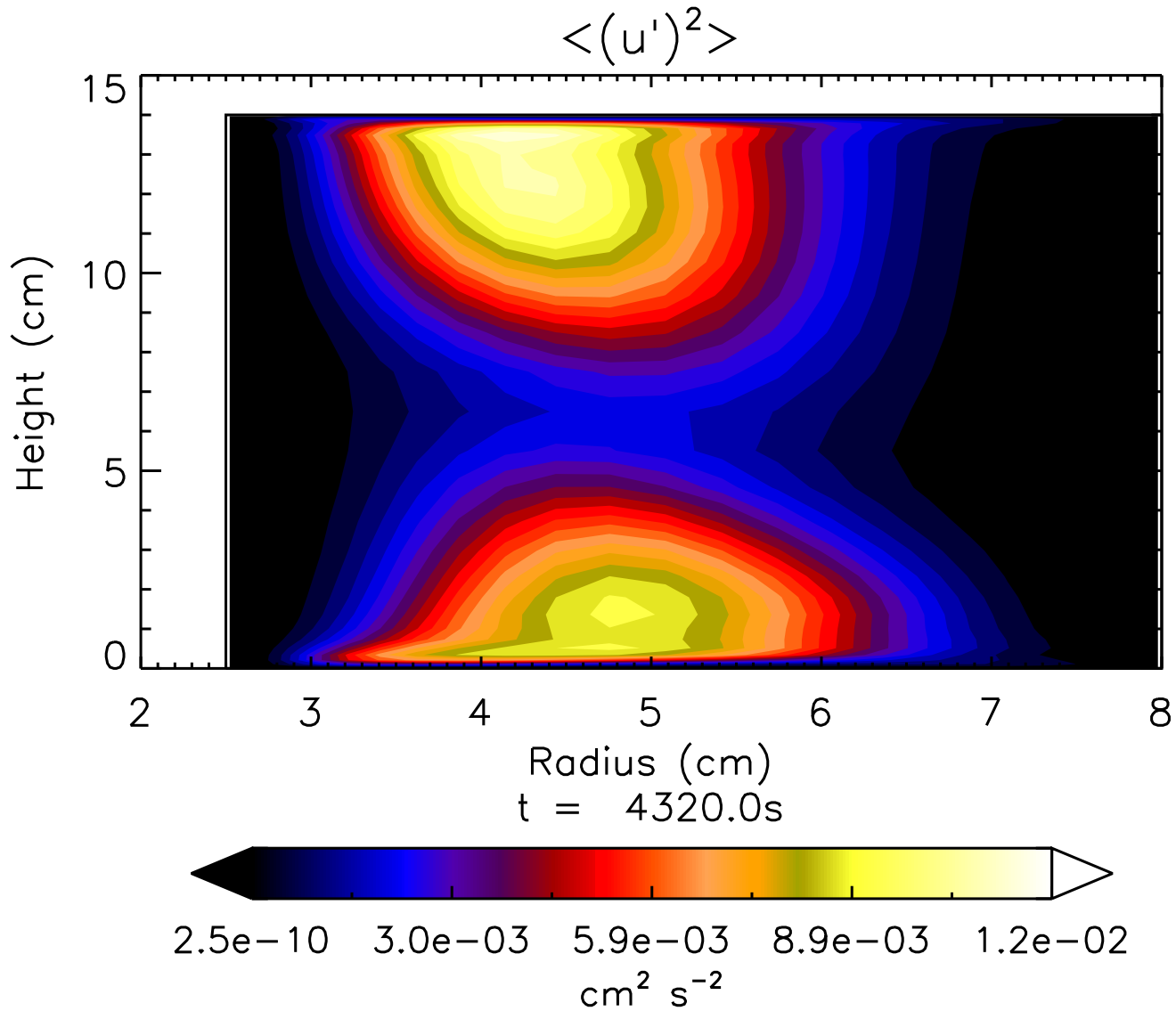


$\langle w \rangle$

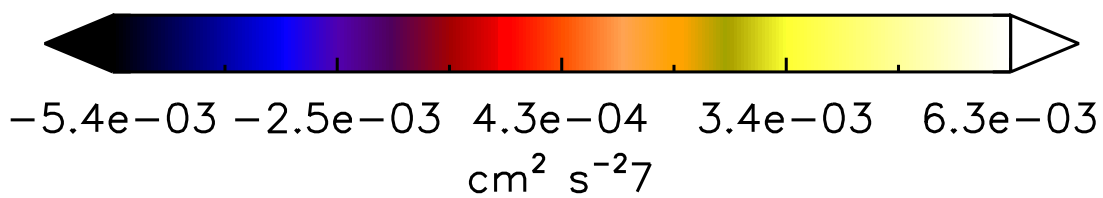
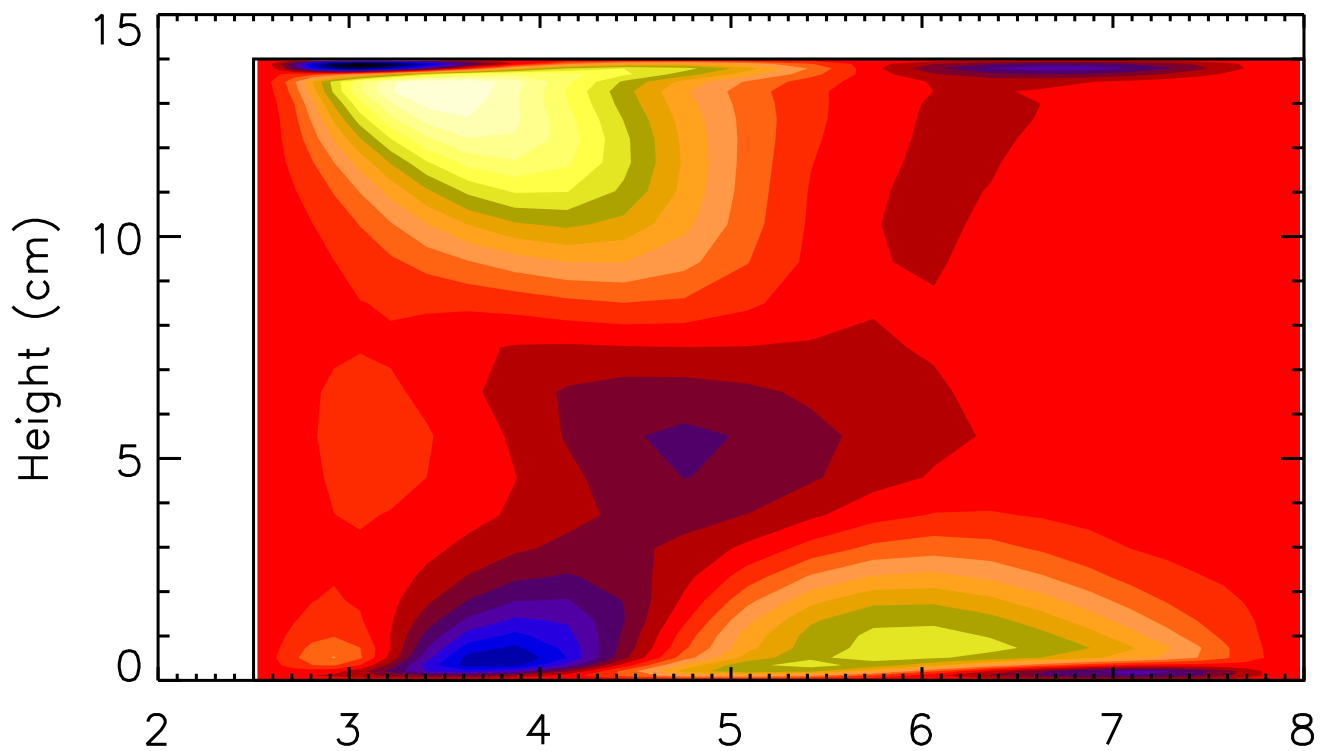


Radius (cm)
 $t = 4320.0s$

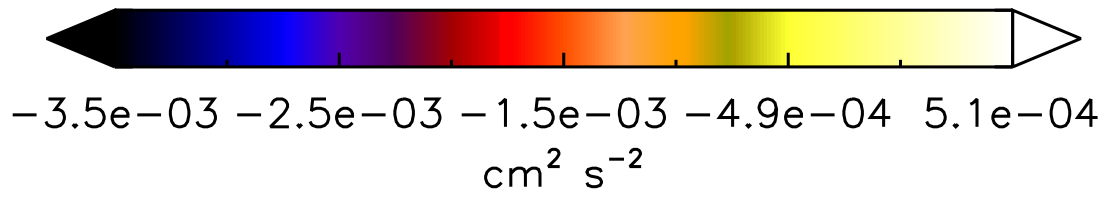
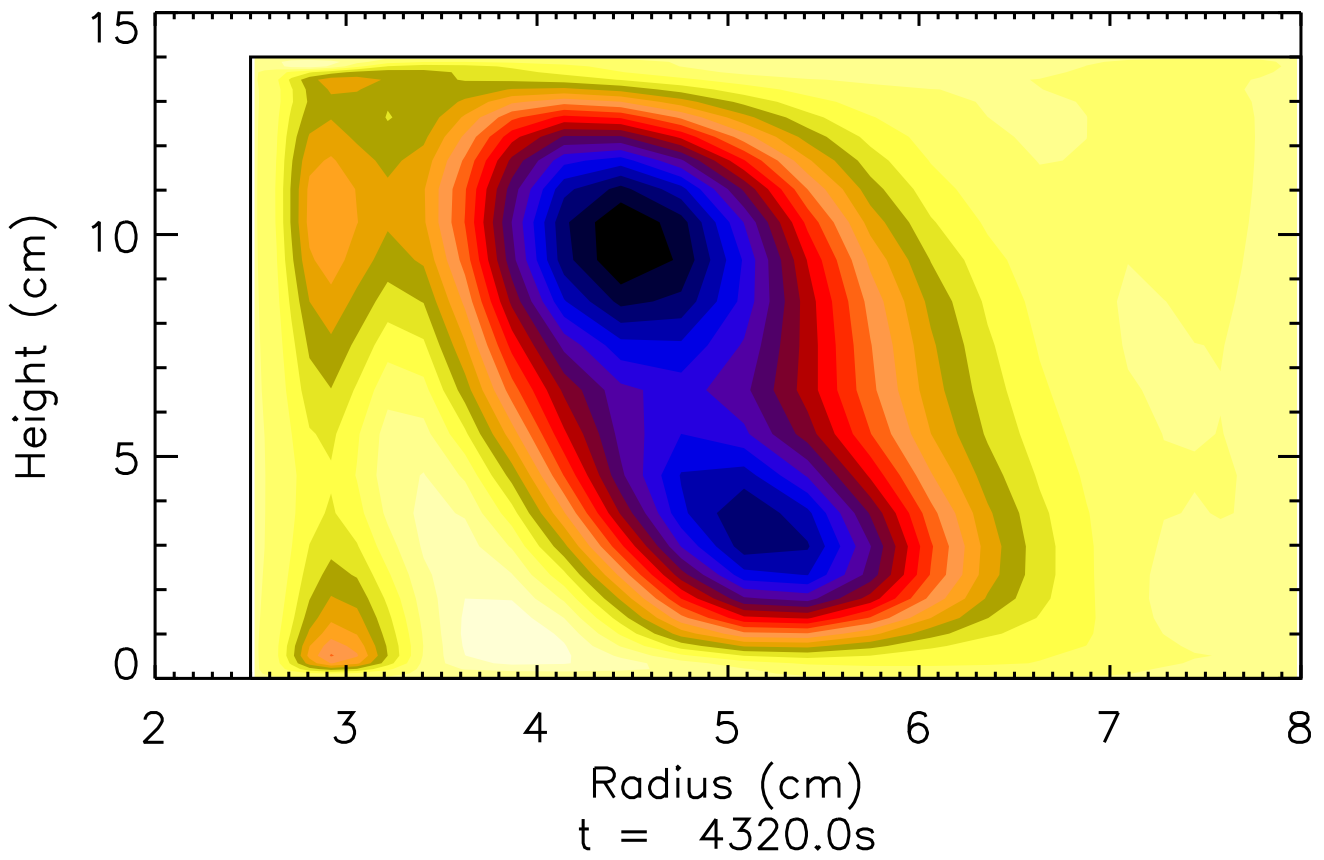


