

MC3E Time-Height Profile Observations

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Oct 15, 2013

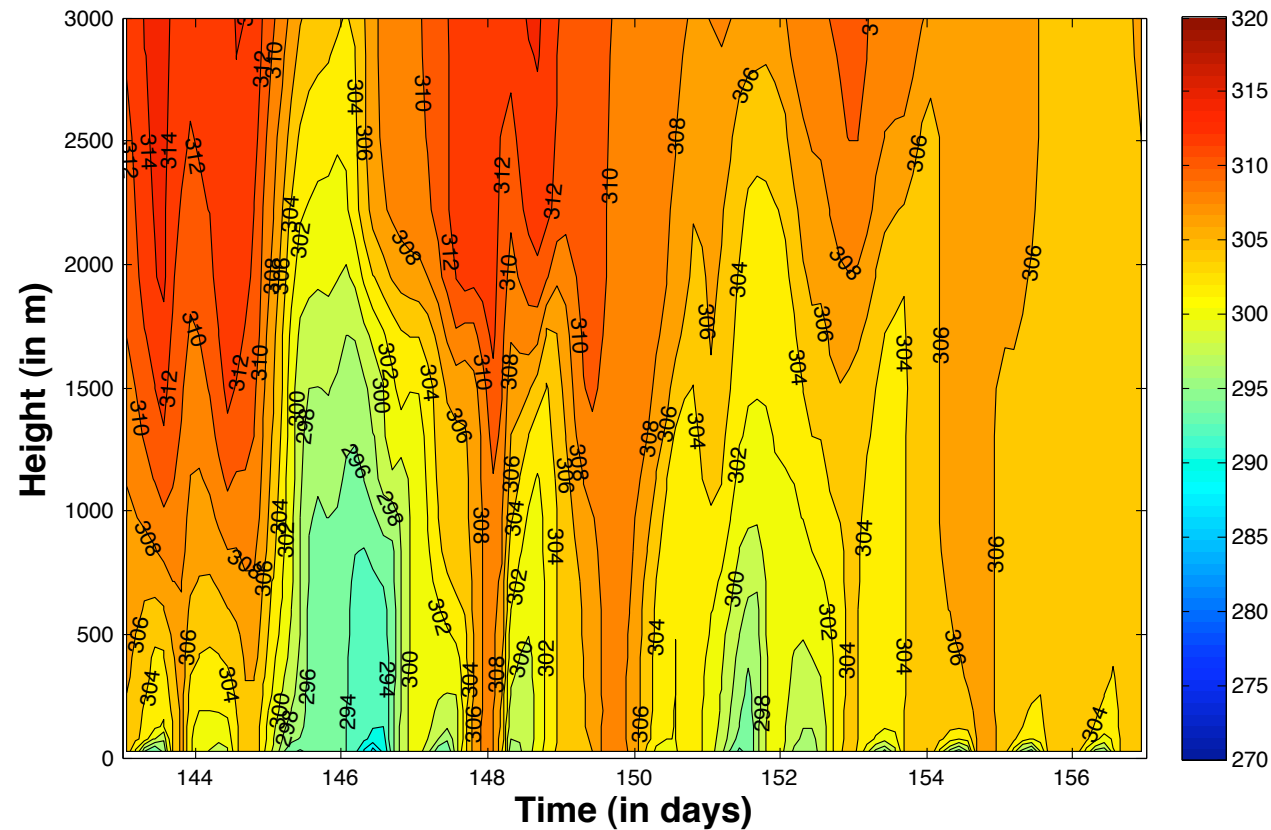
Figures from

[http://home.chpc.utah.edu/~u0652833/
SAM_MC3Eplots/timeheight_crosssections/](http://home.chpc.utah.edu/~u0652833/SAM_MC3Eplots/timeheight_crosssections/)

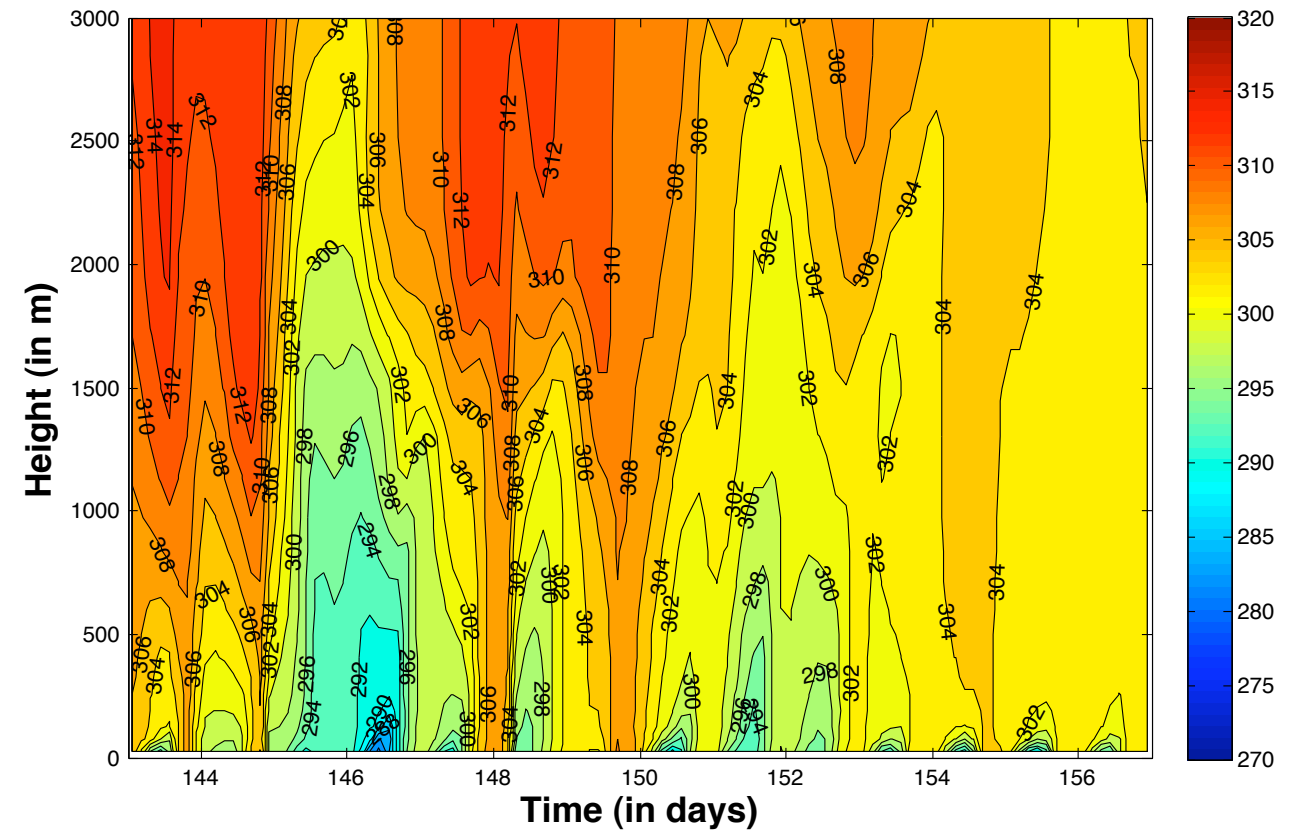
Theta

- 1. Generally, the SHOC profiles have similar structure as no-SHOC profiles. (308a_theta, 208a_theta)