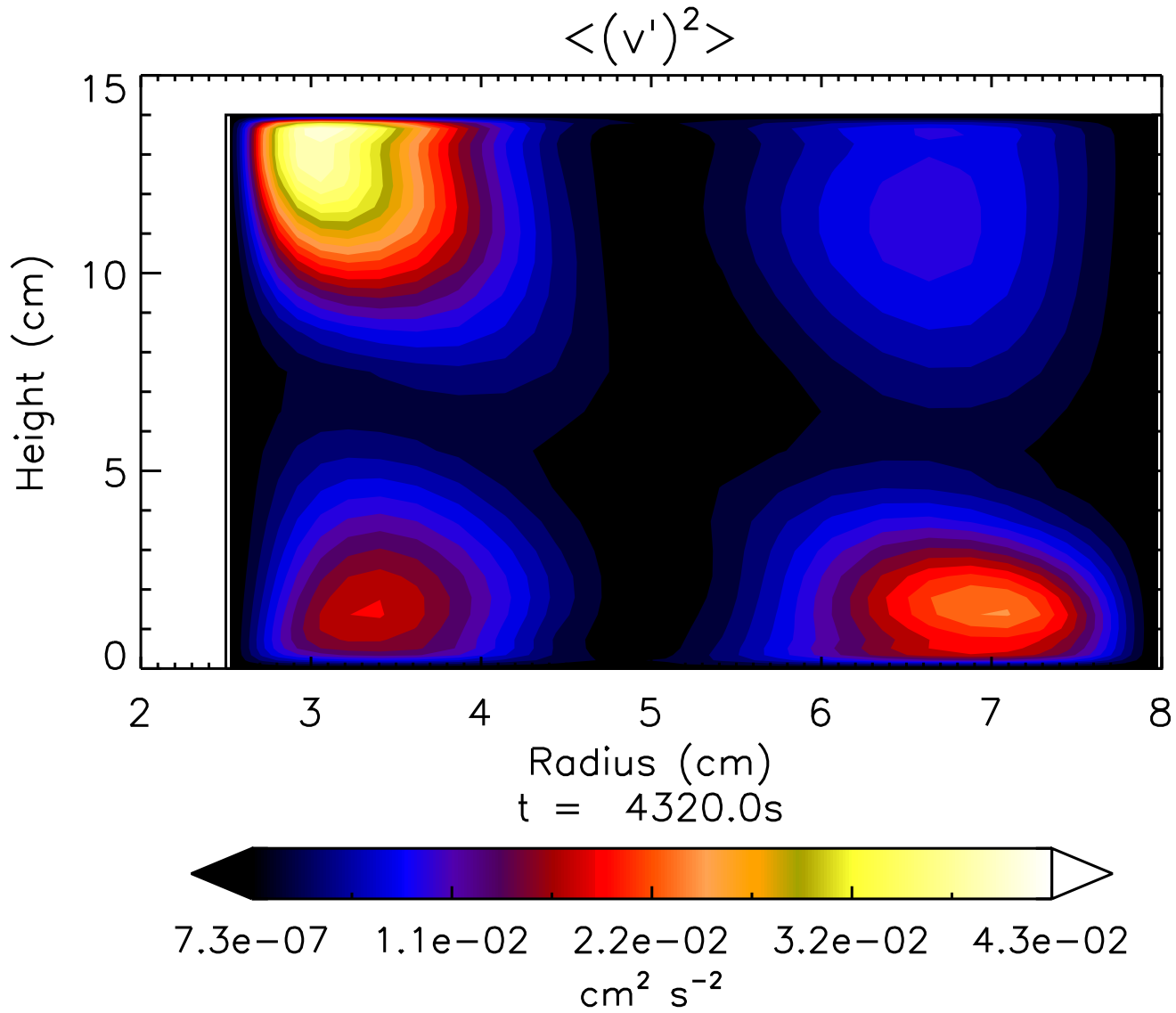


$\langle u'v' \rangle$

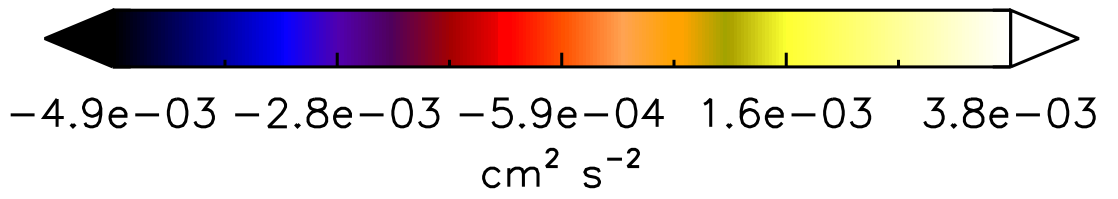
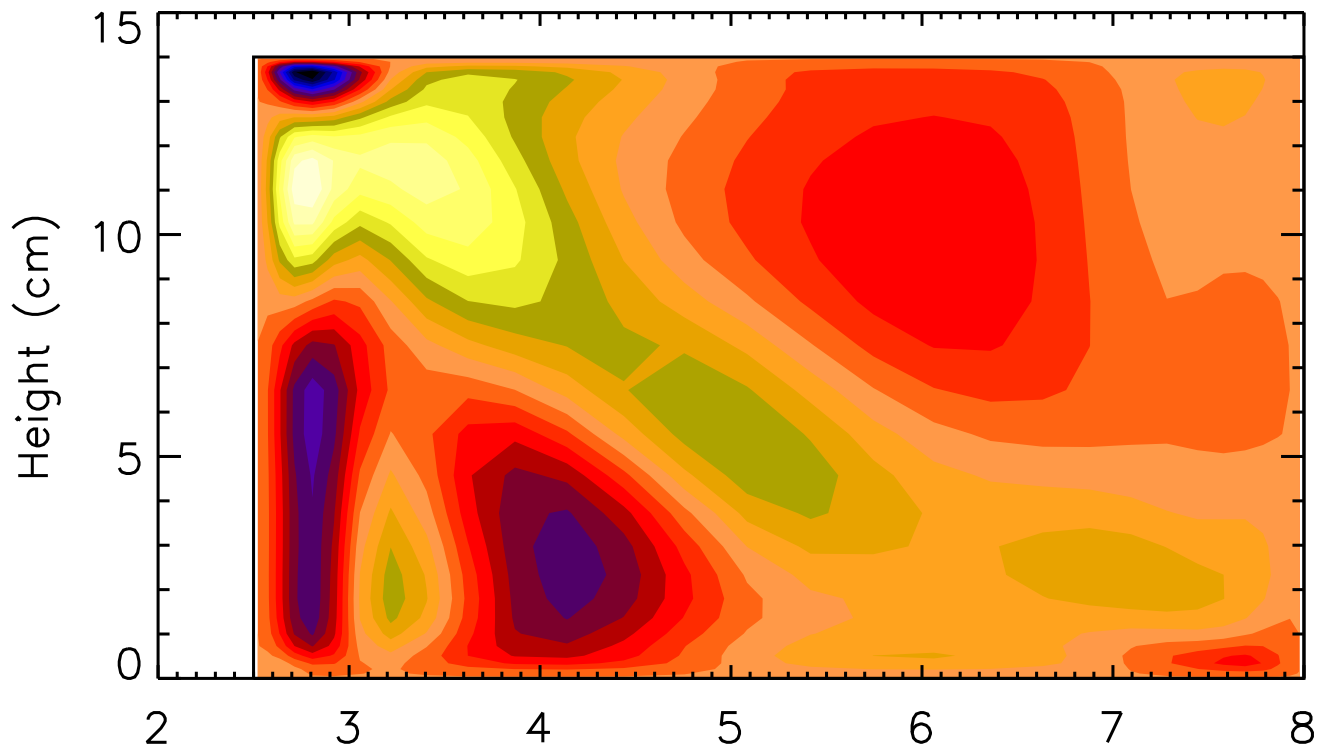


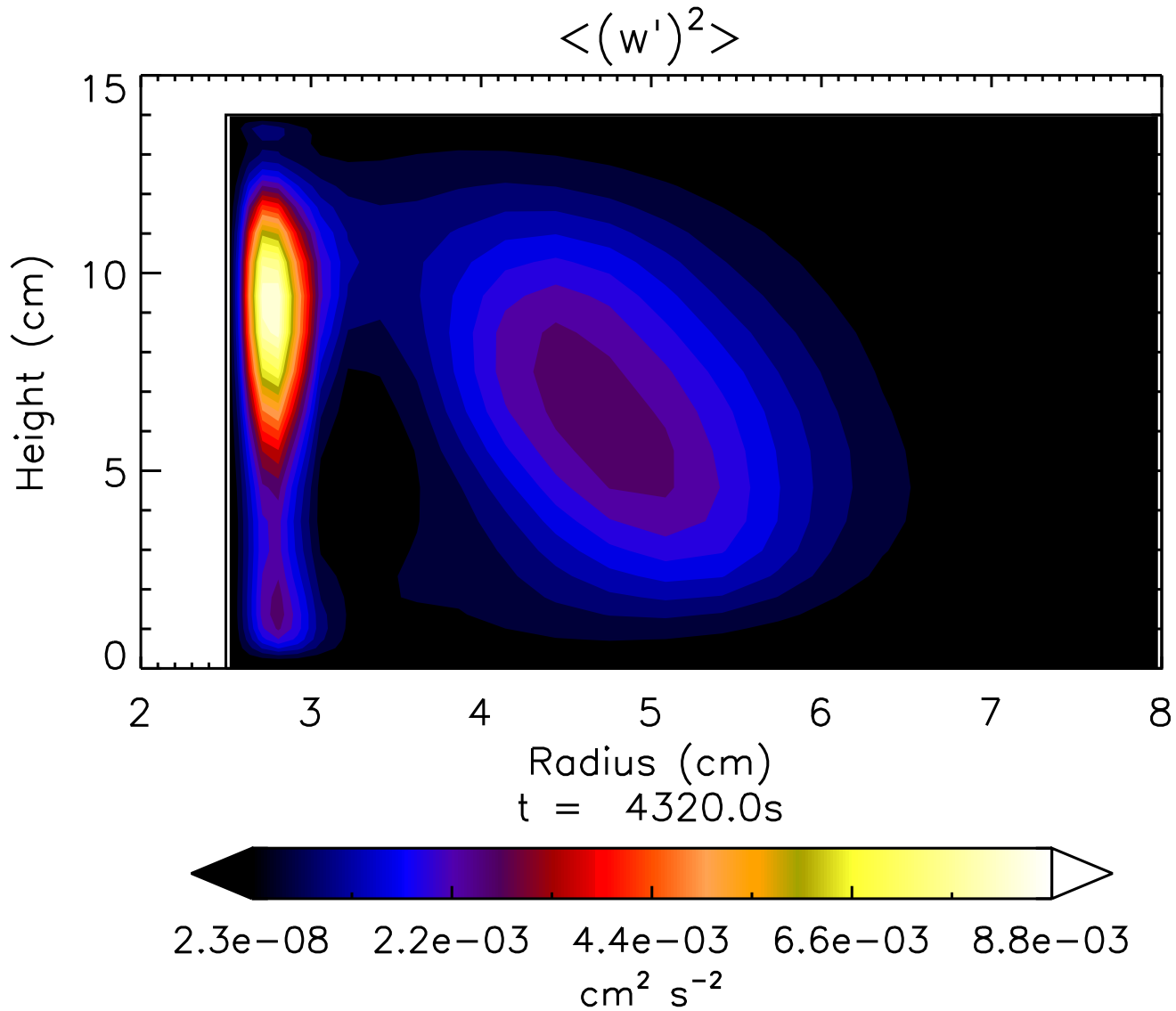
$\langle u'w' \rangle$



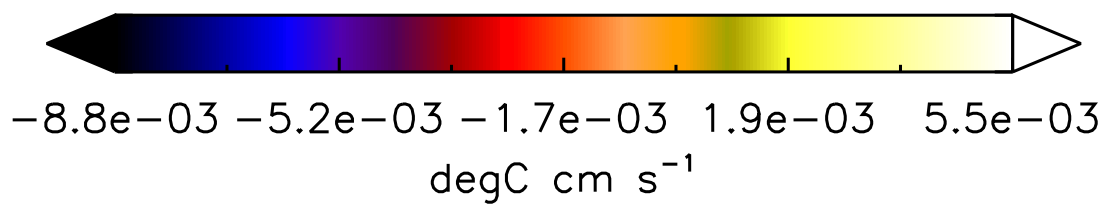
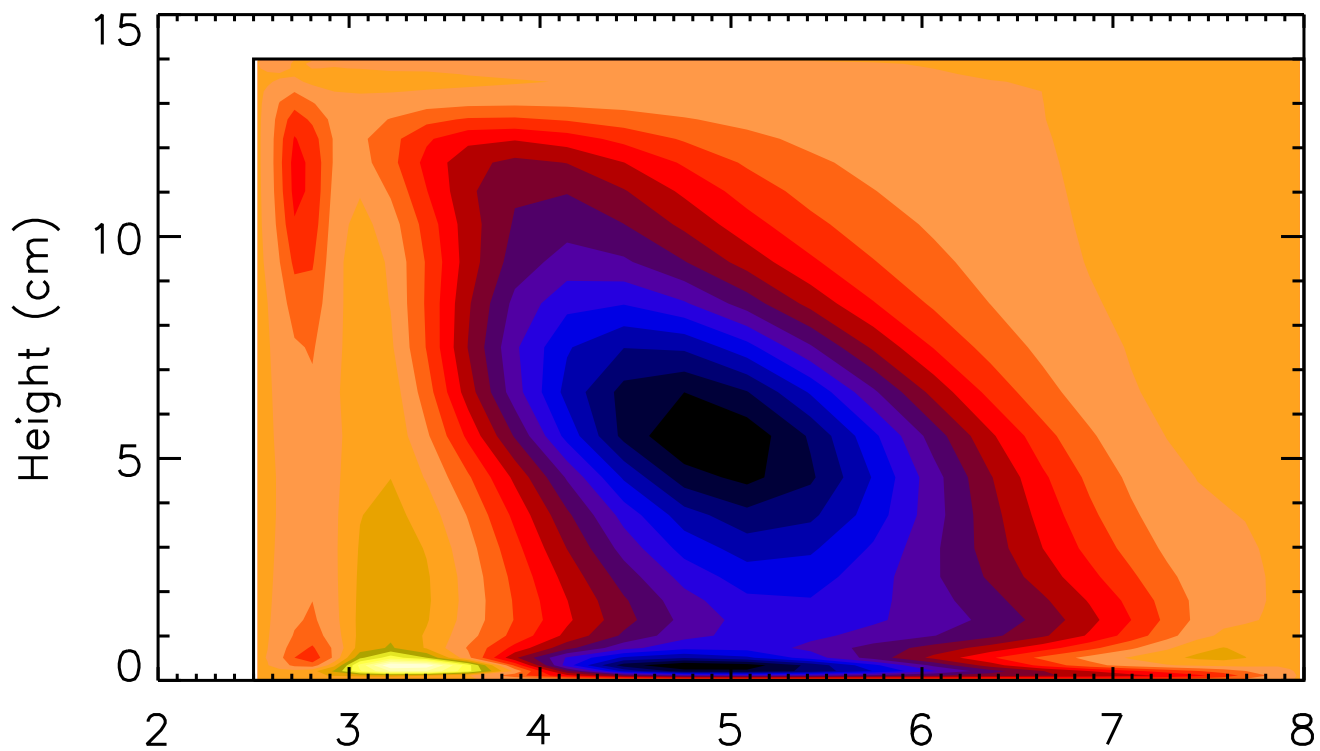


$\langle v'w' \rangle$

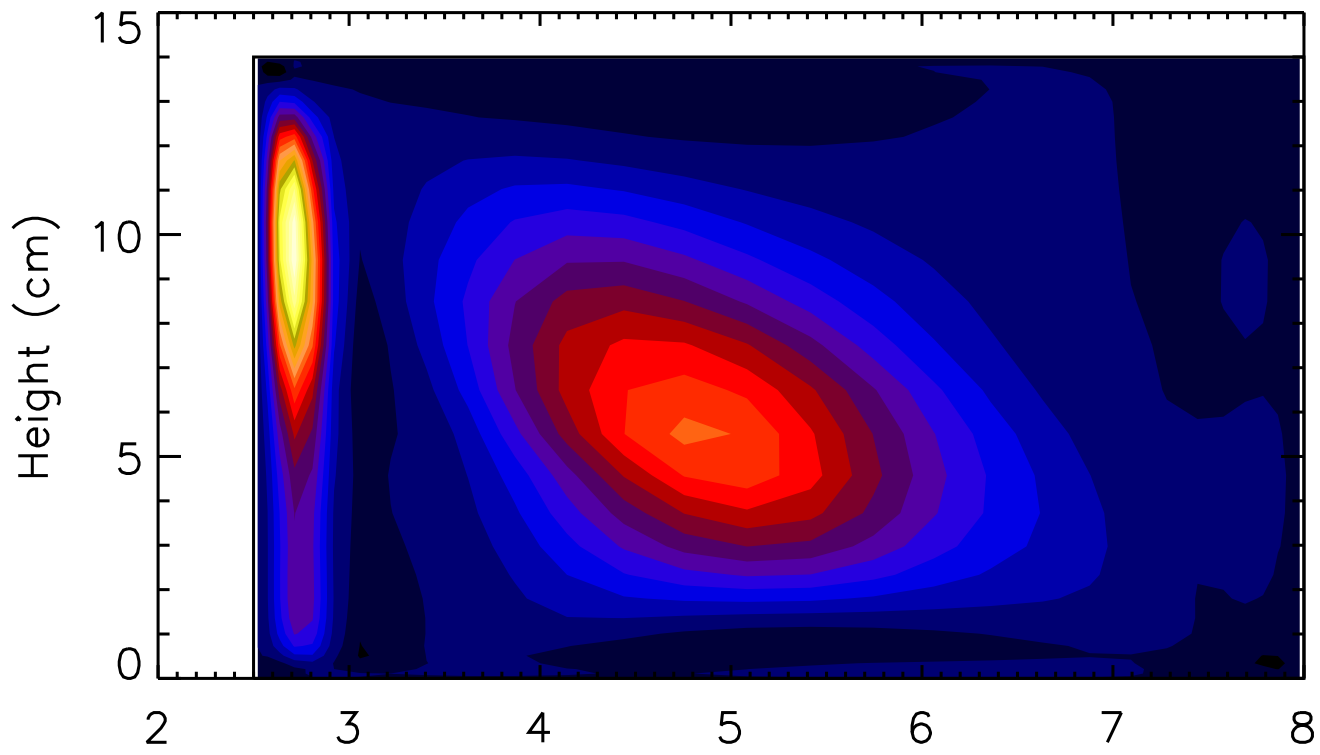




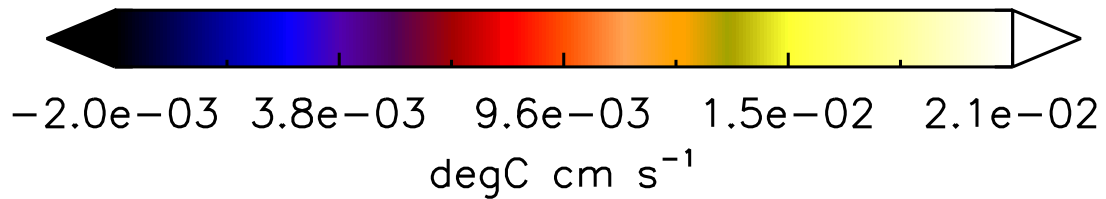
$\langle u'T' \rangle$



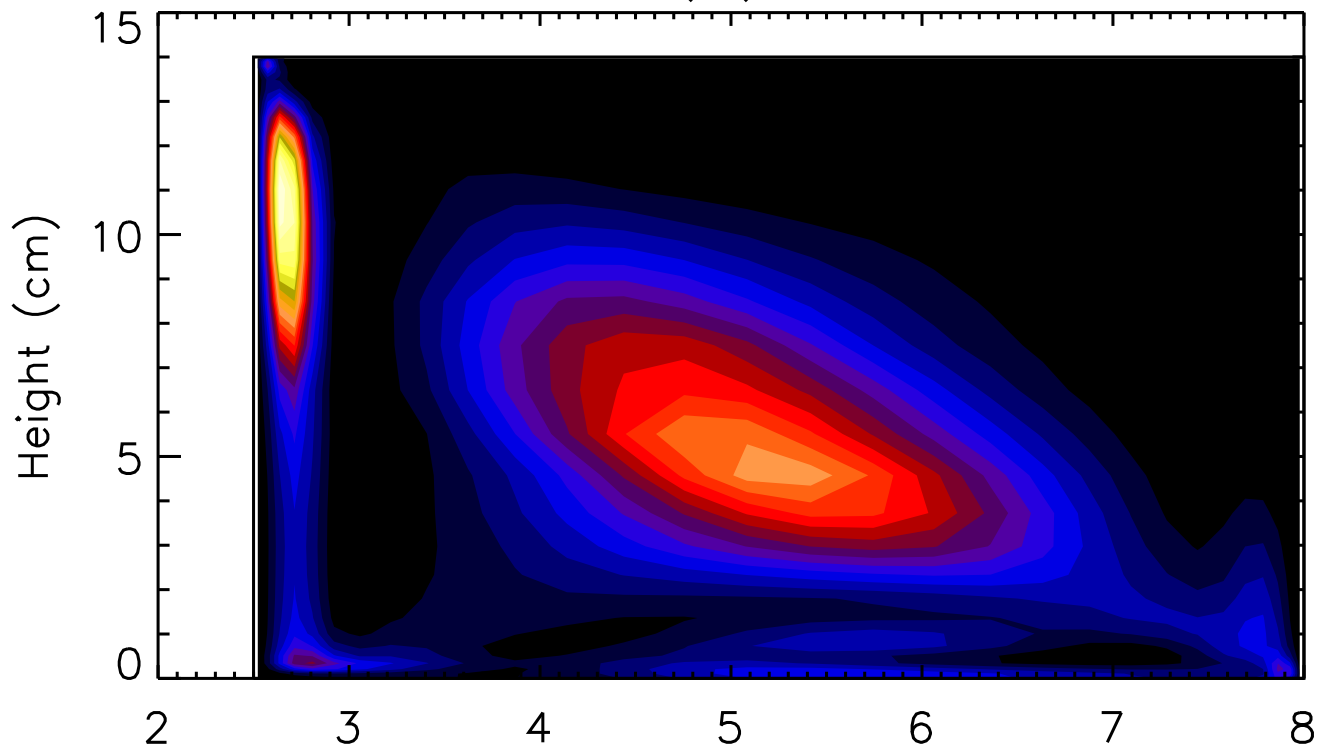
$\langle w'T' \rangle$



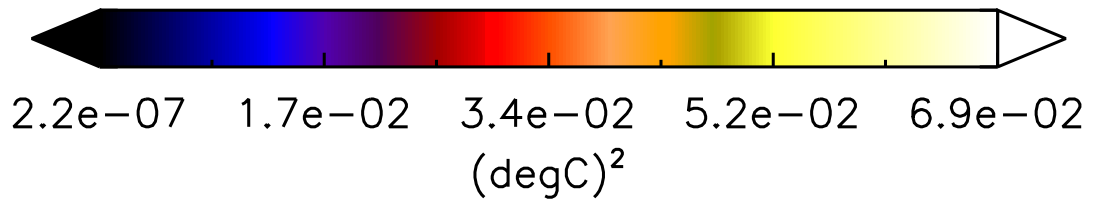
Radius (cm)
 $t = 4320.0s$



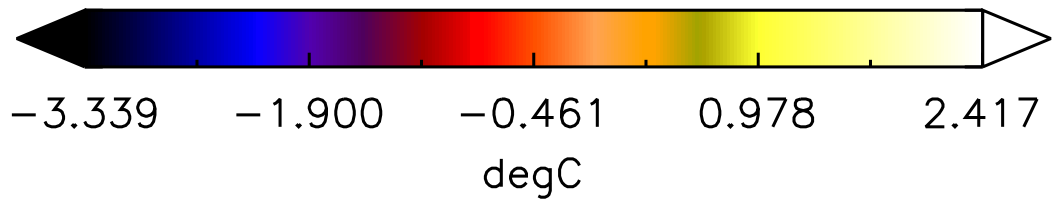
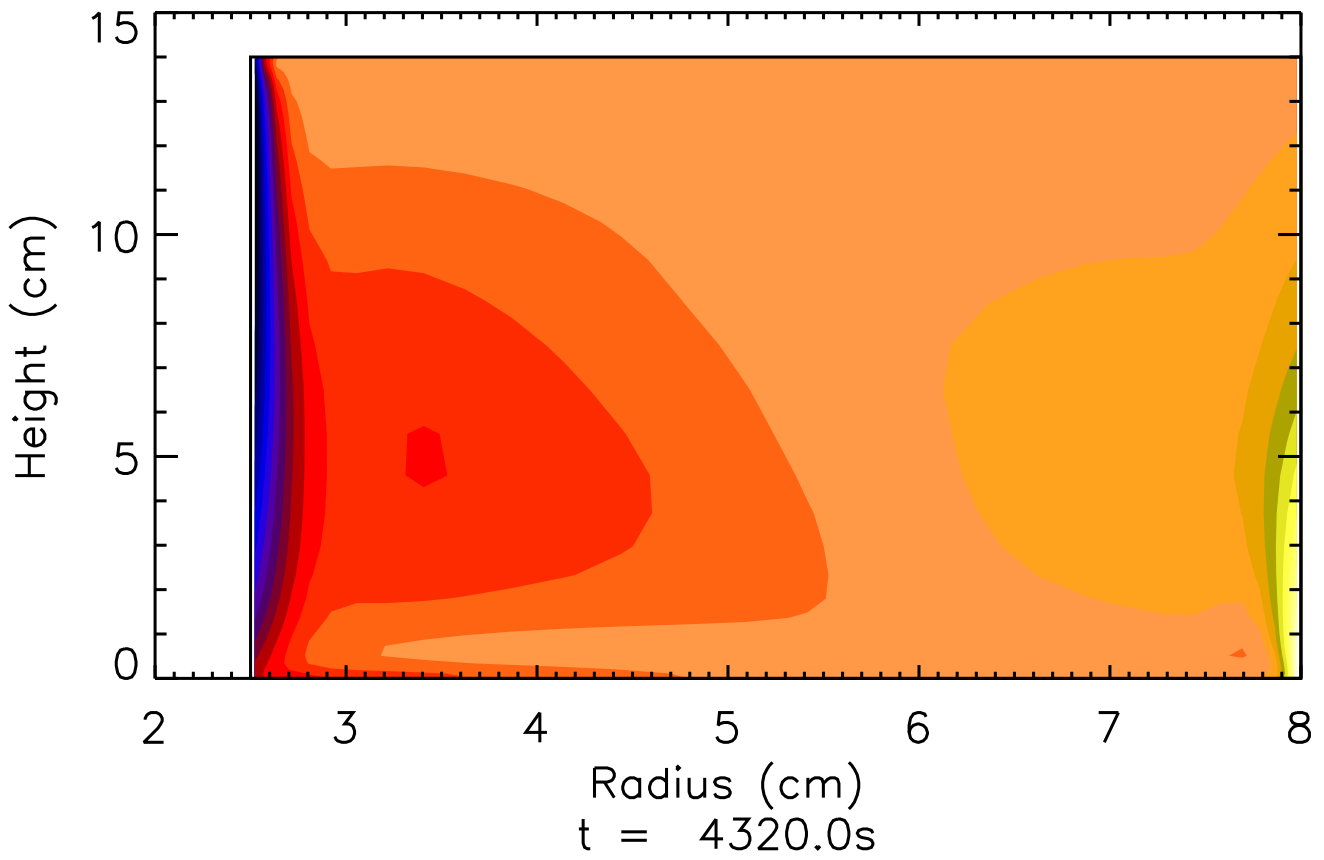
$\langle (T')^2 \rangle$



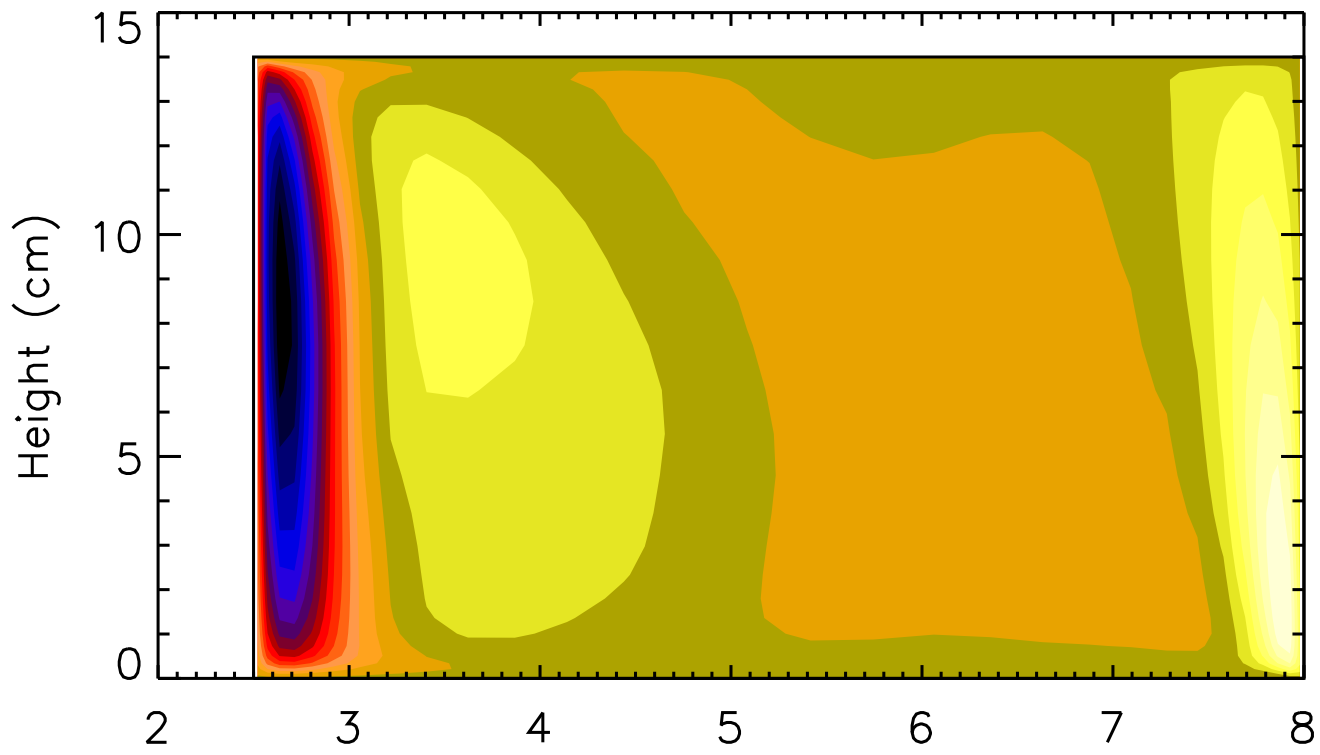
Radius (cm)
t = 4320.0s



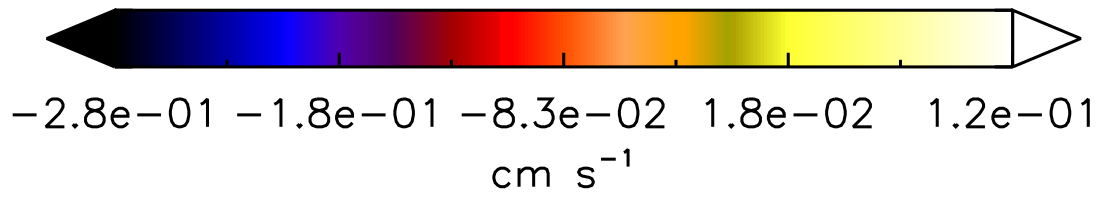
$\langle T'' \rangle$



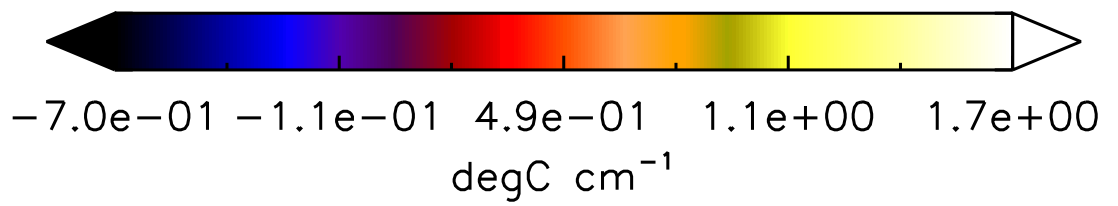
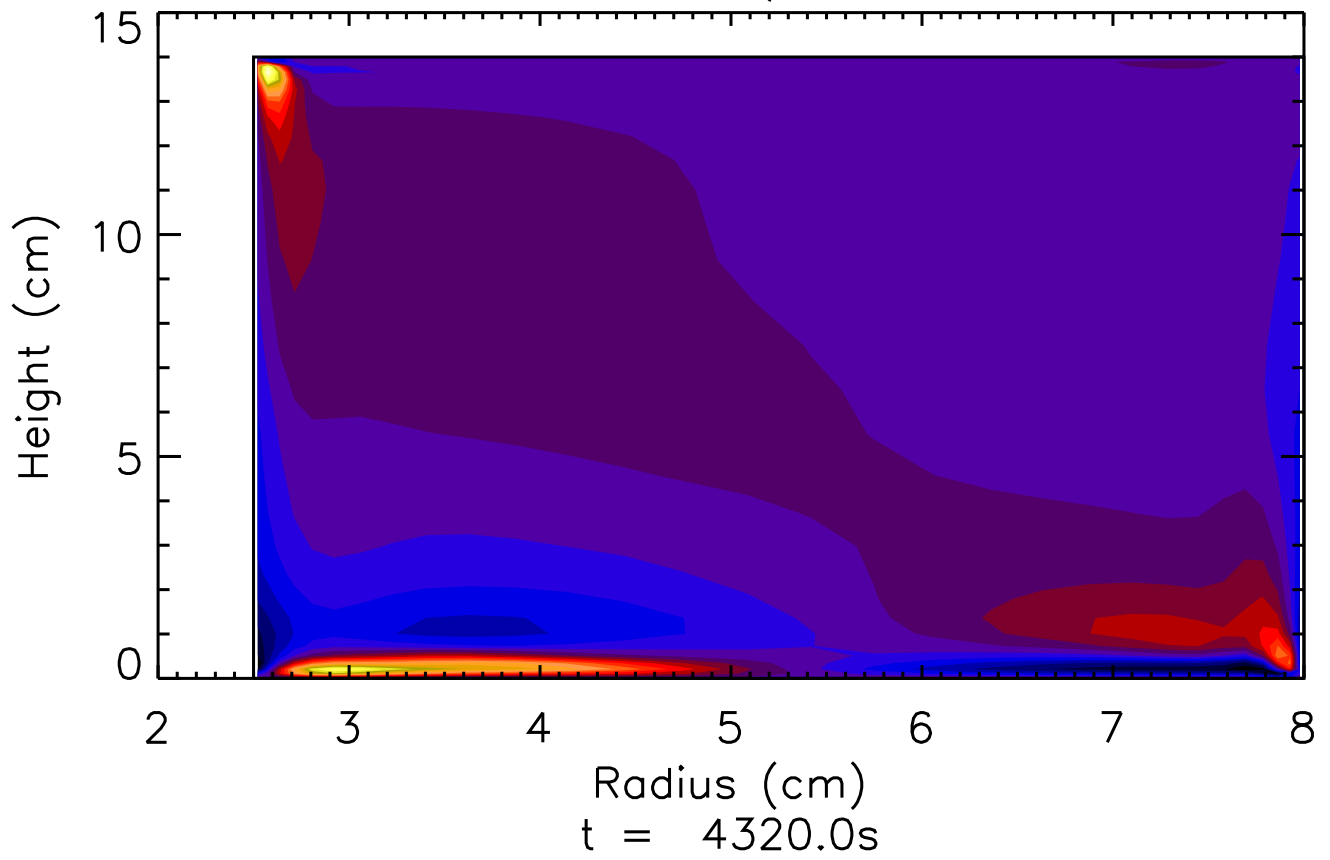
$\langle w'' \rangle$