Run 308a θ

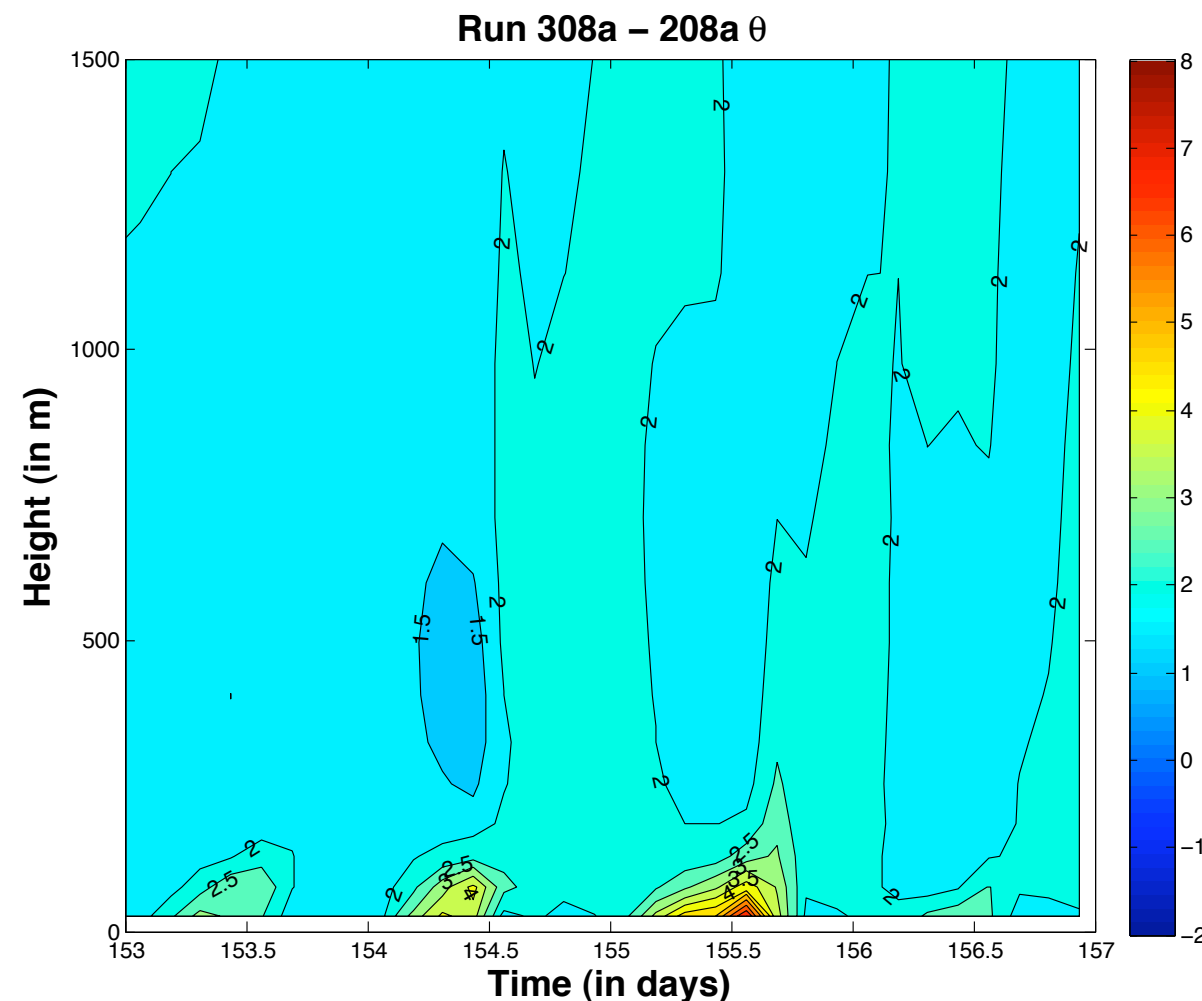


Run 208a θ



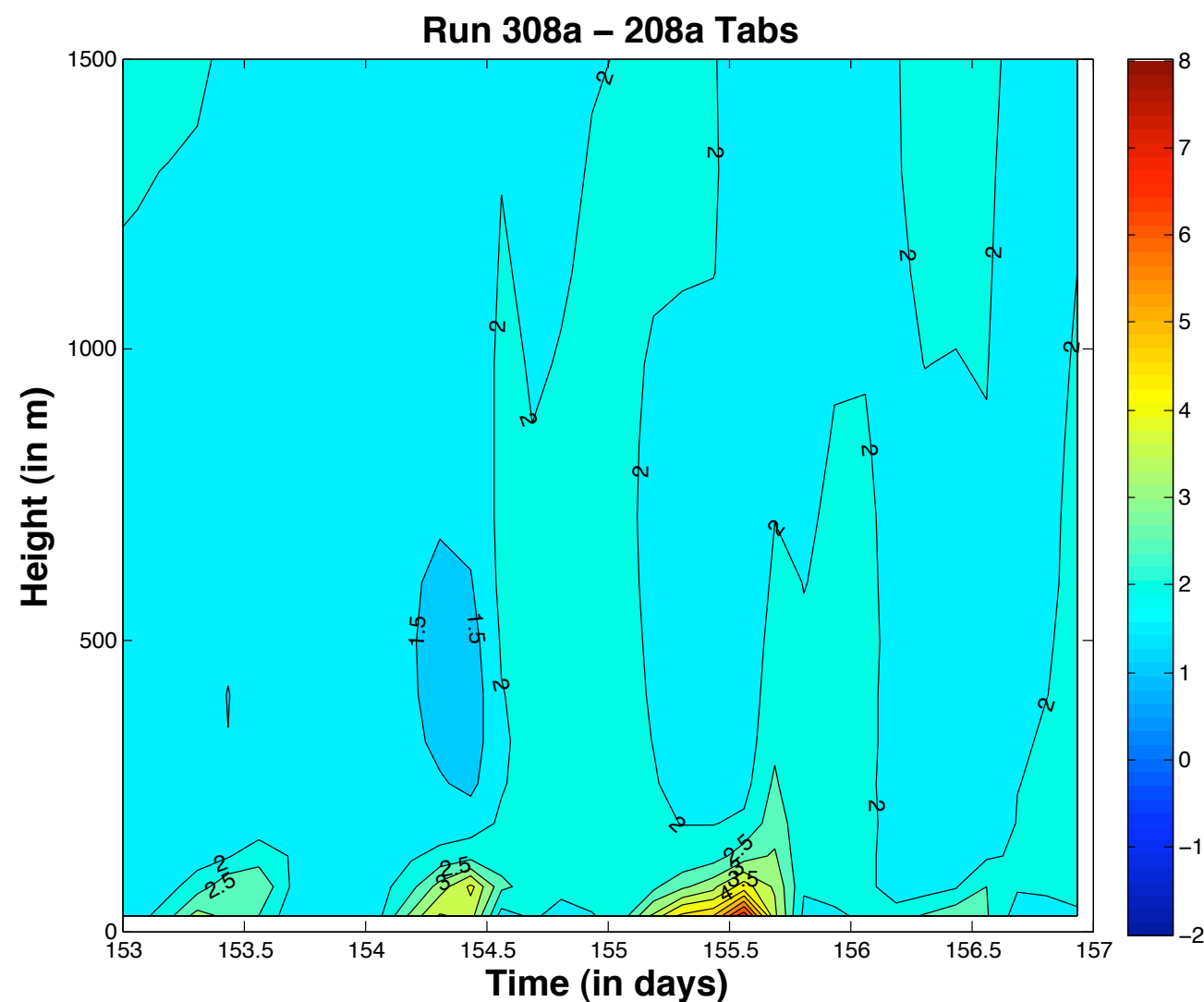
Theta

- 2. The SHOC run is typically 1-2K warmer than the no-SHOC run. However, near the surface during the late night into the early morning, the SHOC run is occasionally much warmer than the no-SHOC run. (153_157_308a minus 208a_theta)



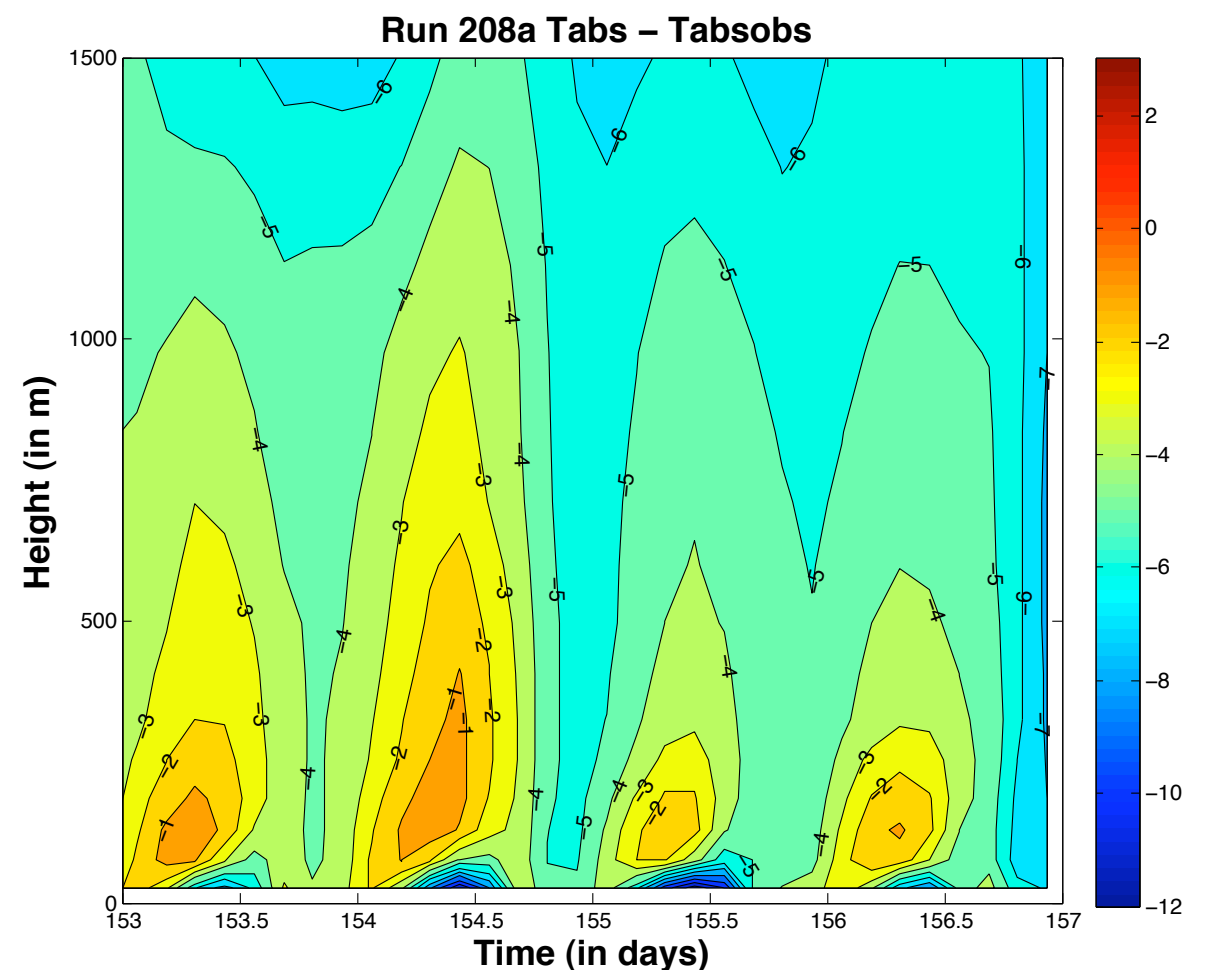
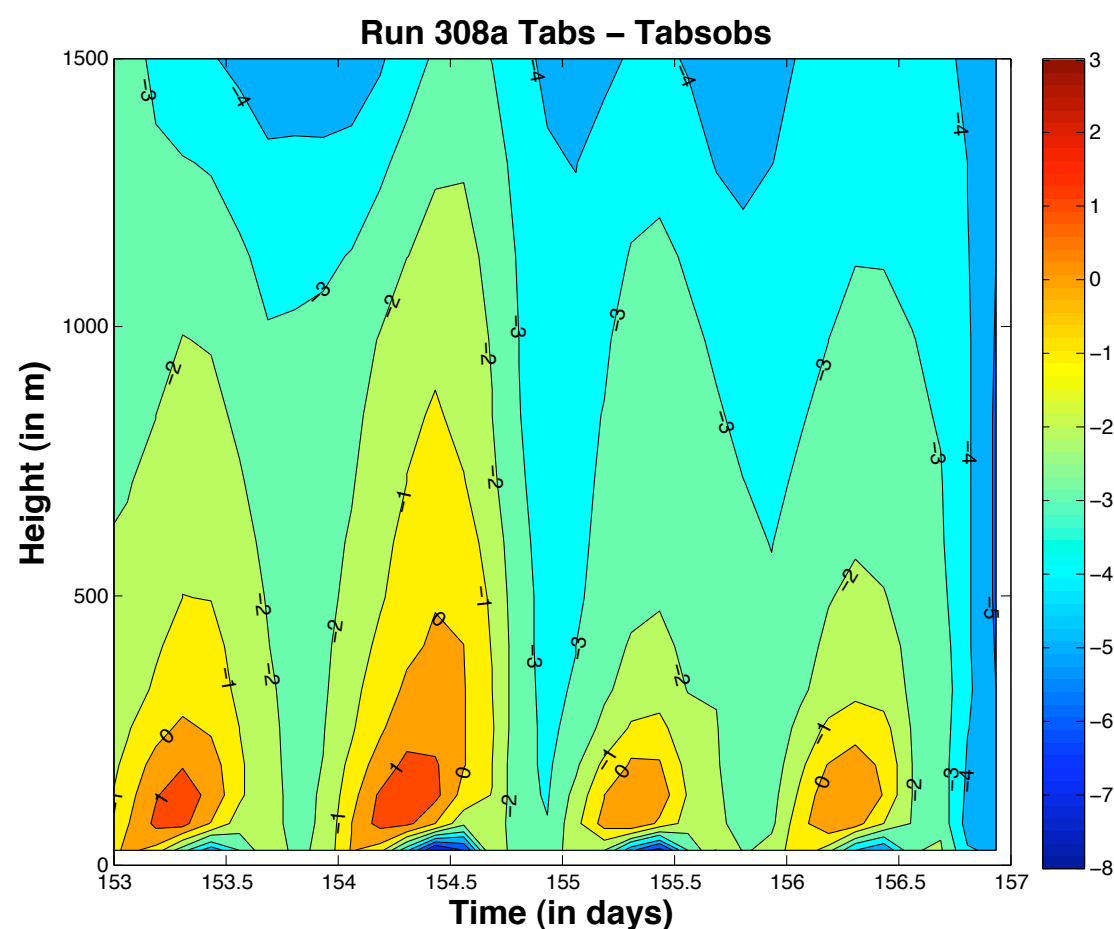
Tabs and Tabsobs