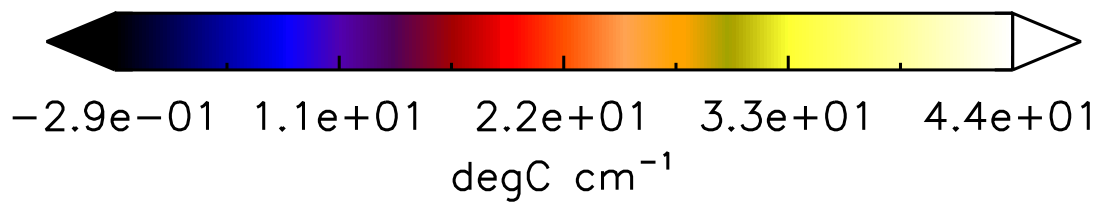
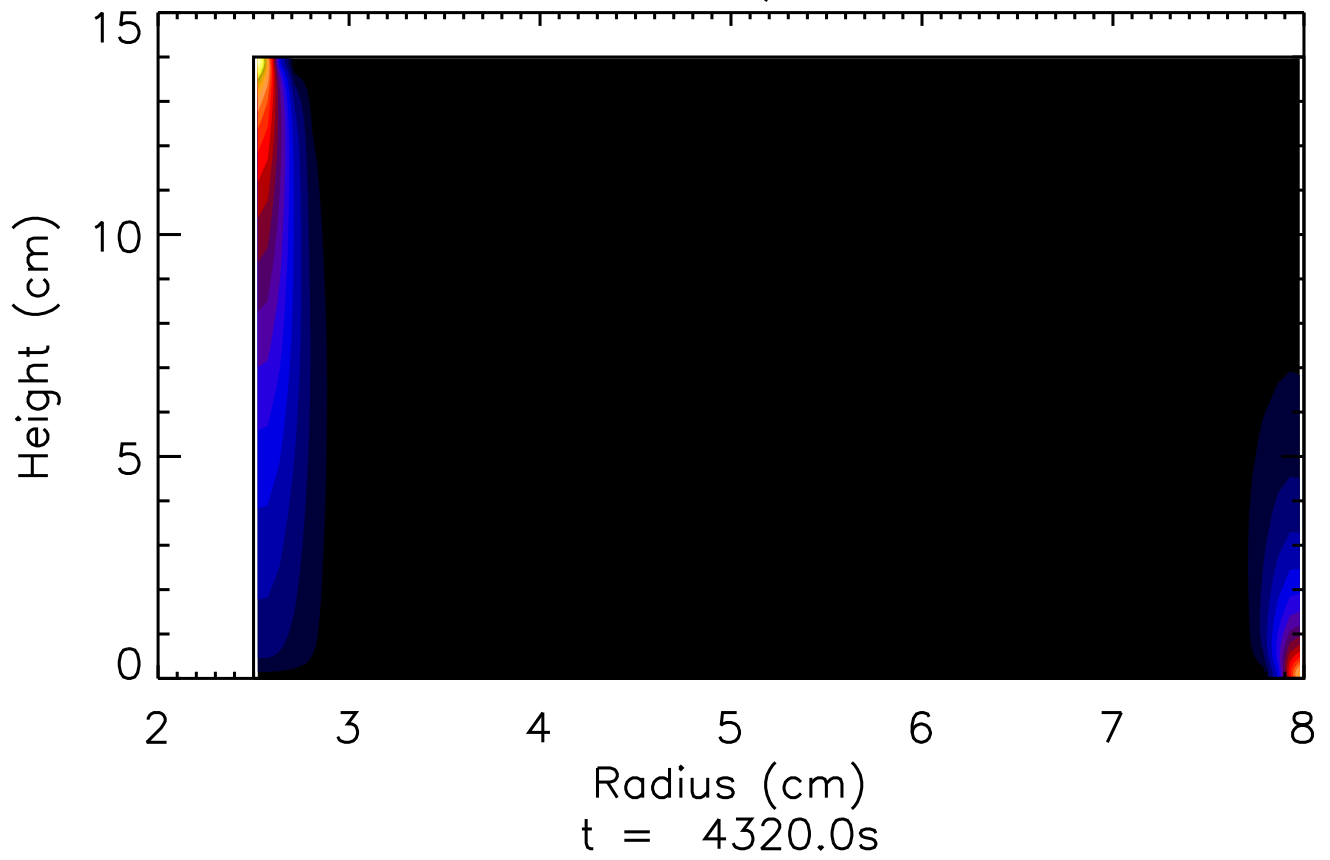
Radius (cm)
 $t = 4320.0s$



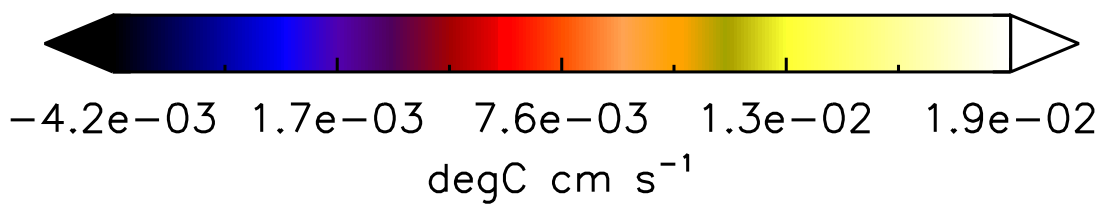
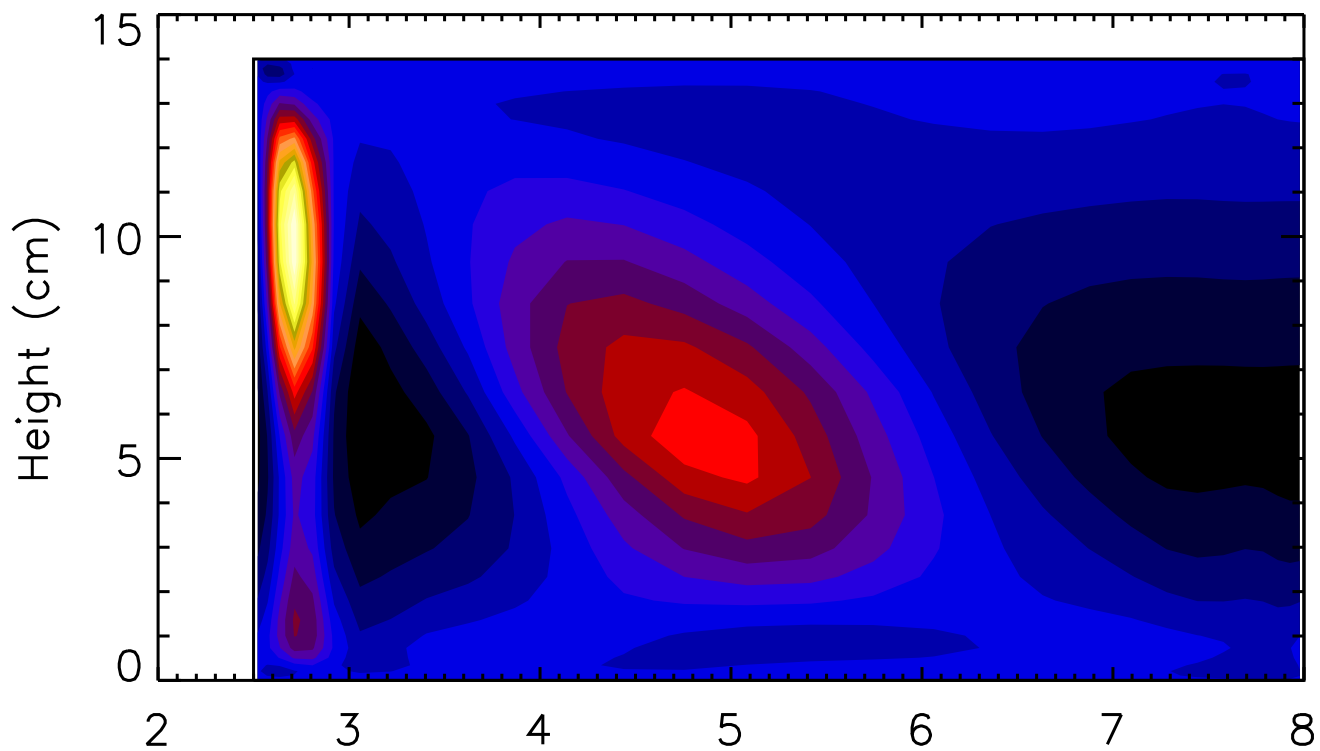
$$\partial \langle T'' \rangle / \partial z$$



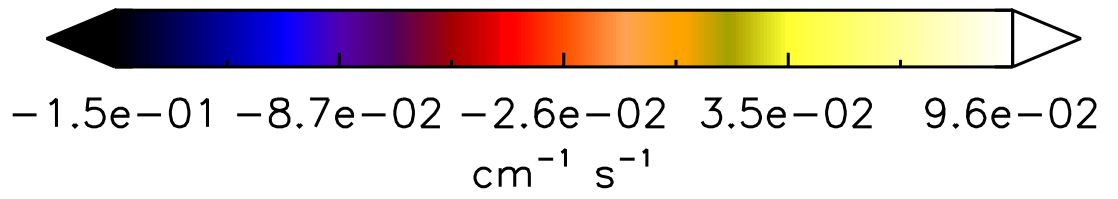
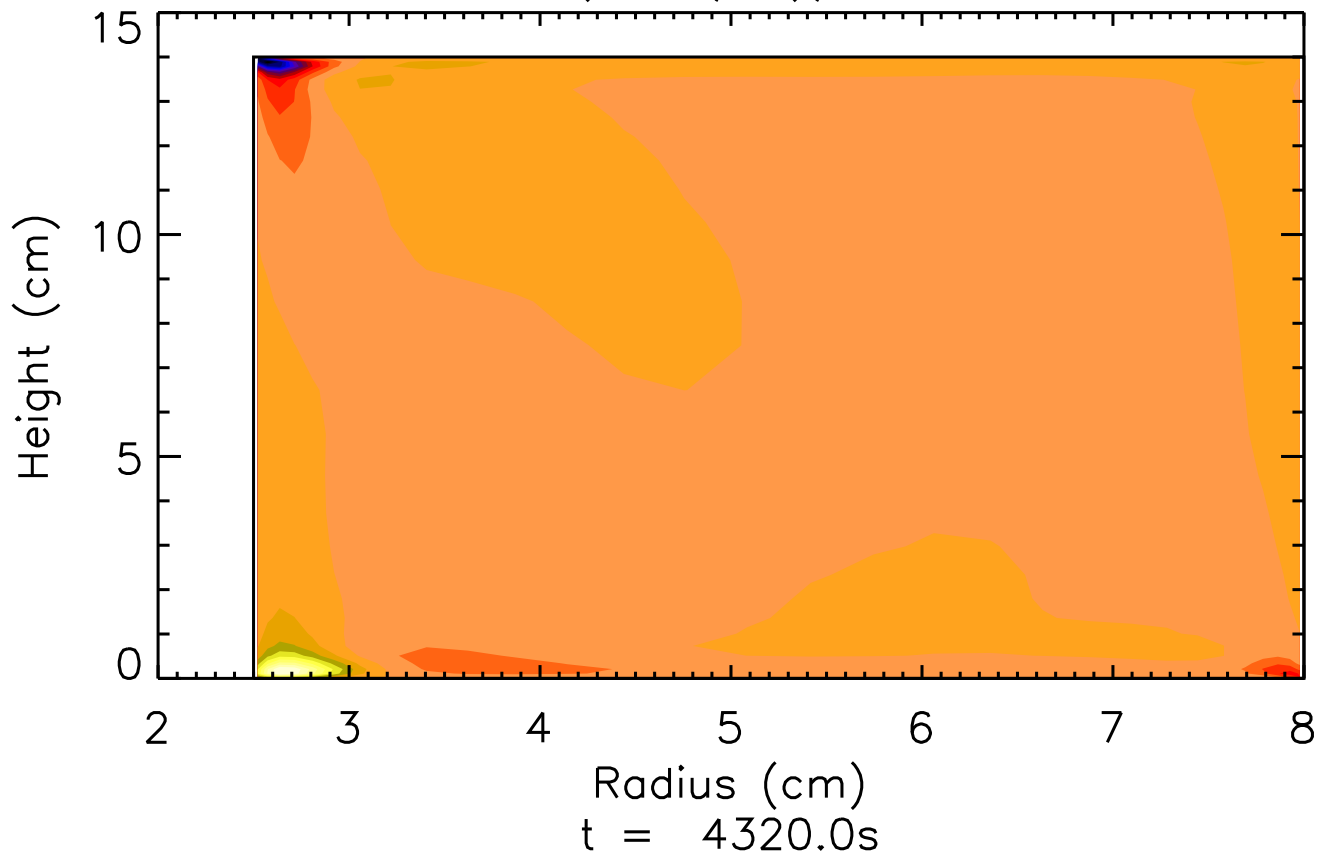
$$\partial \langle T'' \rangle / \partial R$$



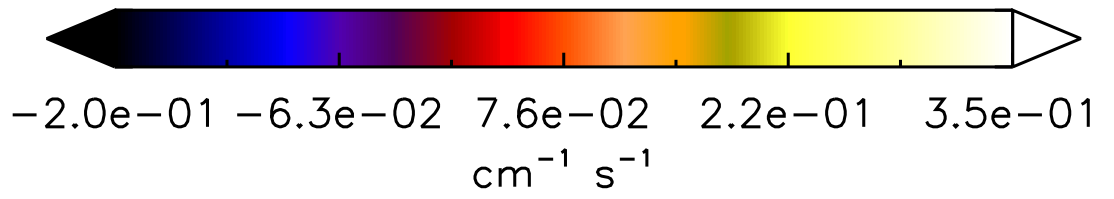
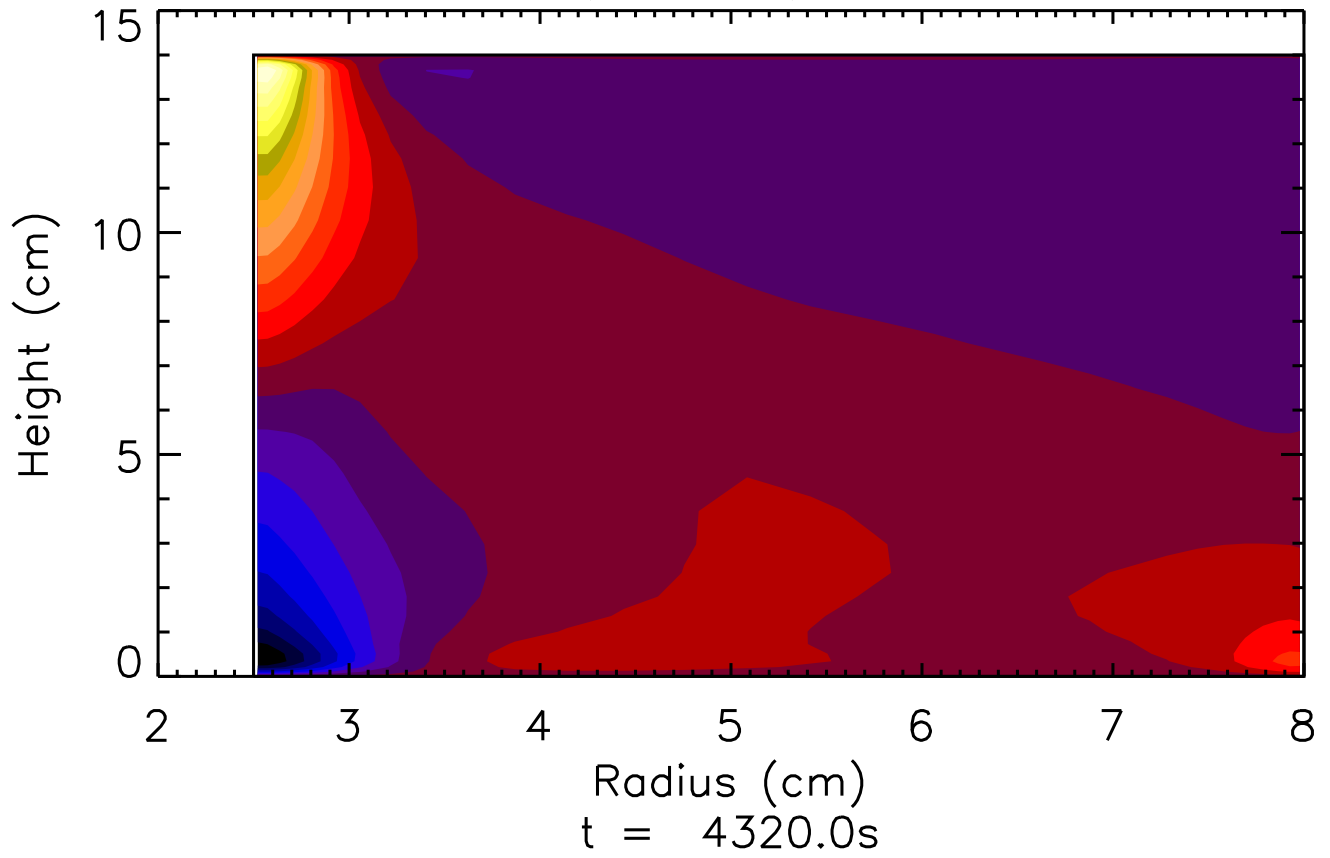
$\langle w'T' \rangle''$