- 1. Like with theta, the SHOC run is typically 1-2K warmer than the no-SHOC run except for near the surface during the late night/early morning period which can be much warmer.
(153_157_308aminus_208a_tabs)



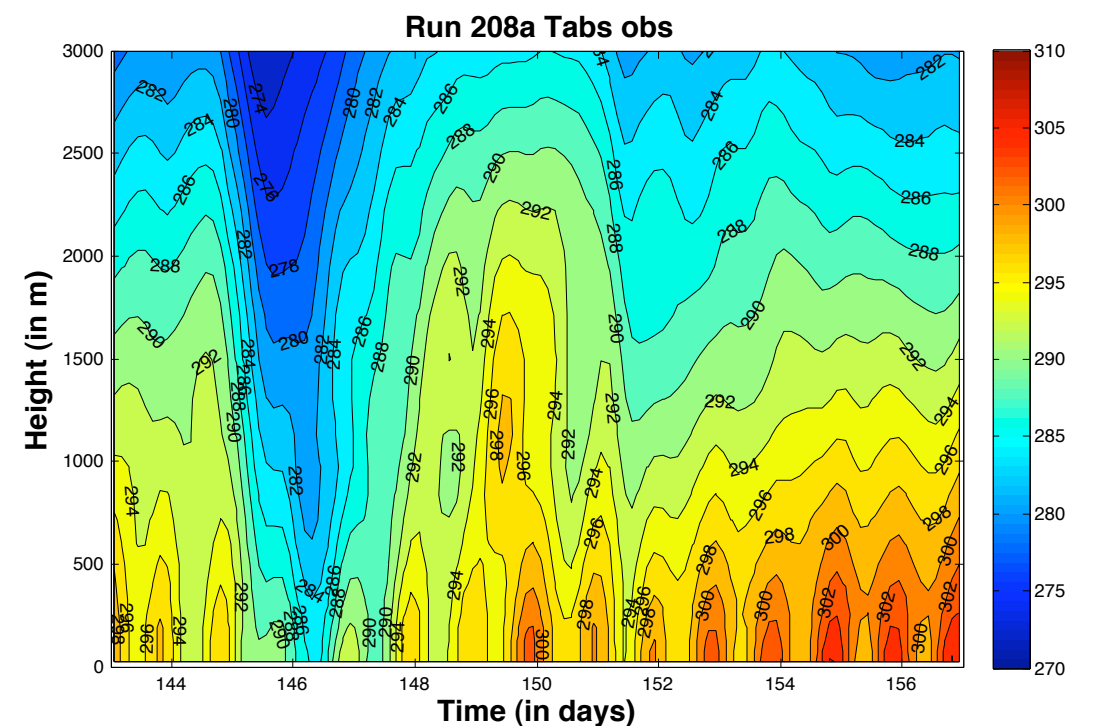
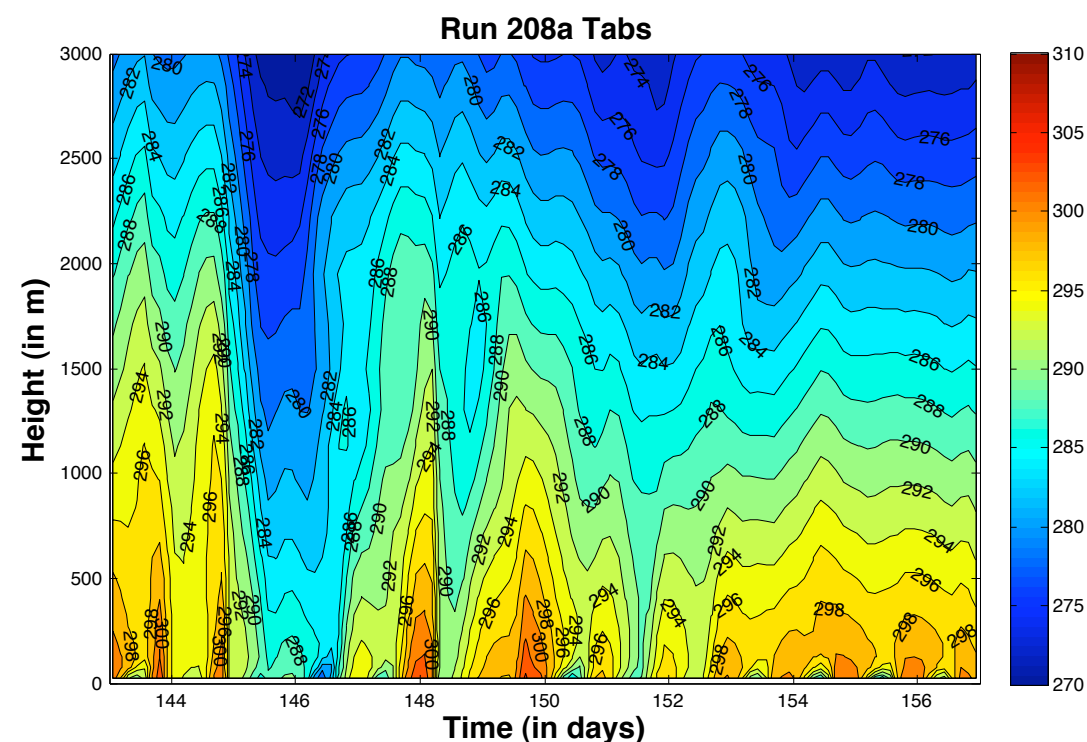
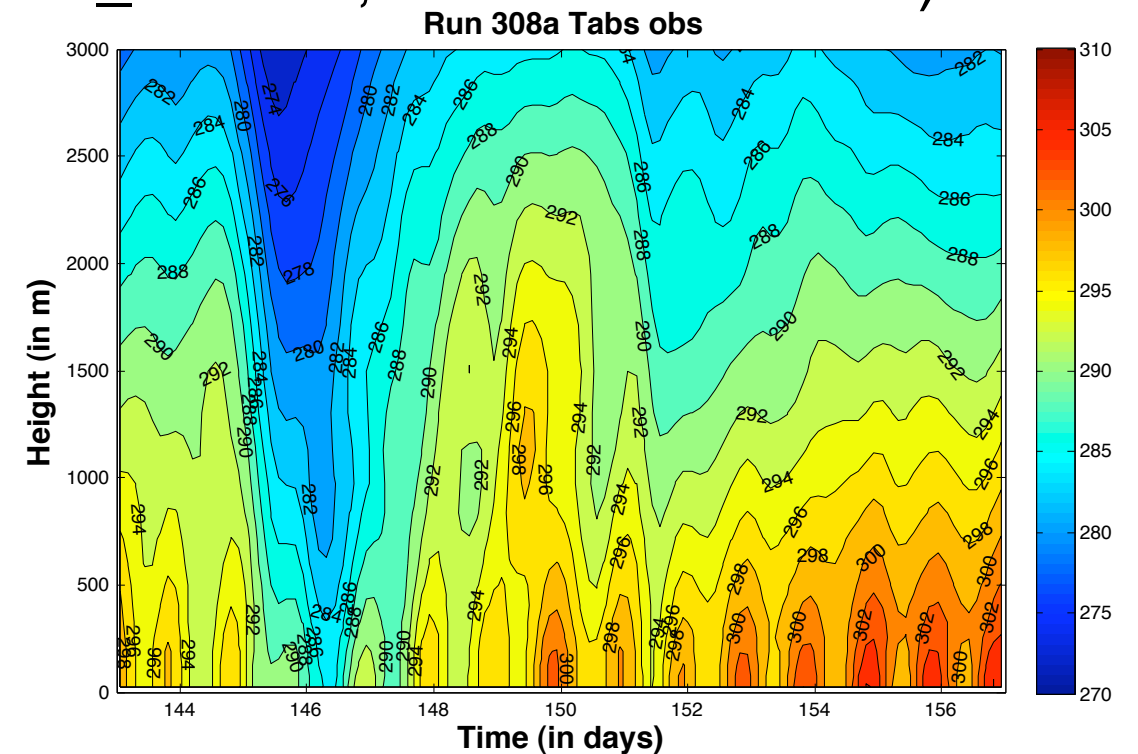
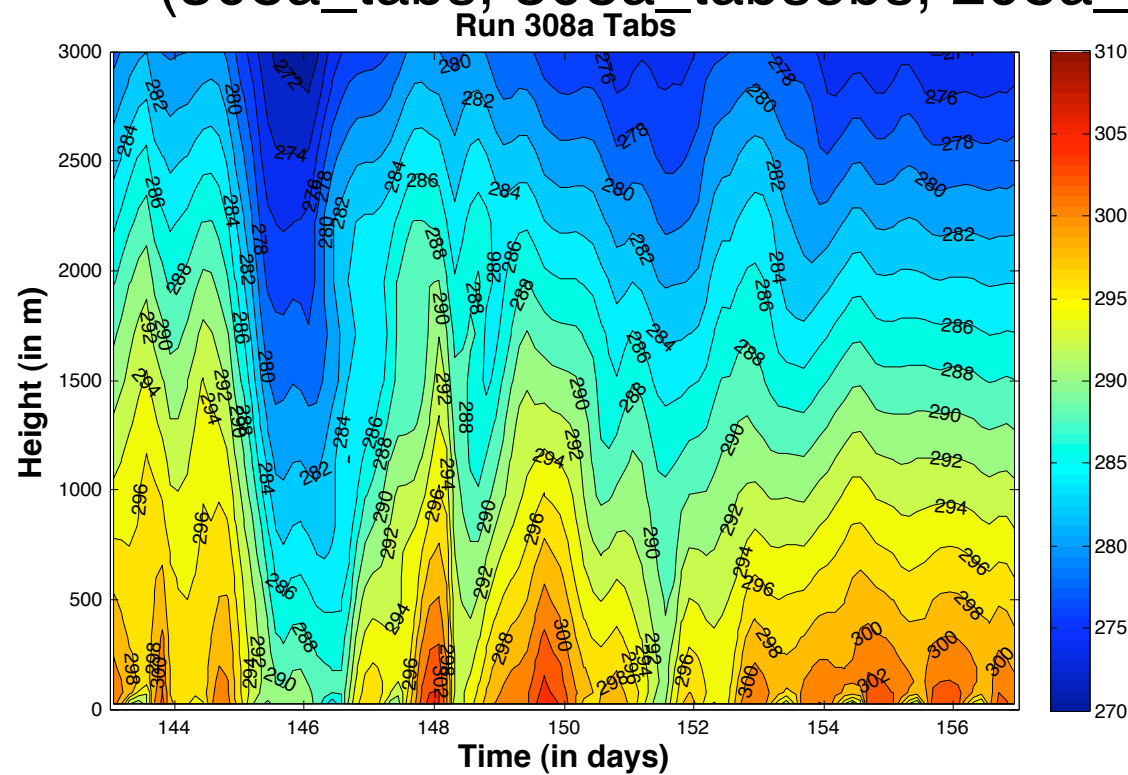
Tabs and Tabsobs

- 2. Both the SHOC and no-SHOC profiles of TABS are much colder at the lowest height level or two than TABSOBS in the late night/early morning. (153_157_308a_tabs_minus_tabsobs, 153_157_208a_tabs_minus_tabsobs)
- 3. Just above the area noted in point 2, the value of Tabs is much closer to that of Tabsobs. Tabs is slightly warmer than Tabsobs in the shoc case and slightly cooler than Tabsobs in the no-shoc case. (same as point 2)



Tabs and Tabsobs

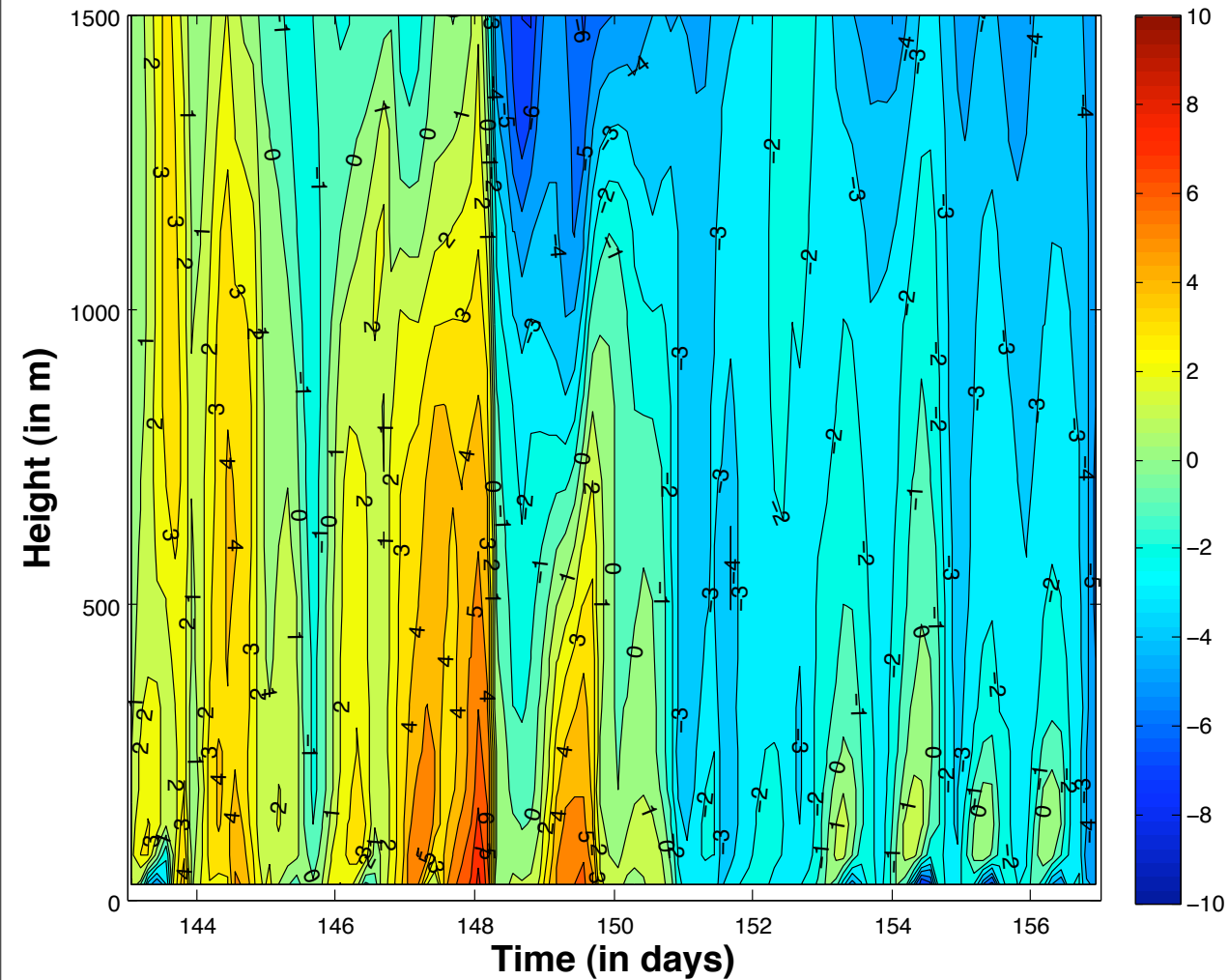
- 4. For both SHOC and no-SHOC runs, above 1km Tabs is higher than Tabsobs by several degrees in the calmer 153-157 period. (see previous slide) This appears to reverse in the more convectively active first half of the model run (308a_tabs, 308a_tabsobs, 208a_tabs, 208a_tabsobs, see also next slide).