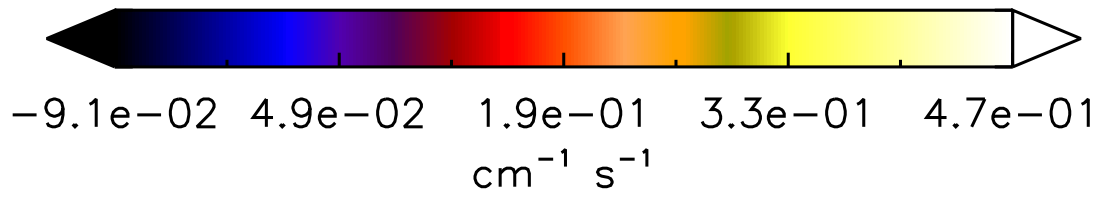
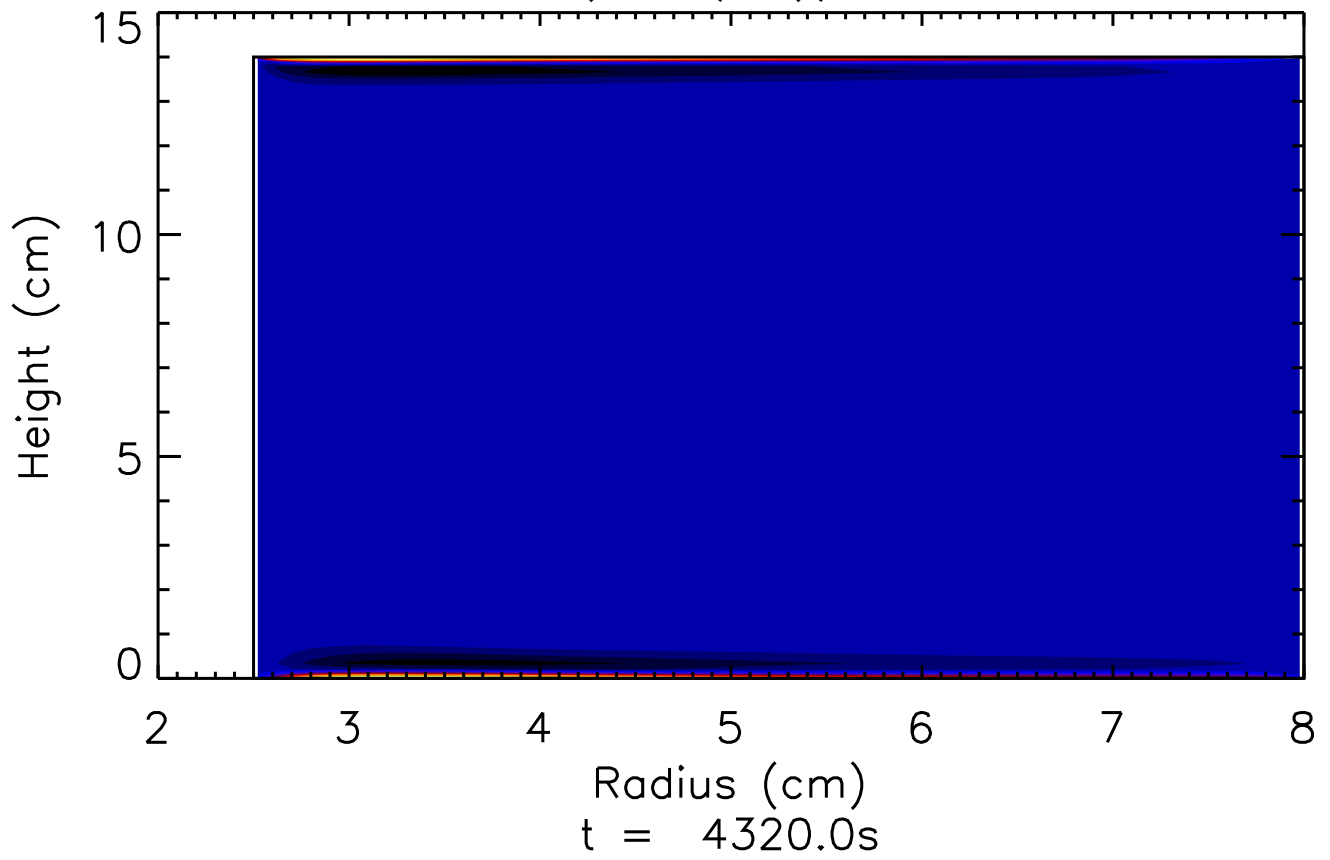
$$\partial(\langle u \rangle / R) / \partial R$$



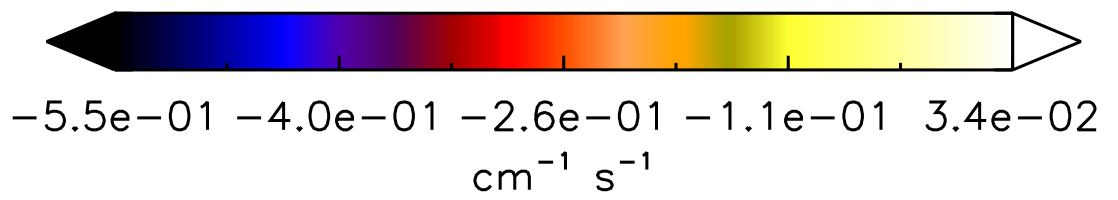
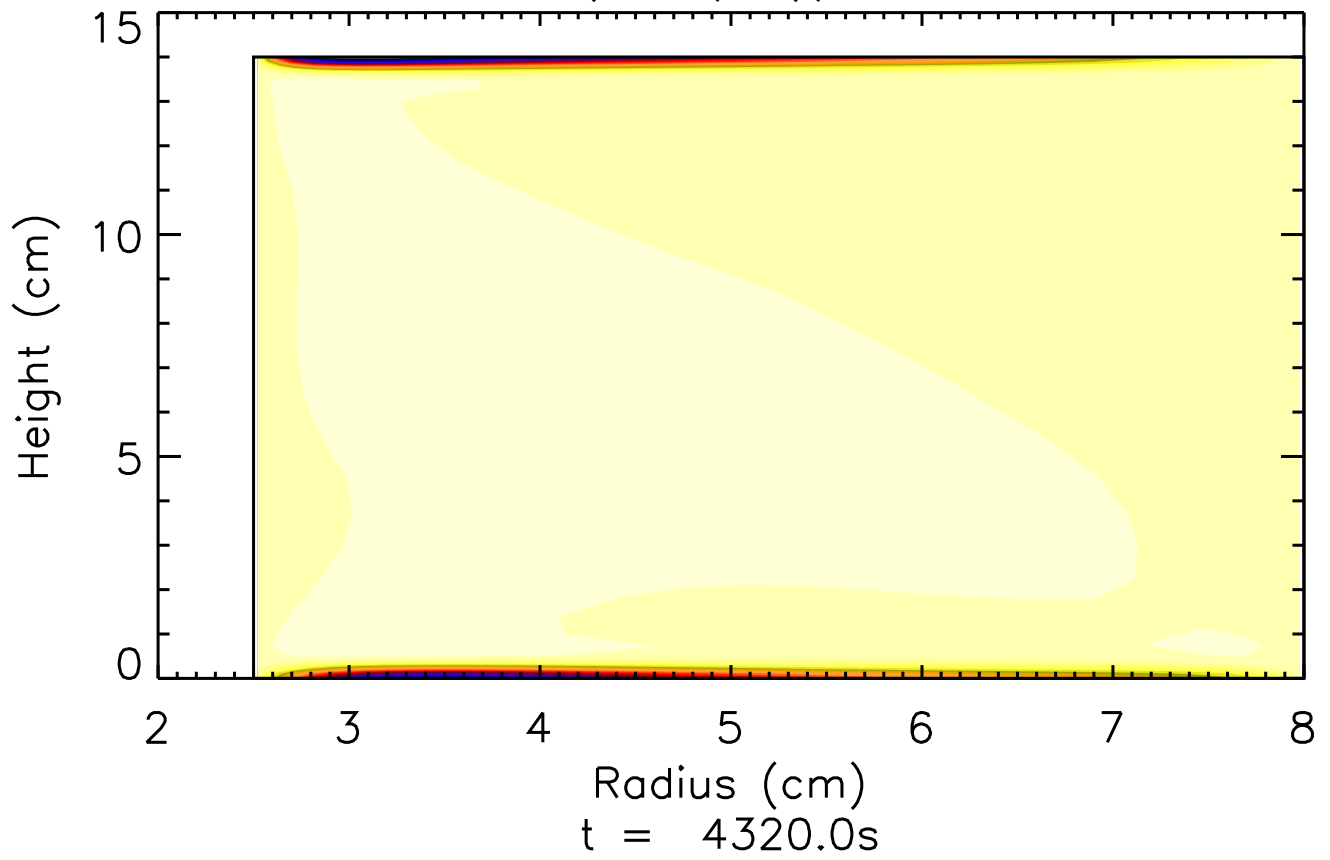
$$\partial(\langle v \rangle / R) / \partial R$$