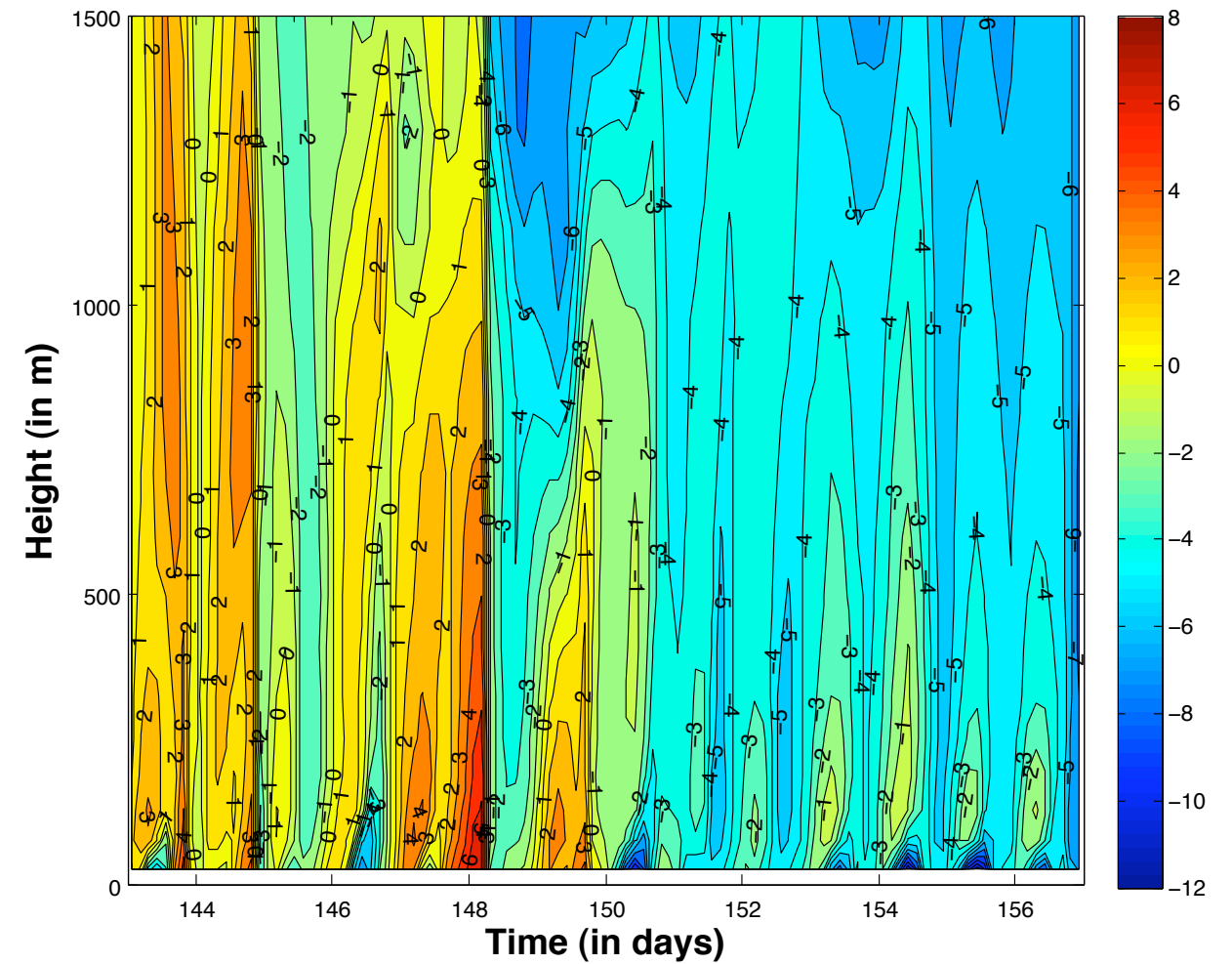
Tabs and Tabsobs

(time_hgt_308a_tabs_minus_tabsobs, time-hgt_208a_tabs_minus_tabsobs)

Run 308a Tabs – Tabsobs

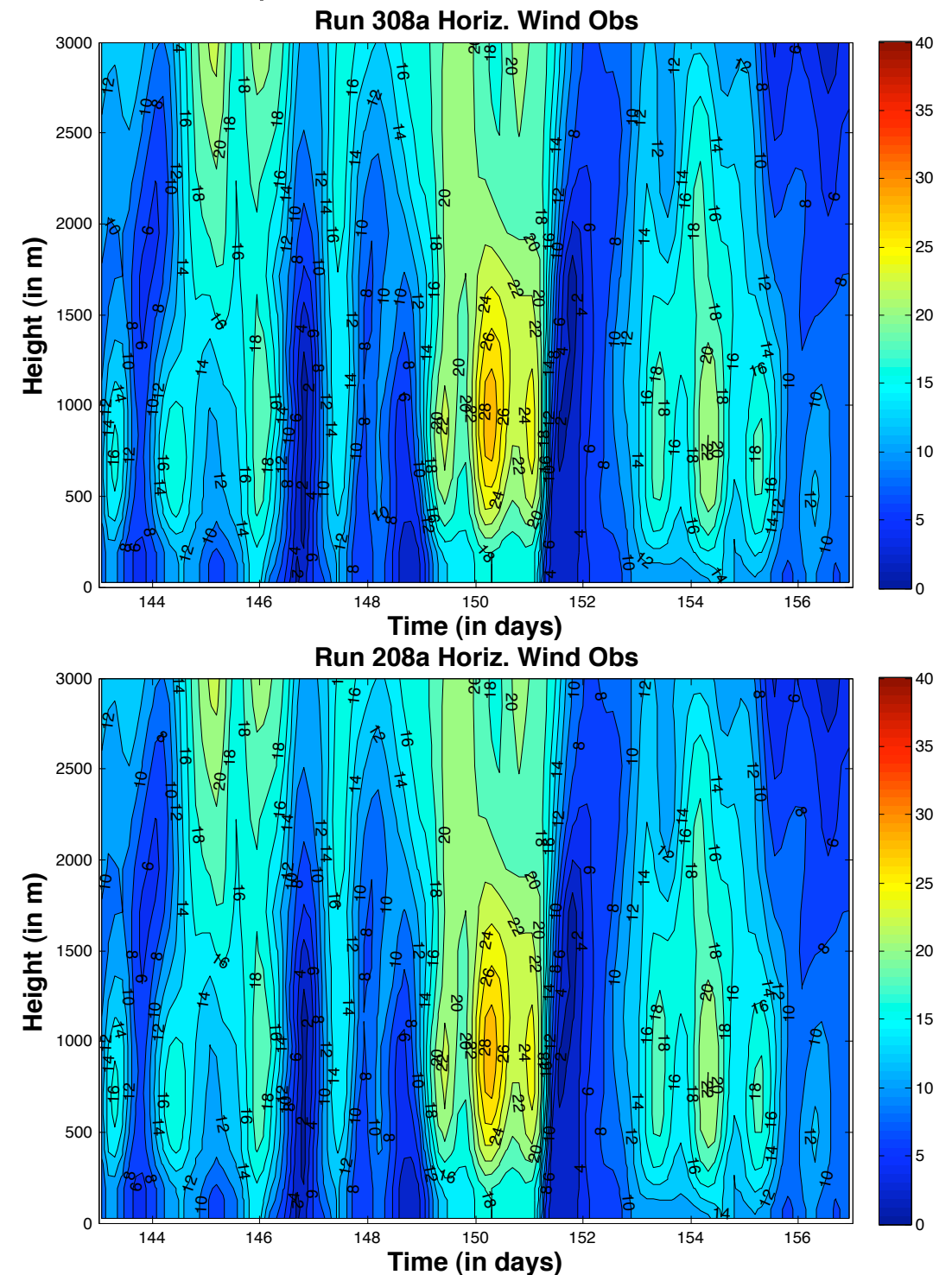
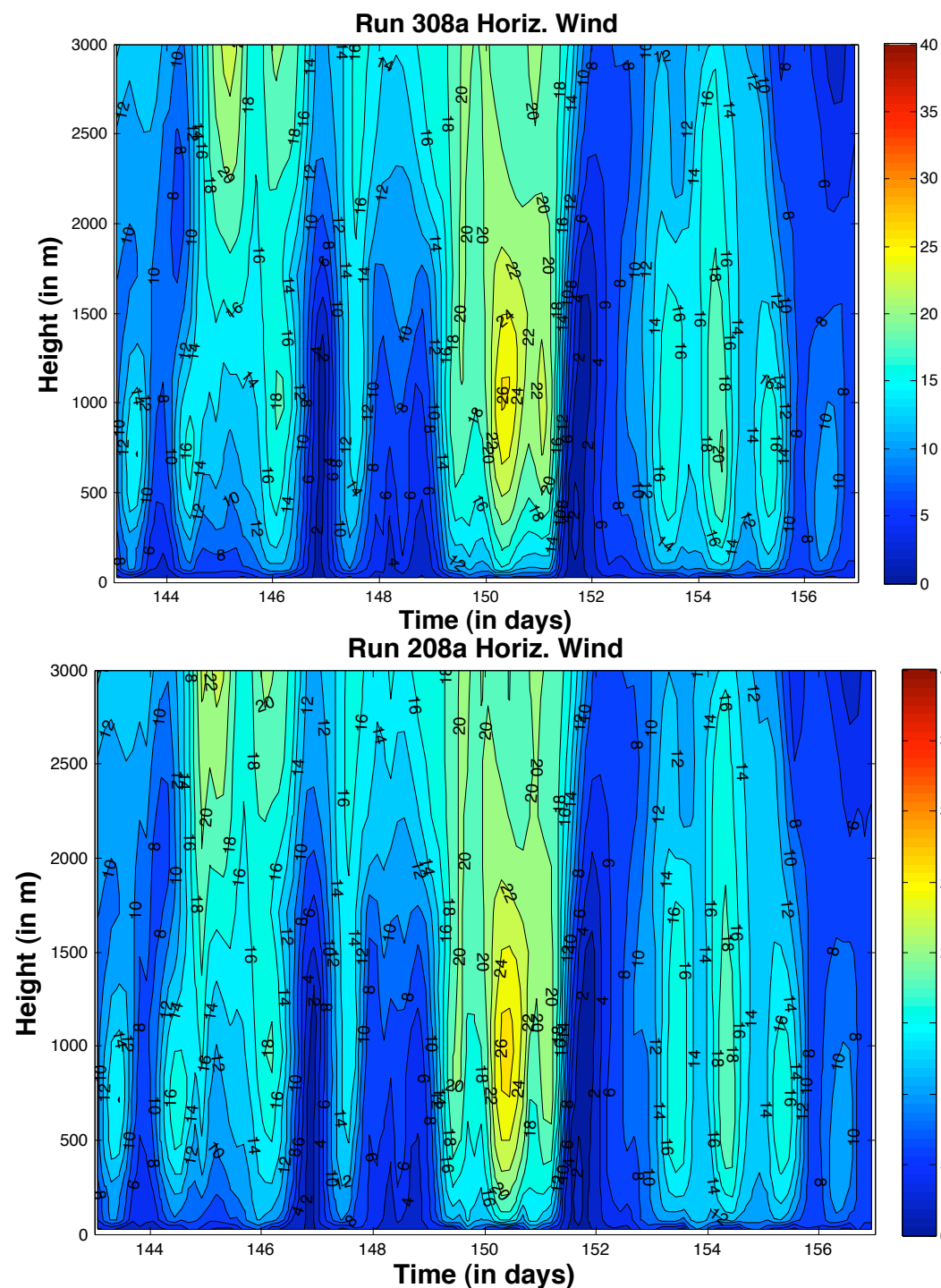


Run 208a Tabs – Tabsobs



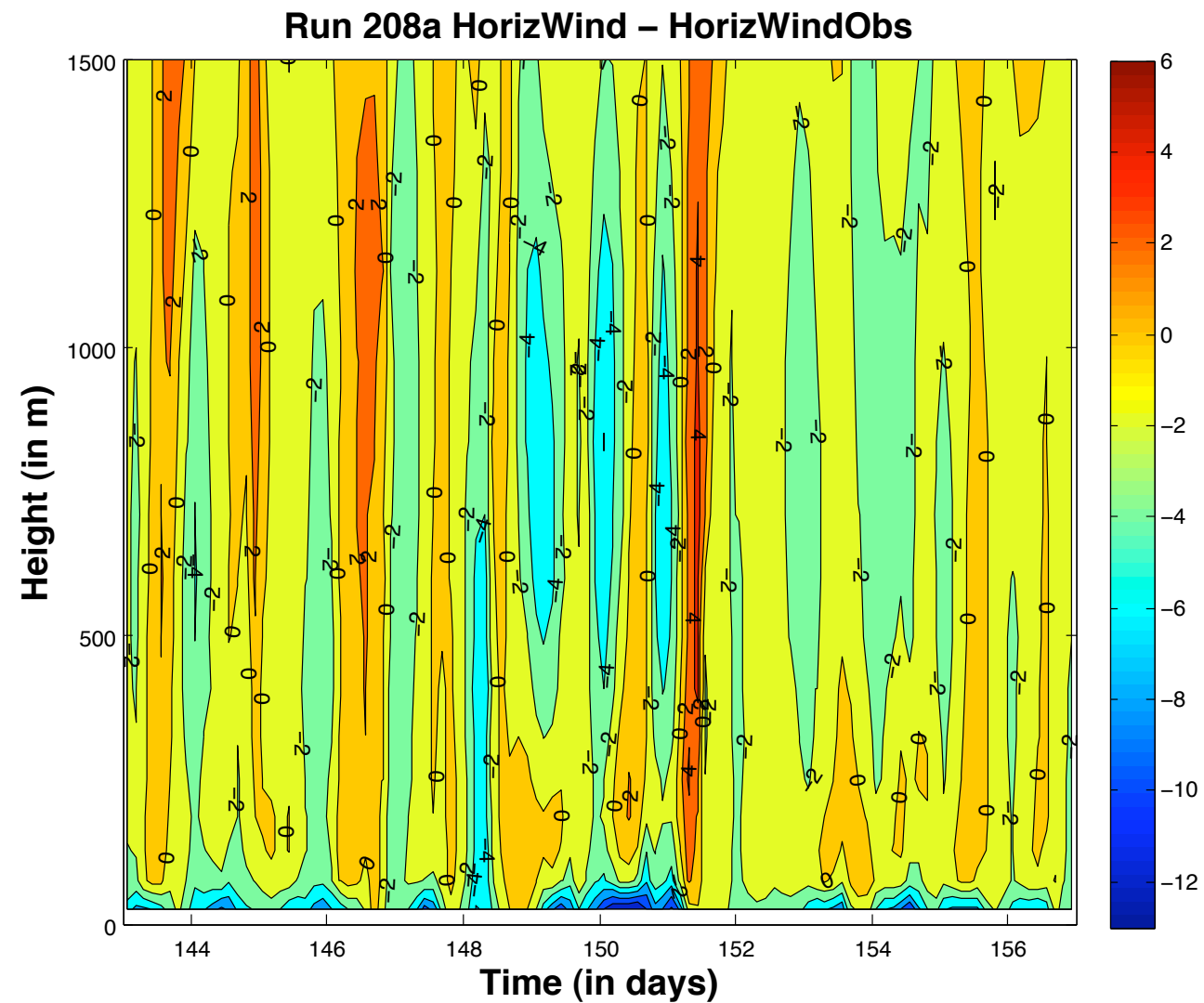
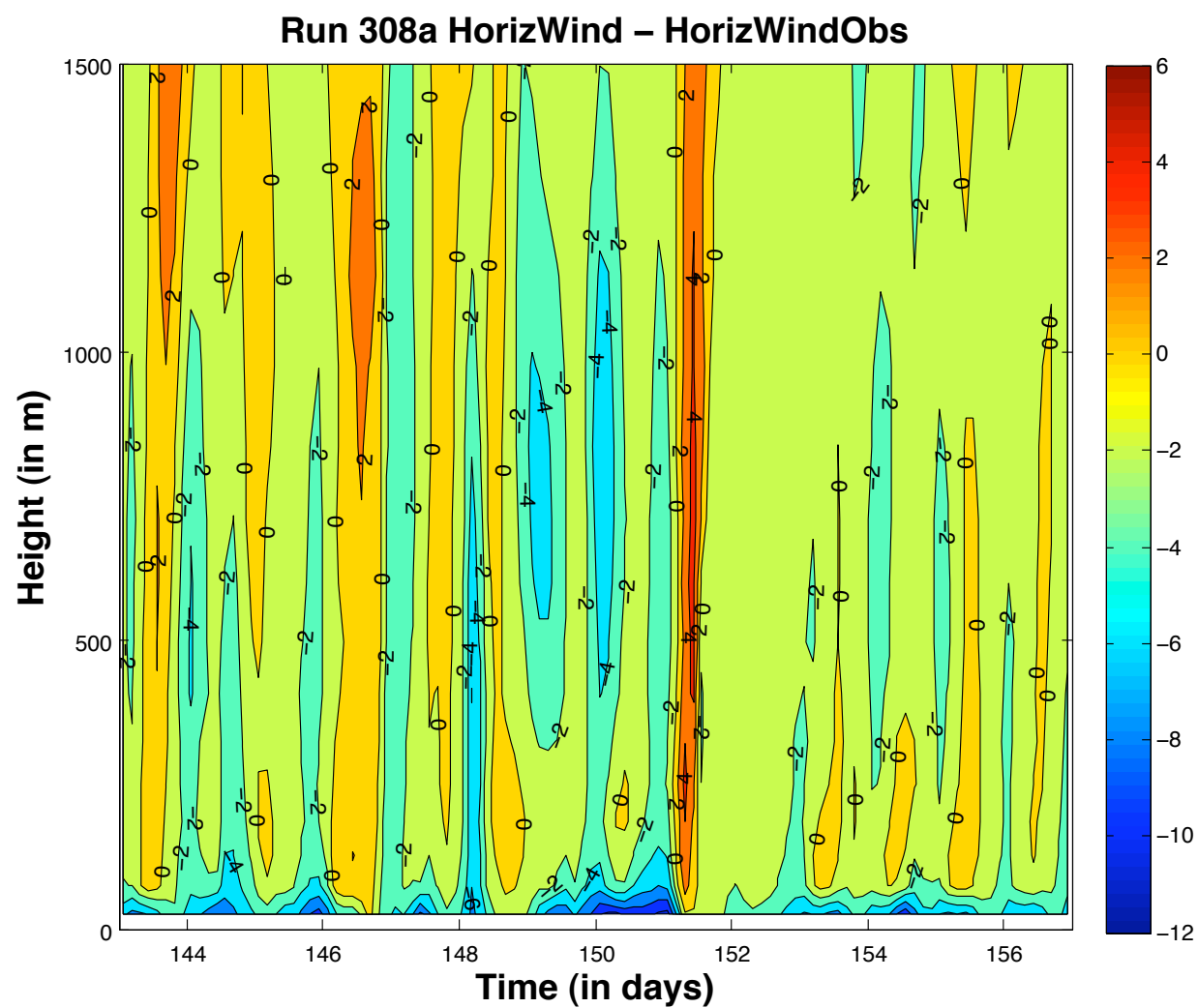
Horiz. Wind and Horiz. Wind Obs.

- 1. Winds at the lowest level stay low for Horiz. Wind but not for Horiz. Wind Obs. (308a_horizwind, 308a_horizwindobs, 208a_horizwind, 208a_horizwindobs, differences on next two slides).