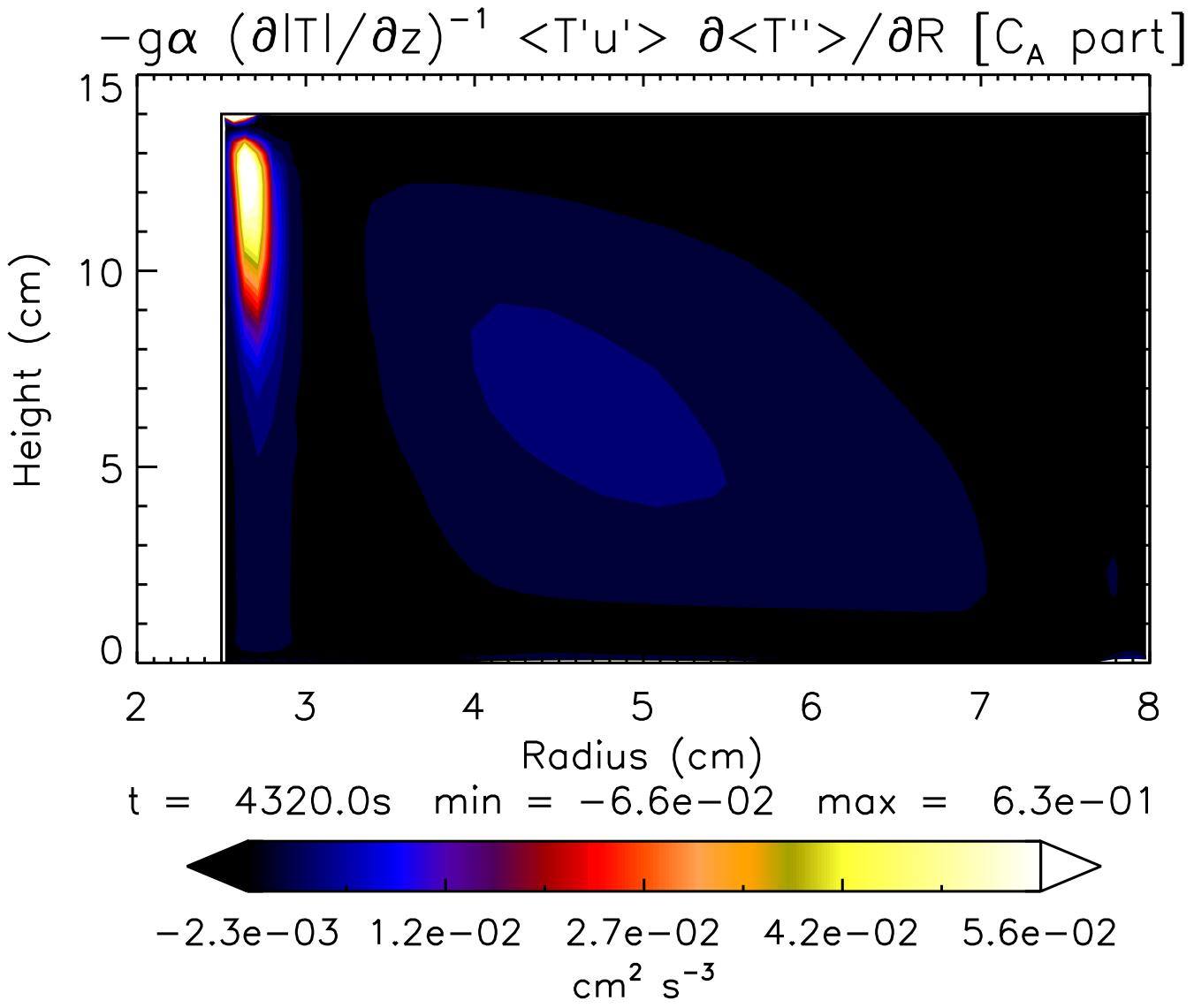


$$\partial(\langle u \rangle / R) / \partial z$$

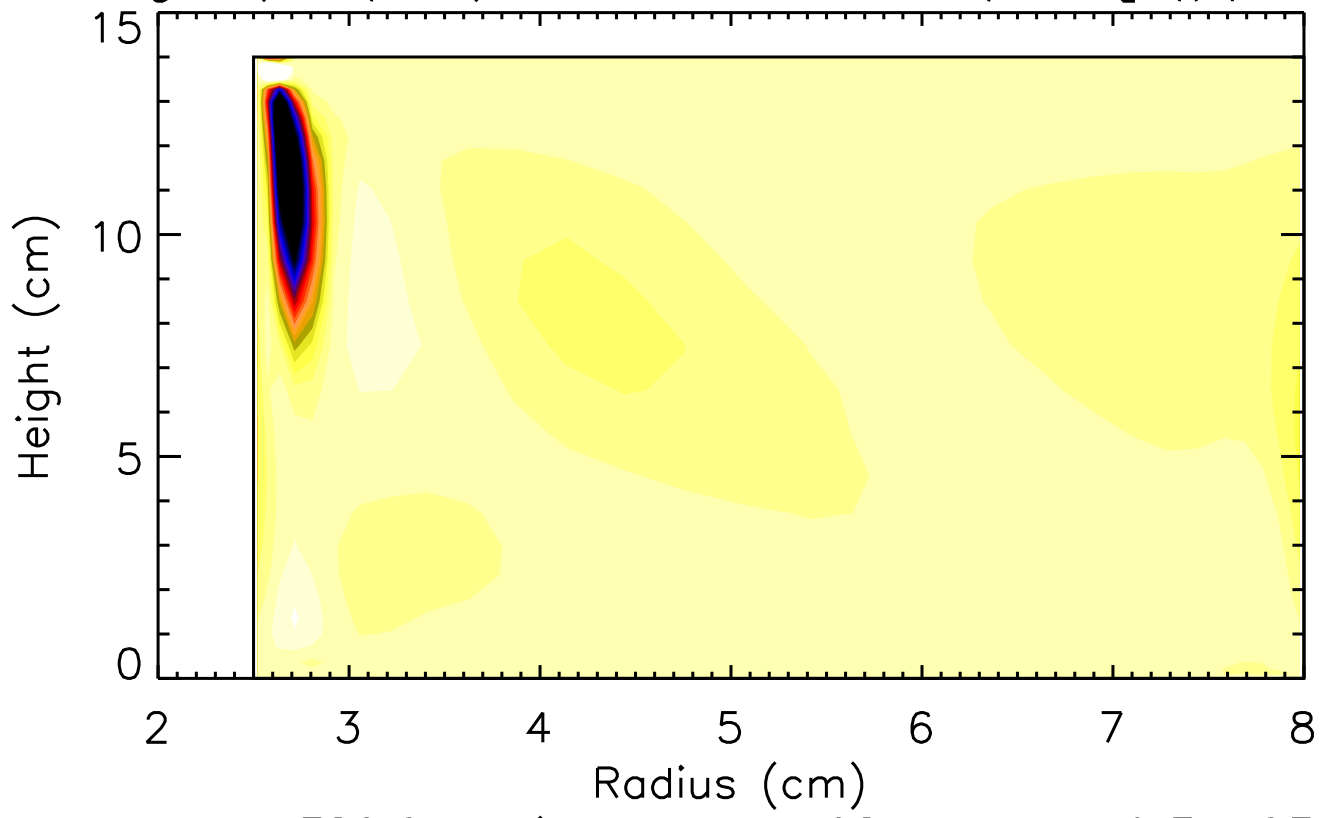


$$\partial(\langle v \rangle / R) / \partial z$$

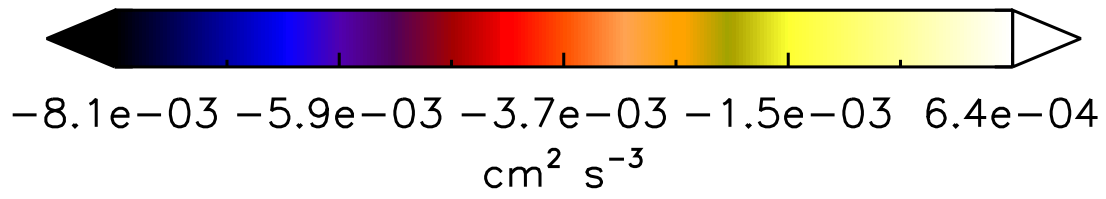




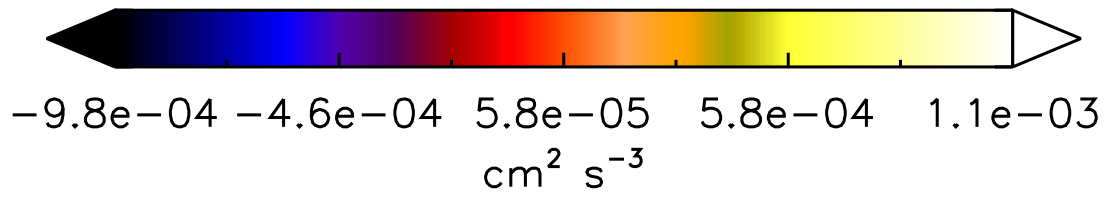
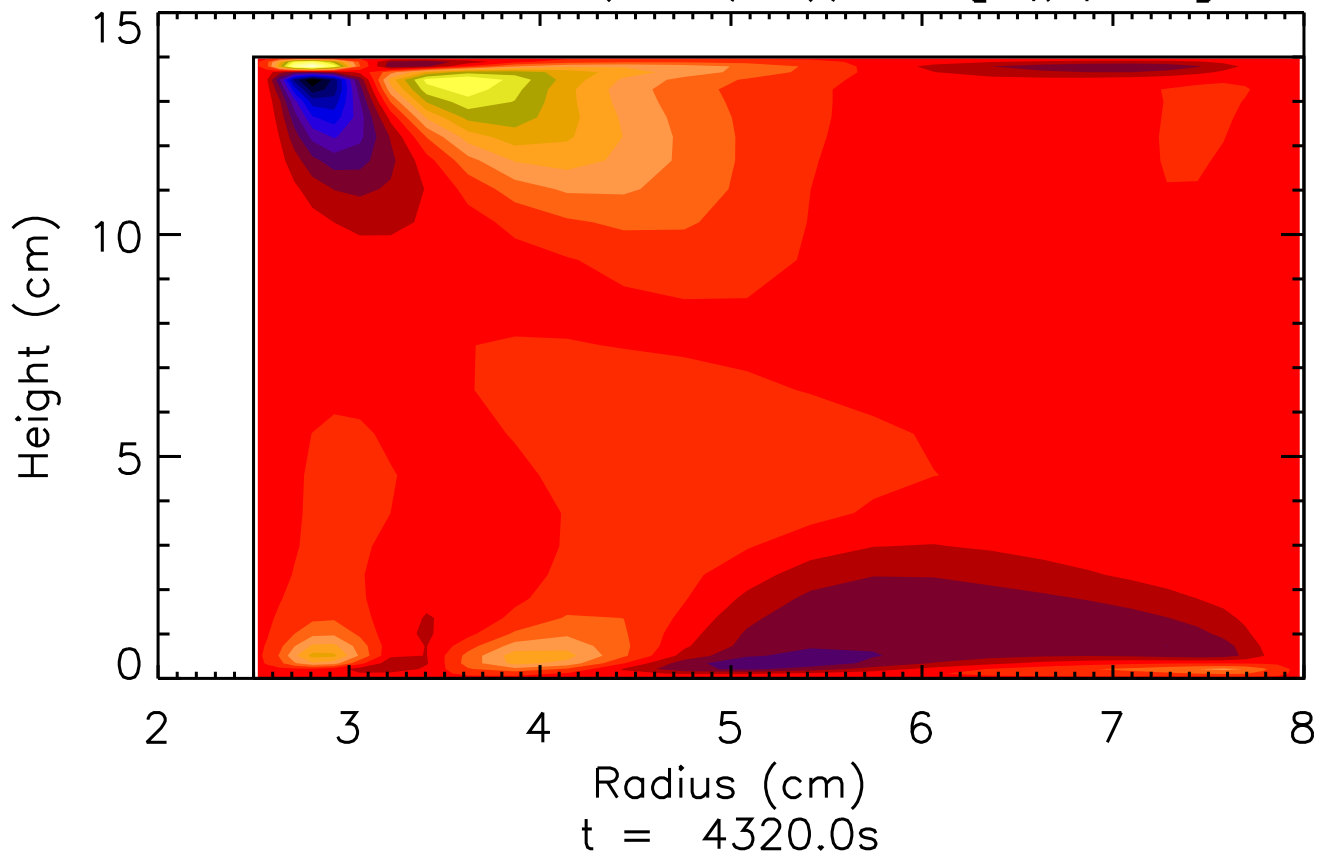
$$-g\alpha (\partial|T|/\partial z)^{-1} \langle T'w' \rangle'' \partial \langle T'' \rangle / \partial z \text{ [C}_A \text{ part]}$$



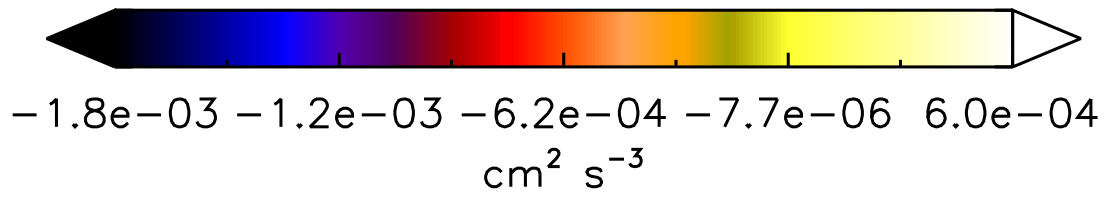
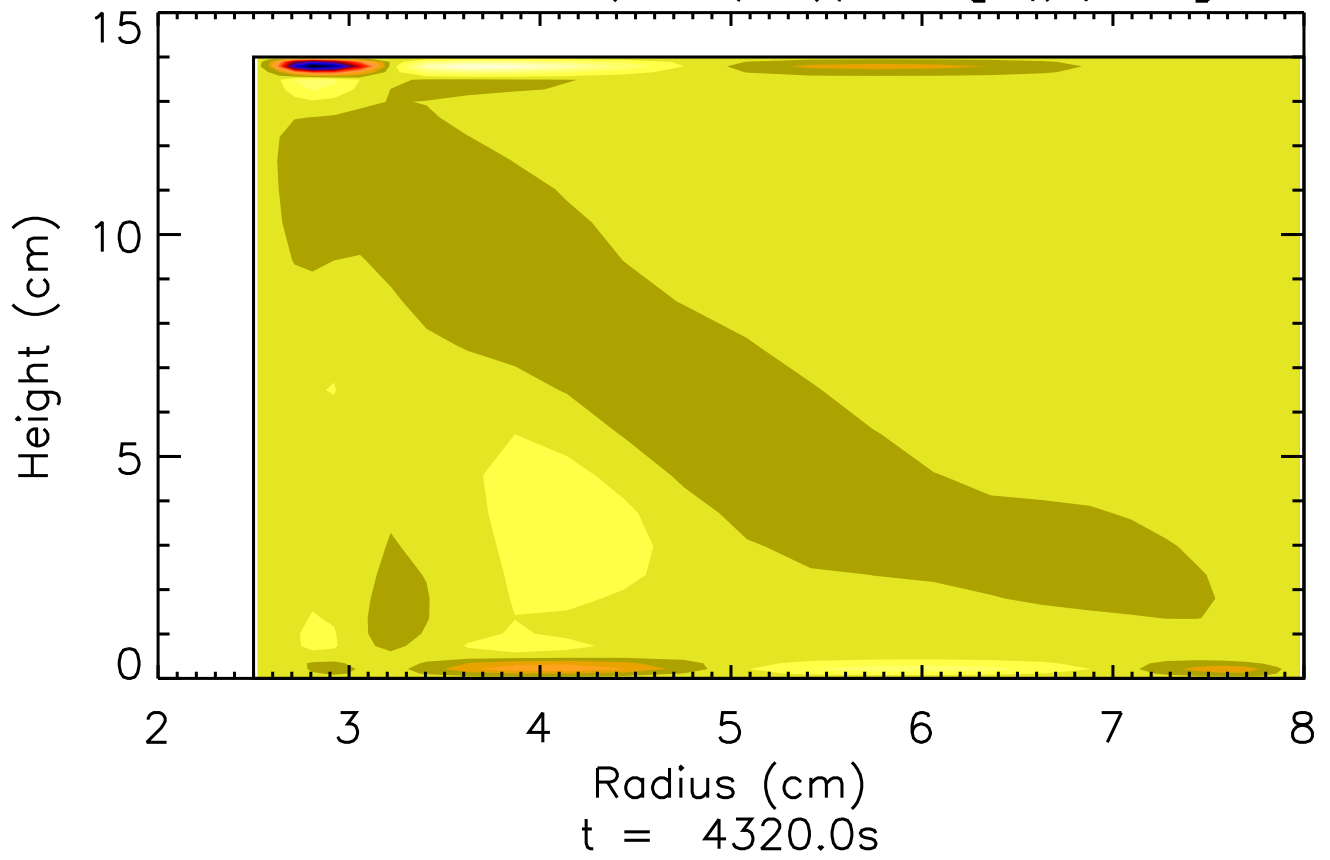
t = 4320.0s min = $-1.1e-02$ max = $9.3e-03$



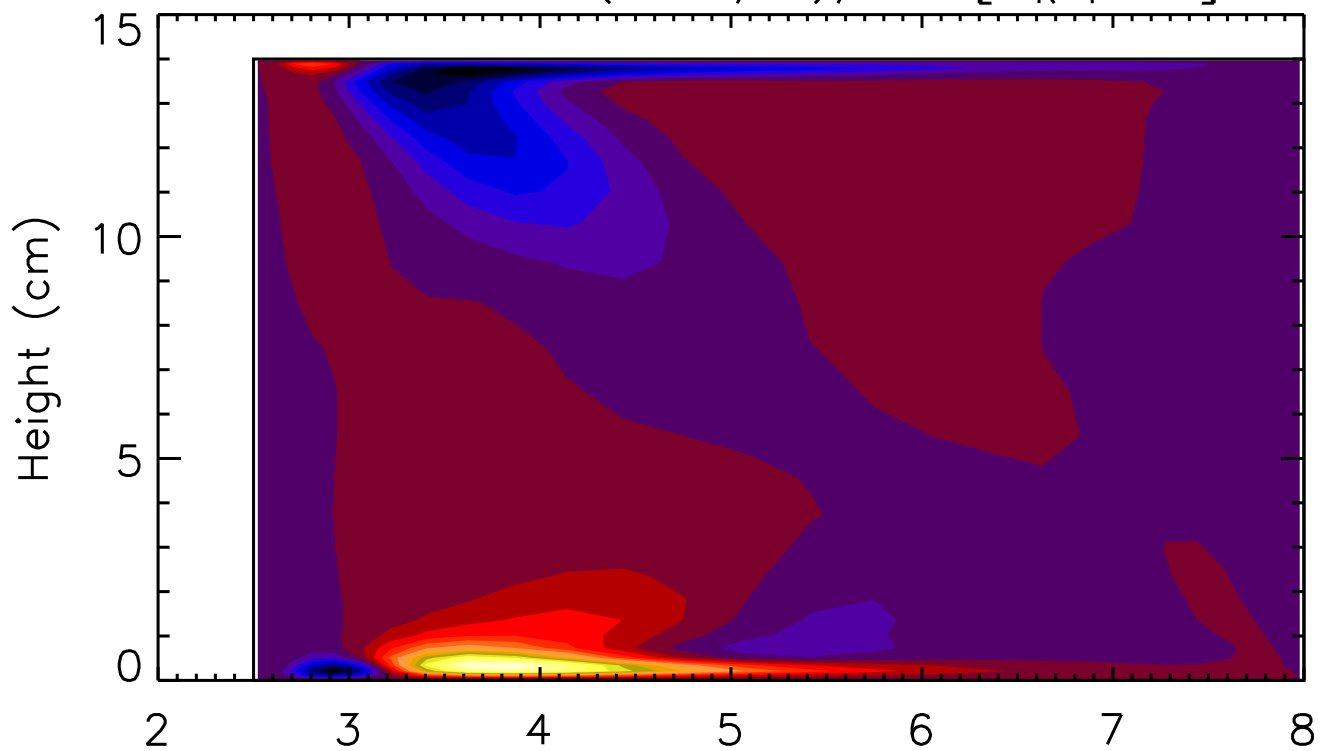
$$-R \langle u'v' \rangle \frac{\partial(\langle v \rangle / R)}{\partial R} [C_k \text{ part}]$$



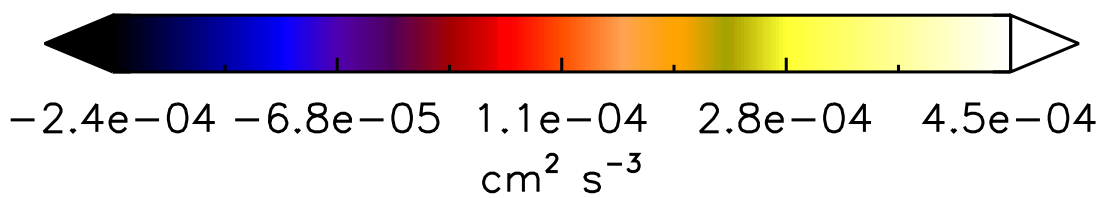
$$-R \langle v'w' \rangle \frac{\partial \langle v \rangle / R}{\partial z} [C_k \text{ part}]$$



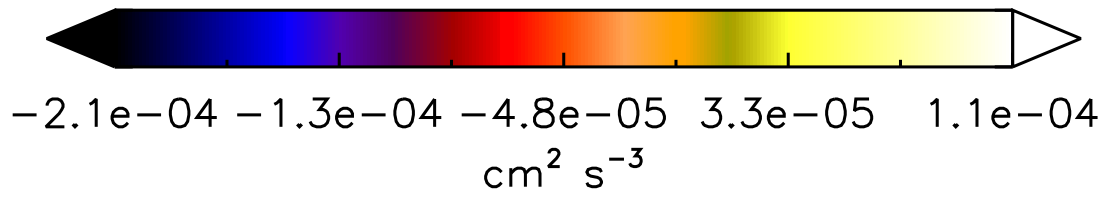
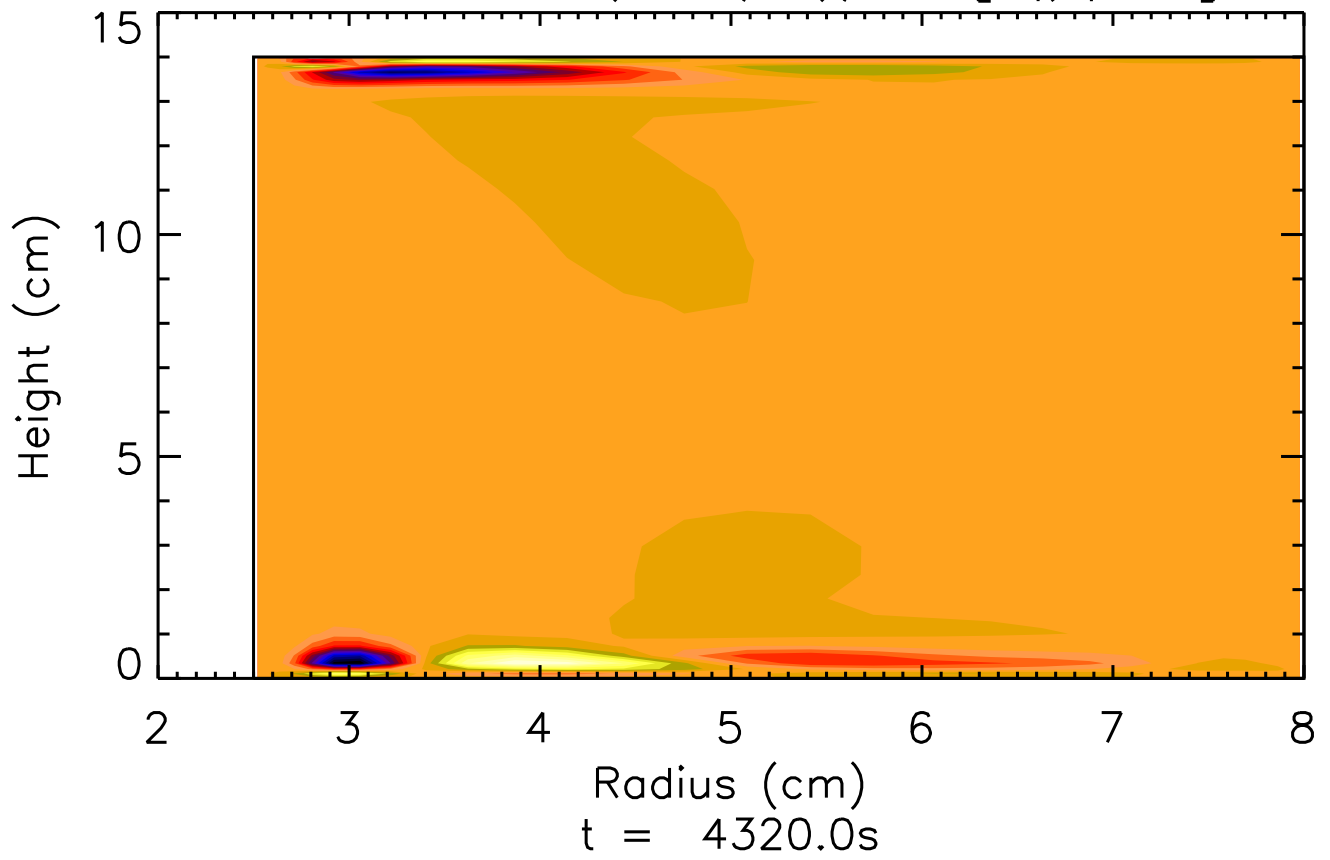
$$-R \langle u'u' \rangle \frac{\partial(\langle u \rangle / R)}{\partial R} [C_k \text{ part}]$$

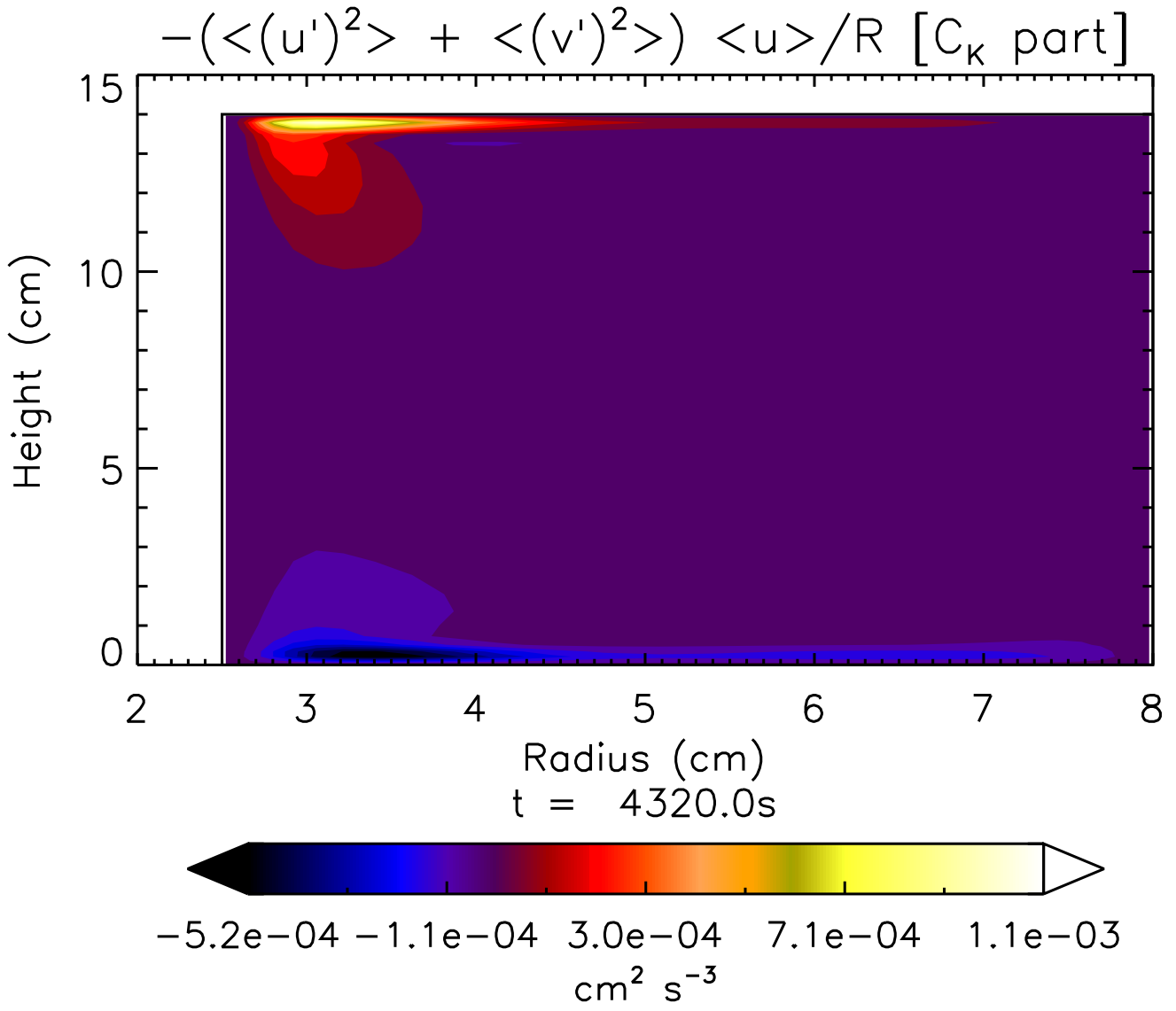


Radius (cm)
t = 4320.0s

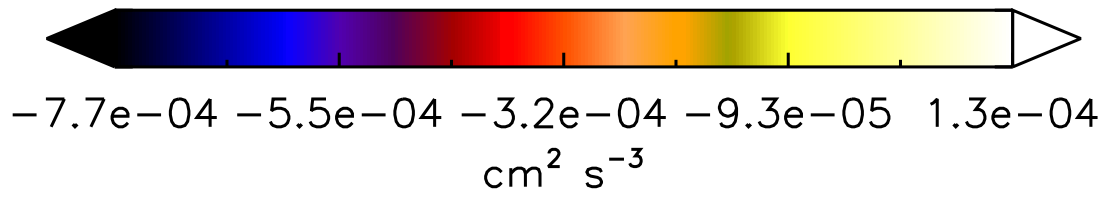
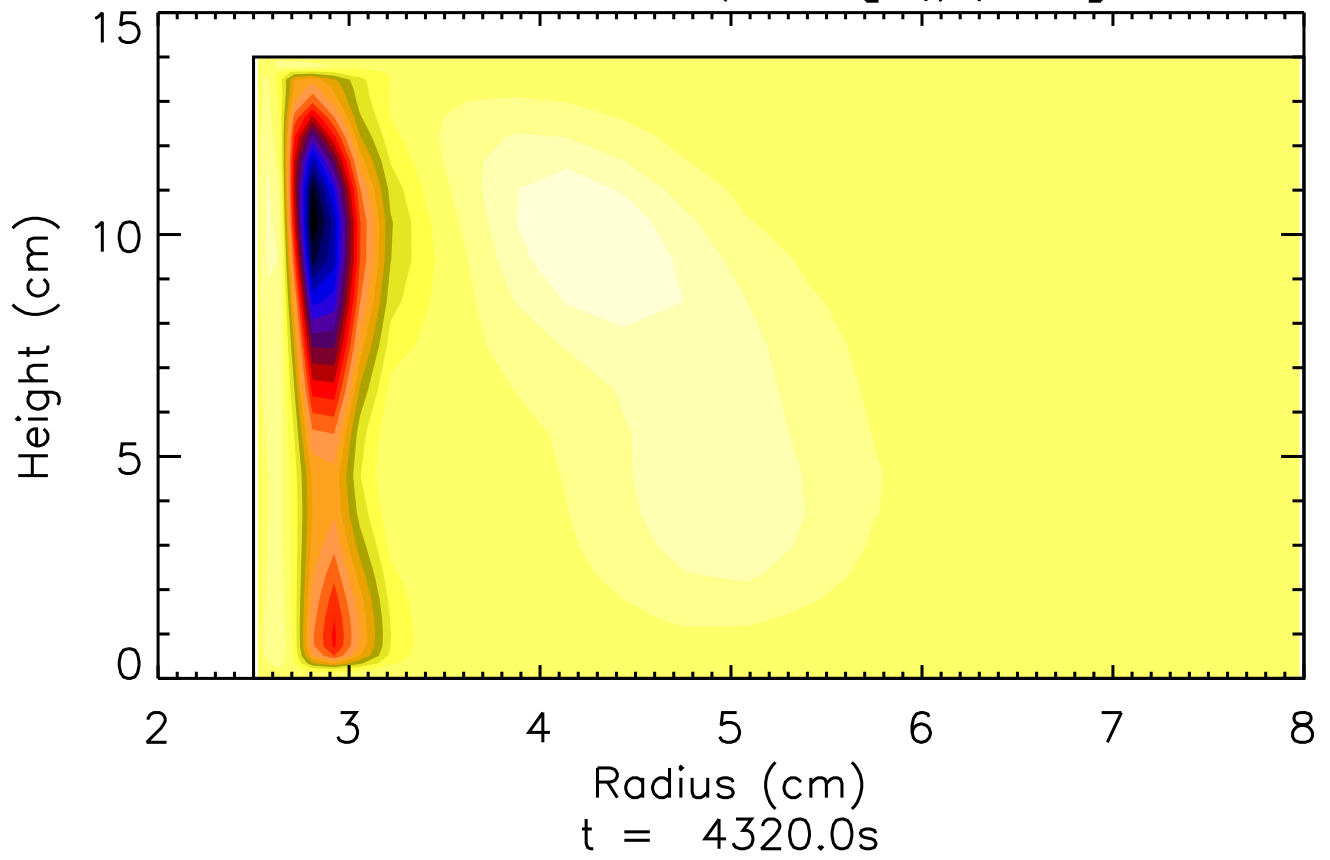


$-R \langle u'w' \rangle \partial(\langle u \rangle / R) / \partial z$ [C_k part]

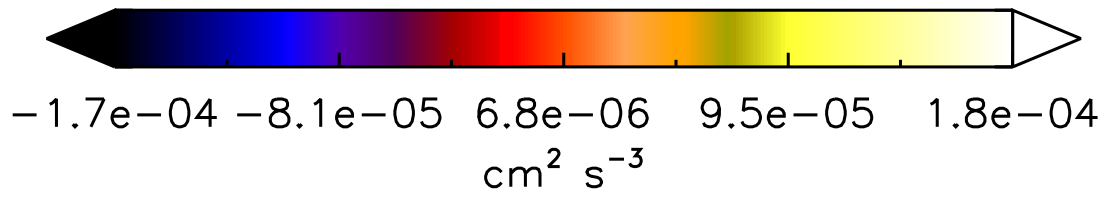
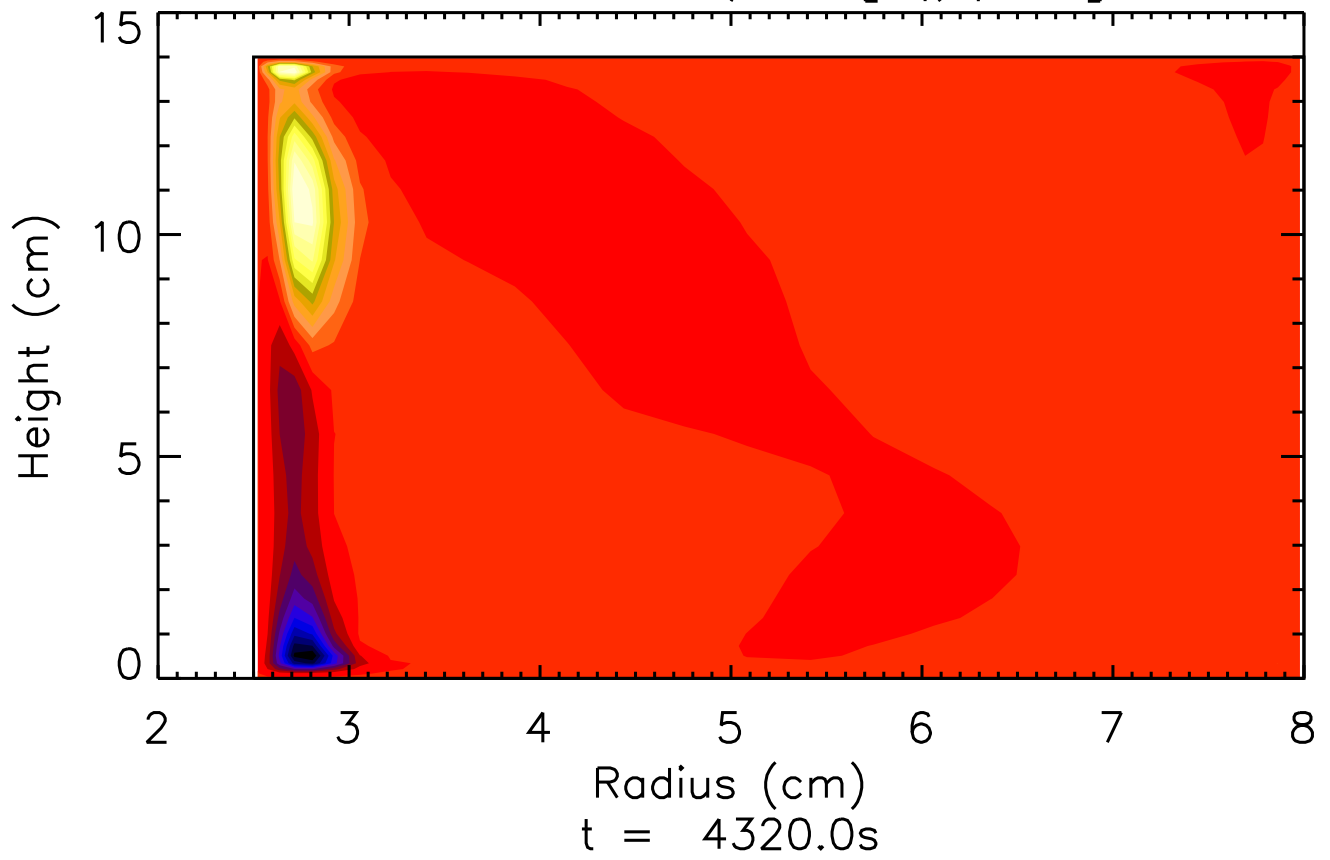