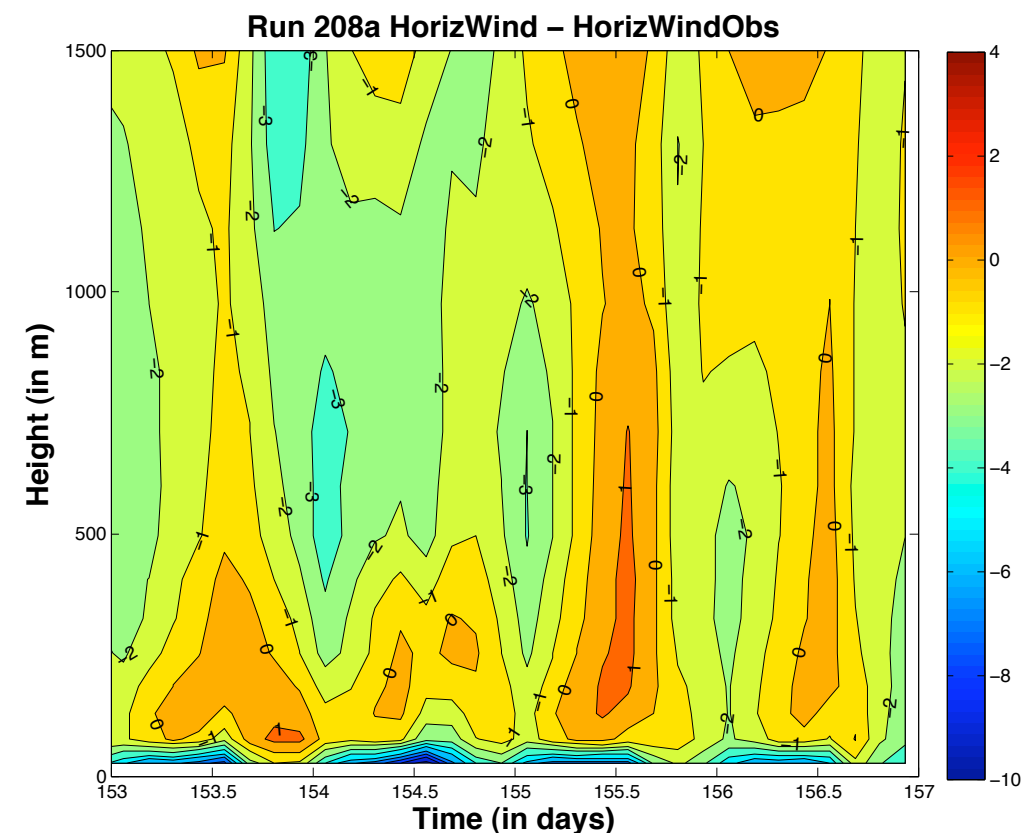
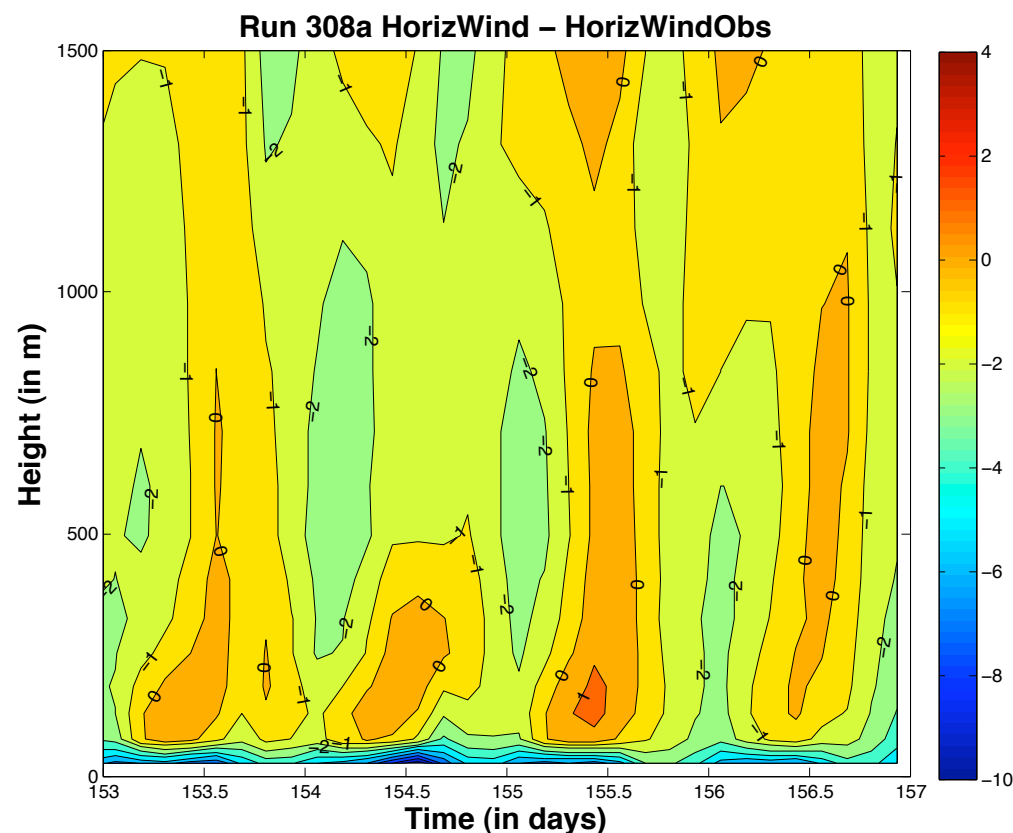
Horiz. Wind and Horiz. Wind Obs.

(time_hgt_308a_horizwind_minus_horizwindobs, time_hgt_208a_horizwind_minus_horizwindobs)



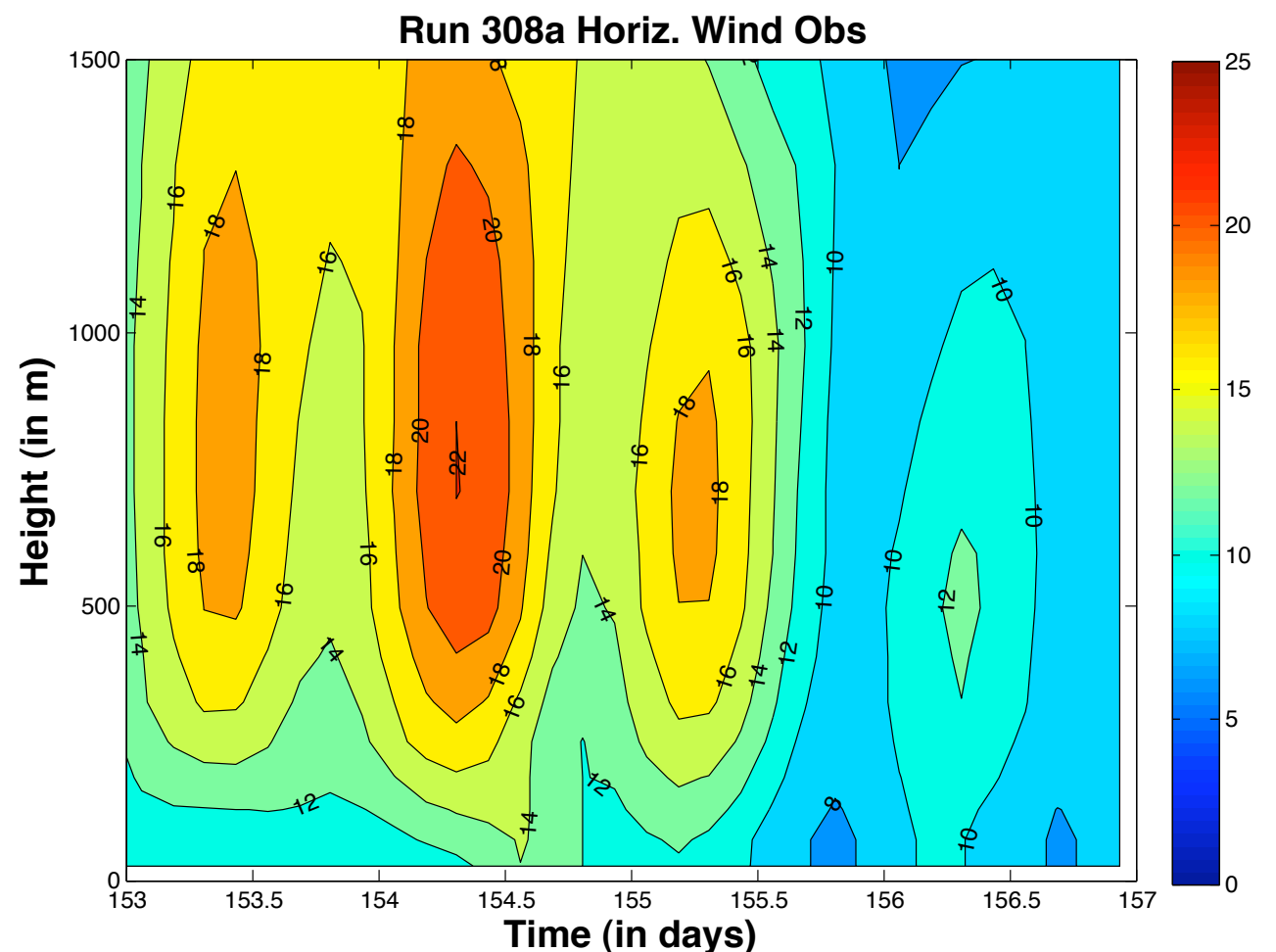
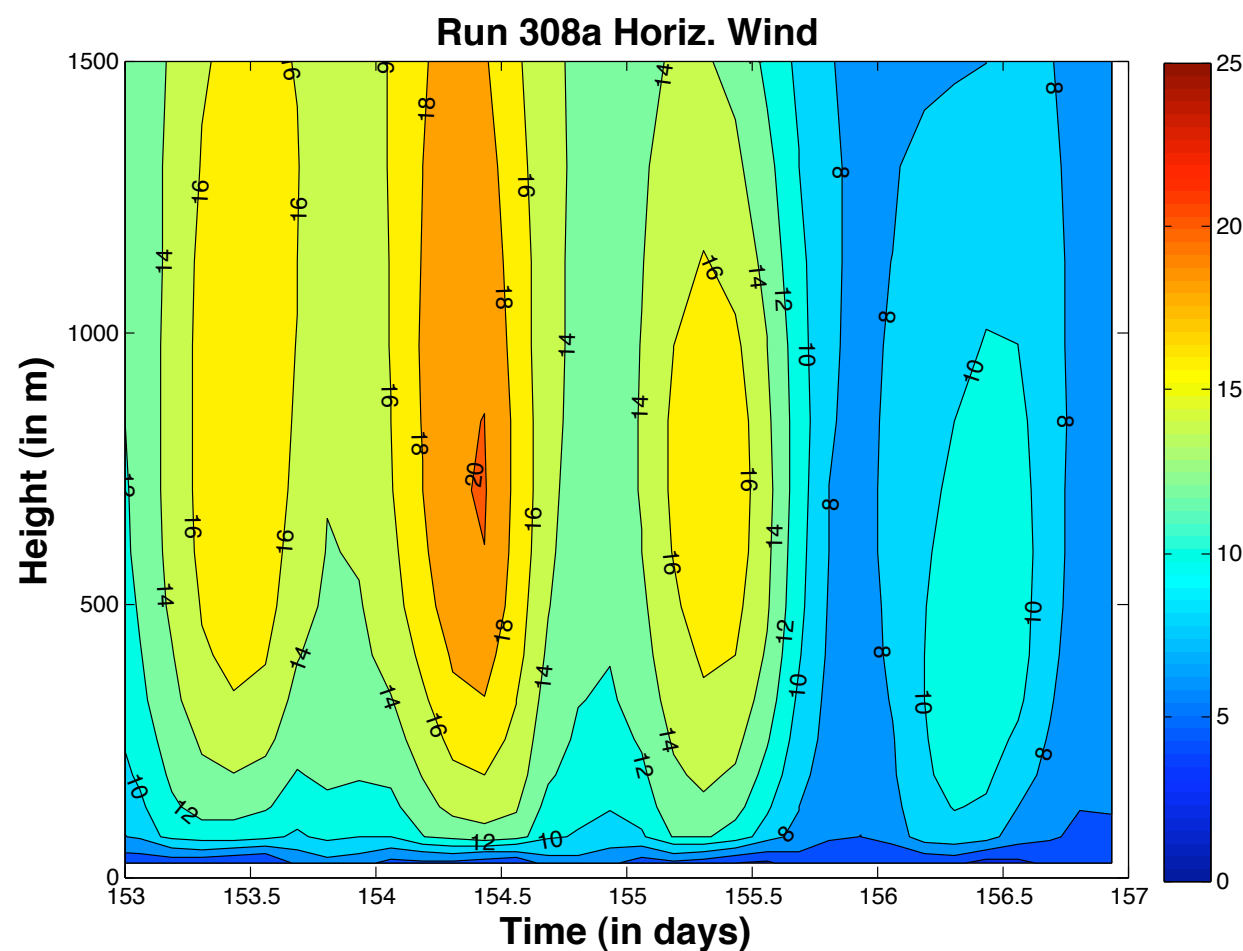
Horiz. Wind and Horiz. Wind Obs.