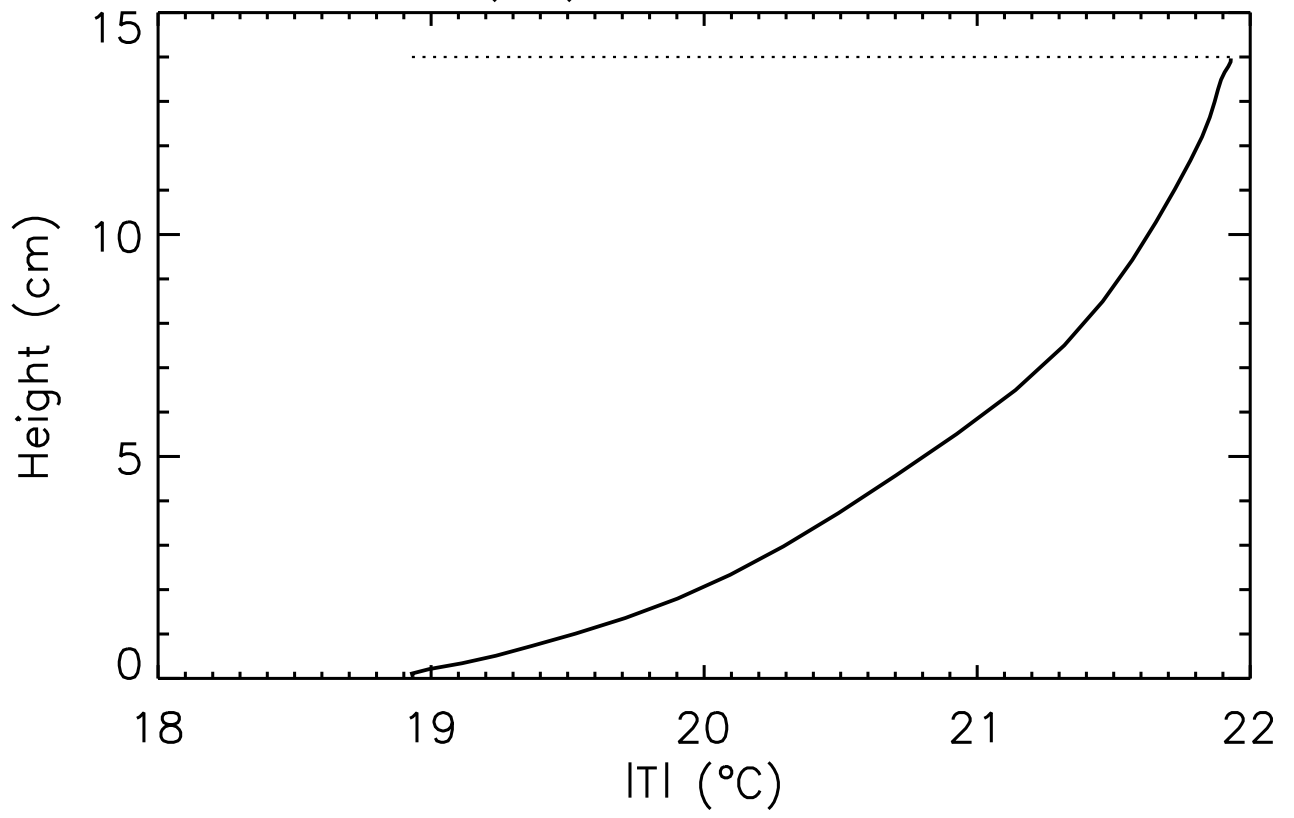
$\langle u'w' \rangle \partial \langle w \rangle / \partial R$ [C_k part]



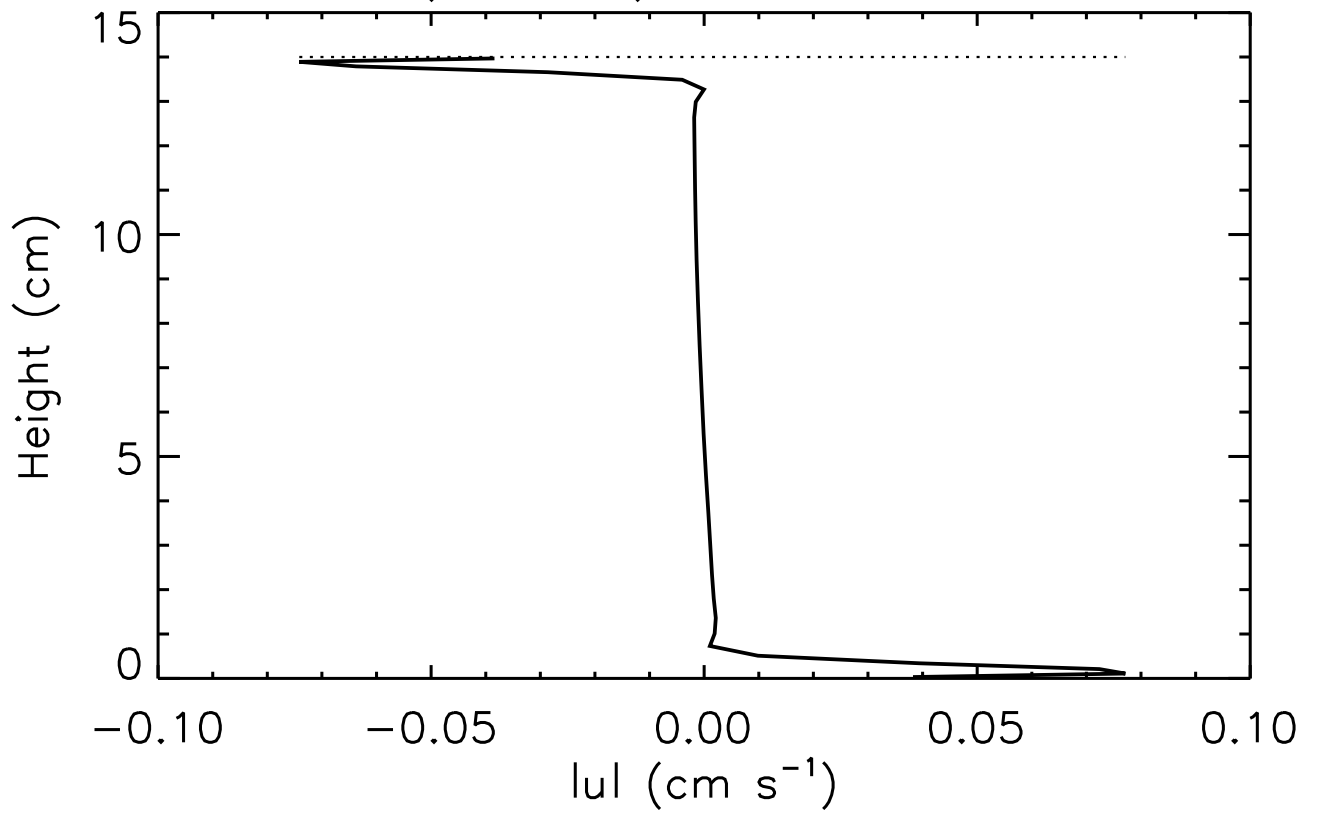
$\langle w'w' \rangle \partial \langle w \rangle / \partial z$ [C_K part]



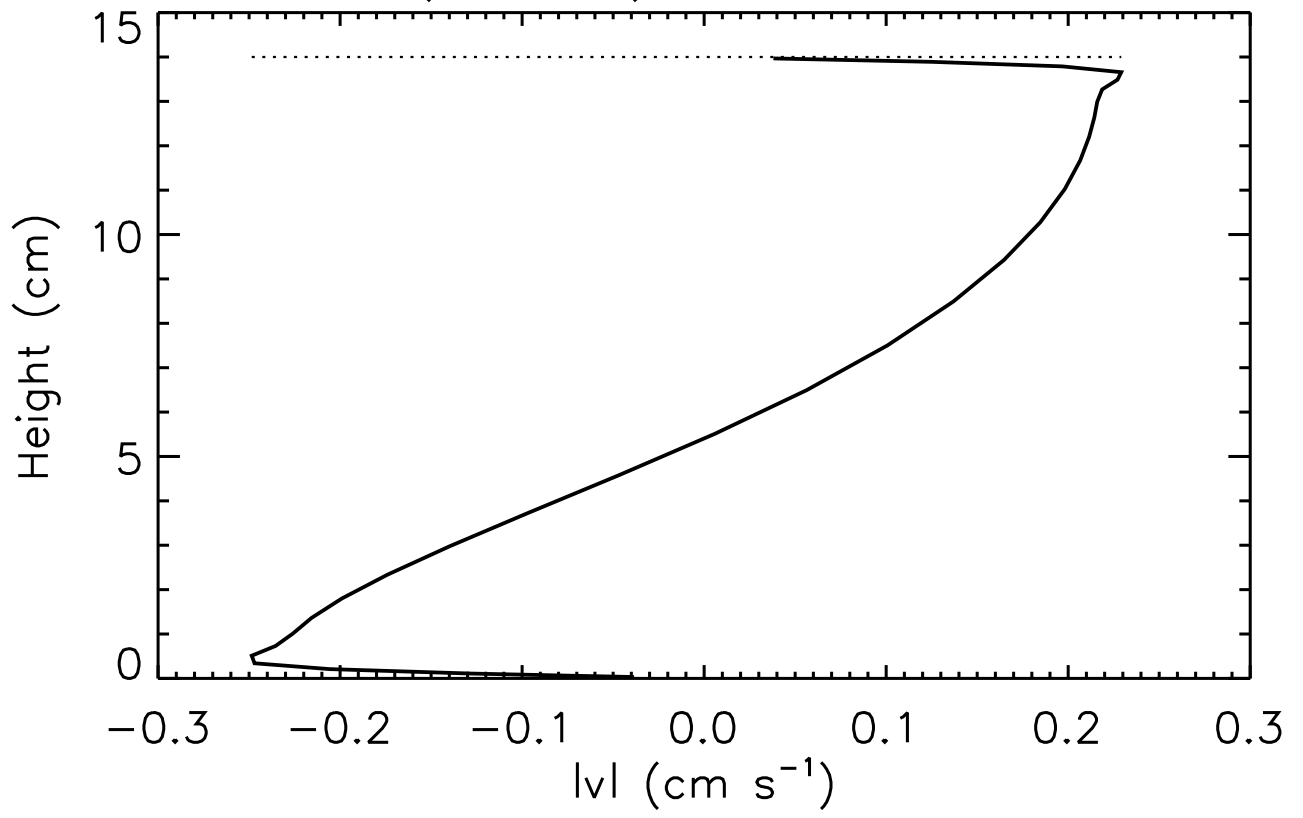
ITI (°C) t = 4320.0s



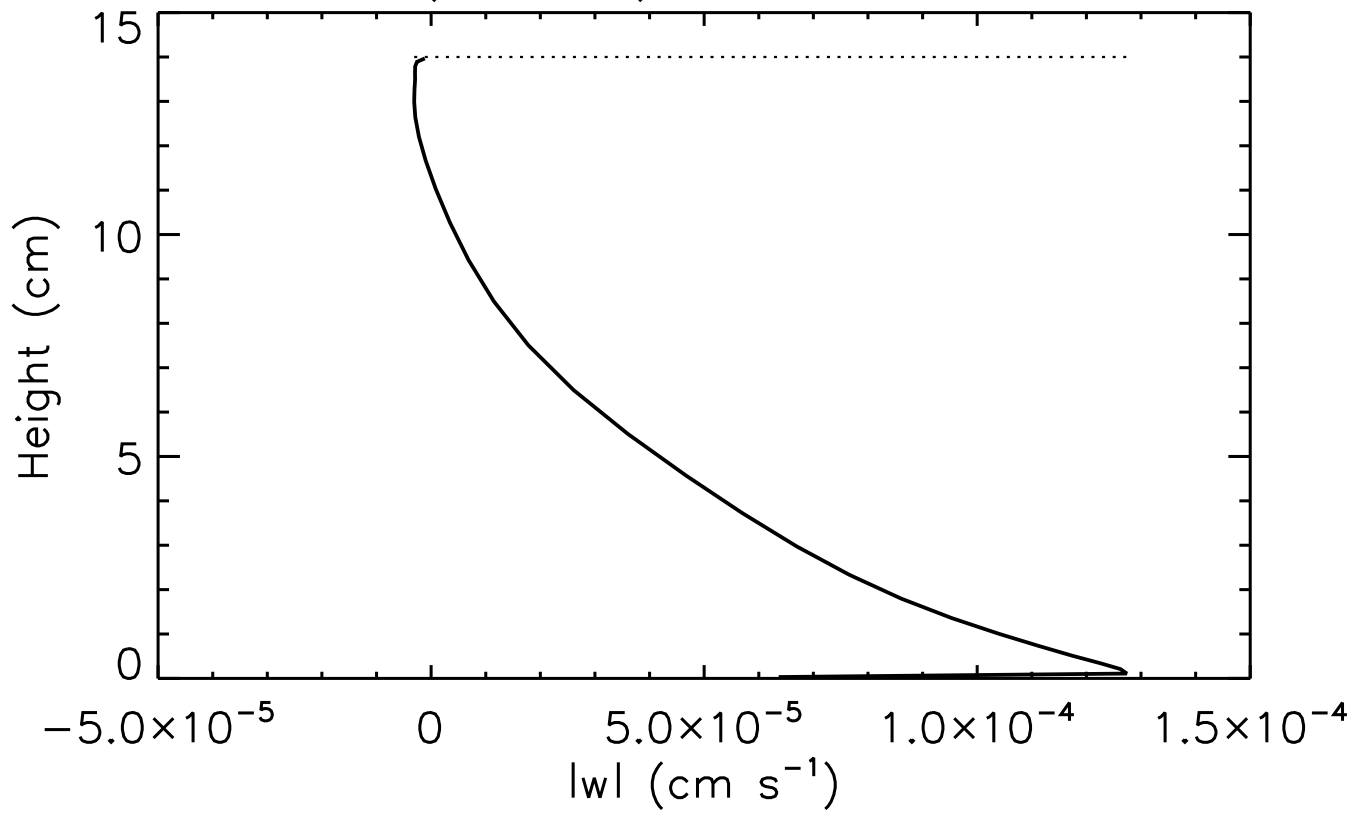
$|\text{ul}| \text{ (cm s}^{-1}\text{)} \quad t = 4320.0\text{s}$



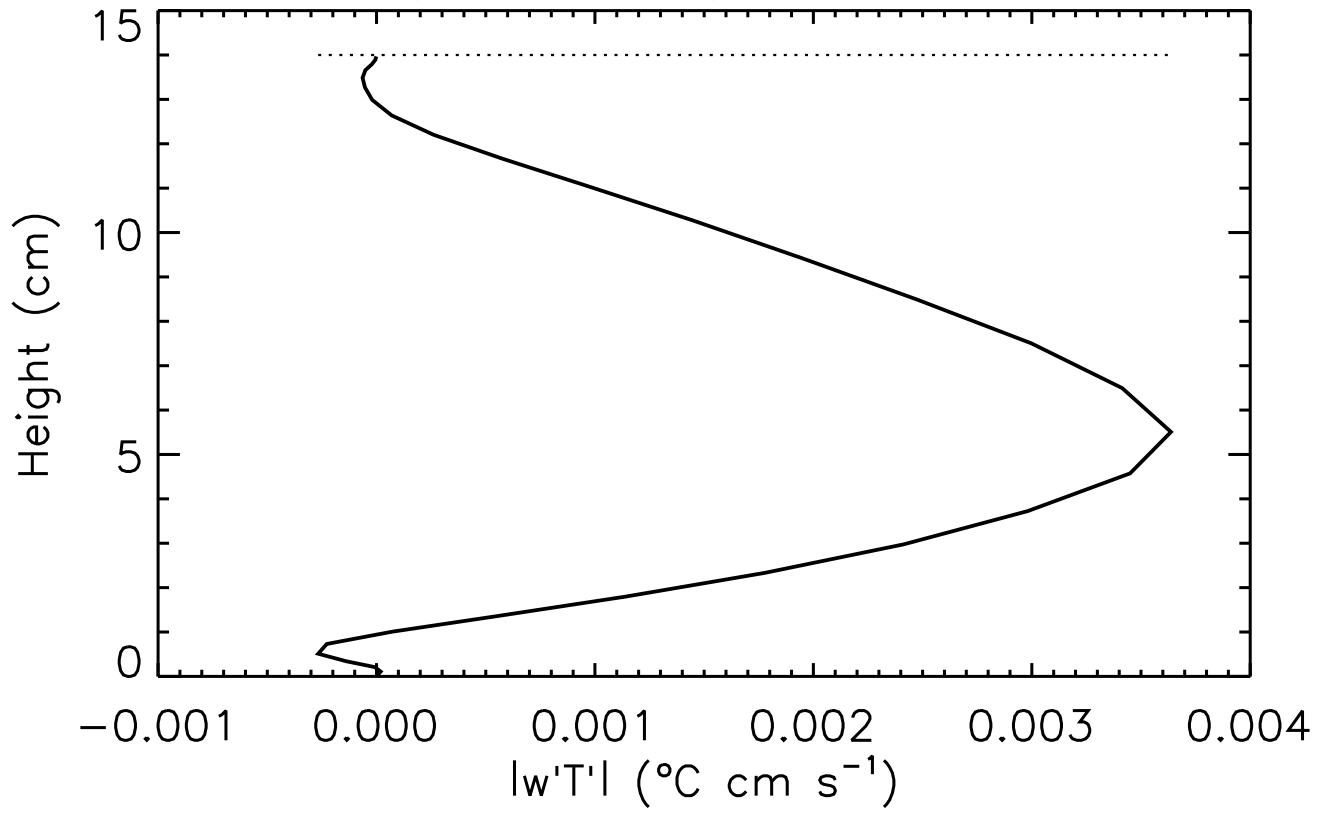
lv_l (cm s^{-1}) $t = 4320.0\text{s}$



$|\omega|$ (cm s⁻¹) t = 4320.0s



$|w'T'|$ ($^{\circ}\text{C cm s}^{-1}$) $t = 4320.0\text{s}$



$\partial|T|/\partial z$ ($^{\circ}\text{C cm}^{-1}$) $t = 4320.0\text{s}$