- 2. Point 1 is the case for both SHOC and no-SHOC runs.
(153_157_208a_horizwind_minus_horizwindobs,
153_157_308a_horizwind_minus_horizwindobs).
- 3. Above the surface in the early morning, horizwind is slightly stronger than horizwindobs, at other times of day horizwindobs is slightly stronger than horizwind (same plots as point 2).



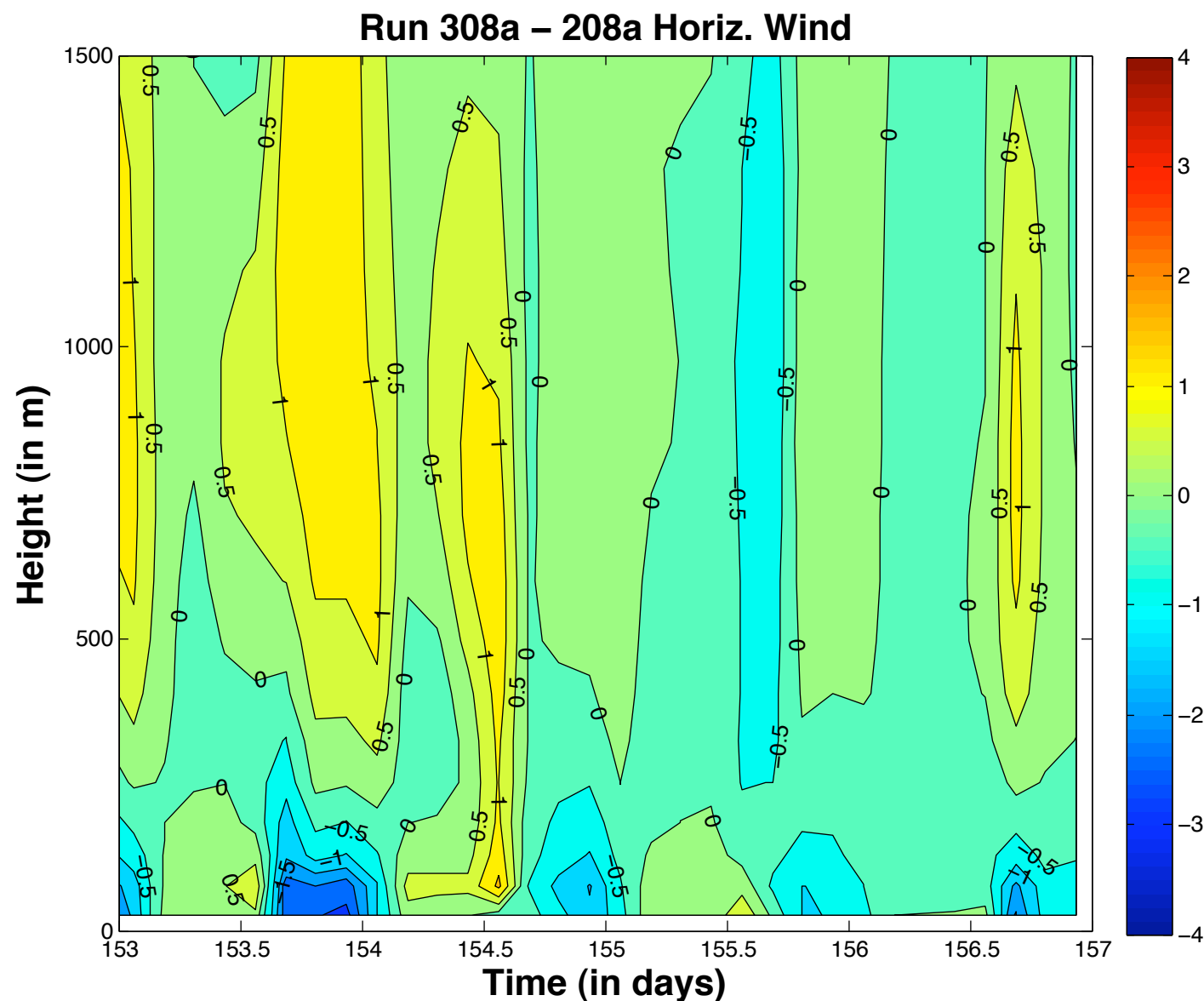
Horiz. Wind and Horiz. Wind Obs.

- 4. Horiz. Wind and Horiz Wind Obs are both larger in magnitude from 500-1500m during the early morning on calmer days than other times of day. (153_157_run308a_horizwind, 153_157_run308a_horizwindobs)



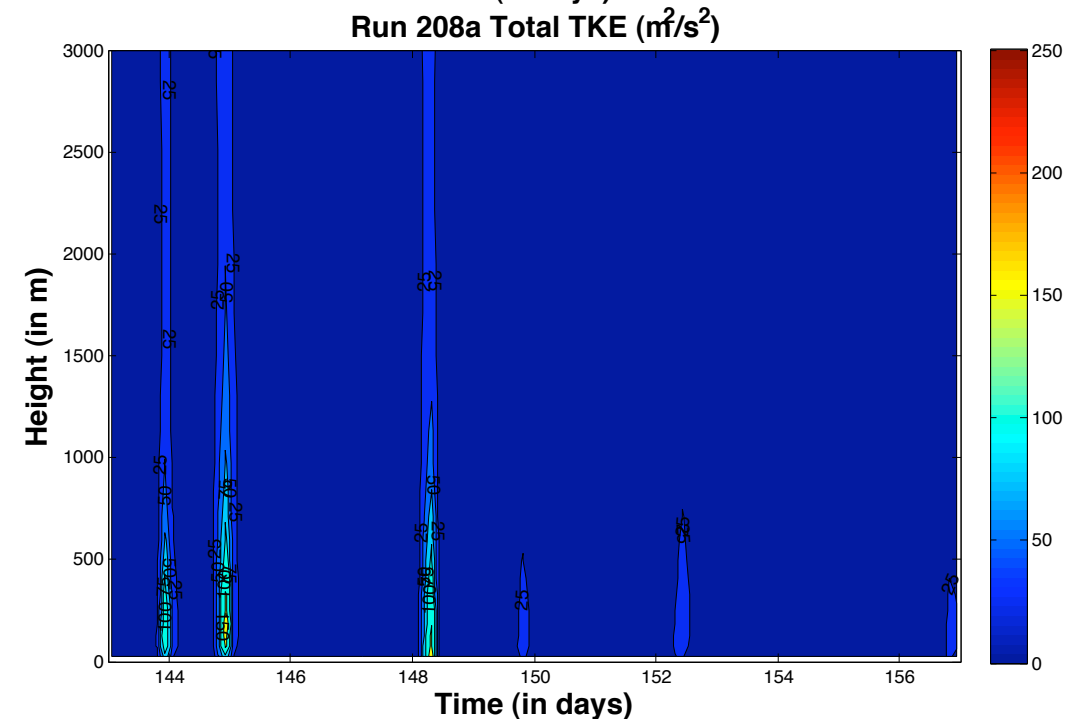
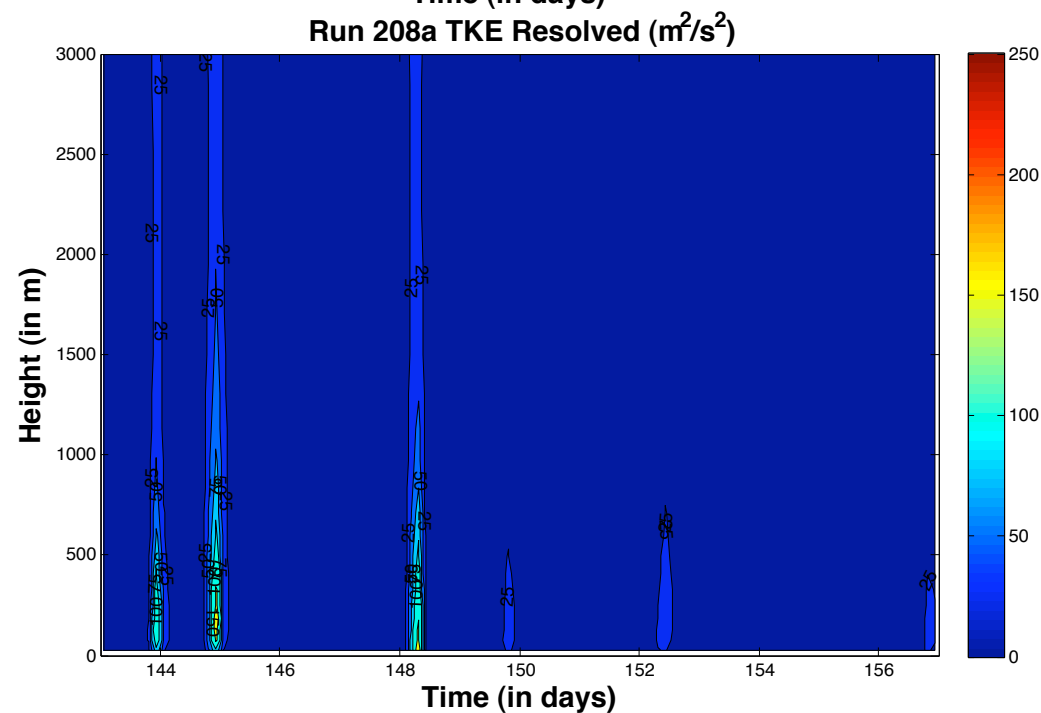
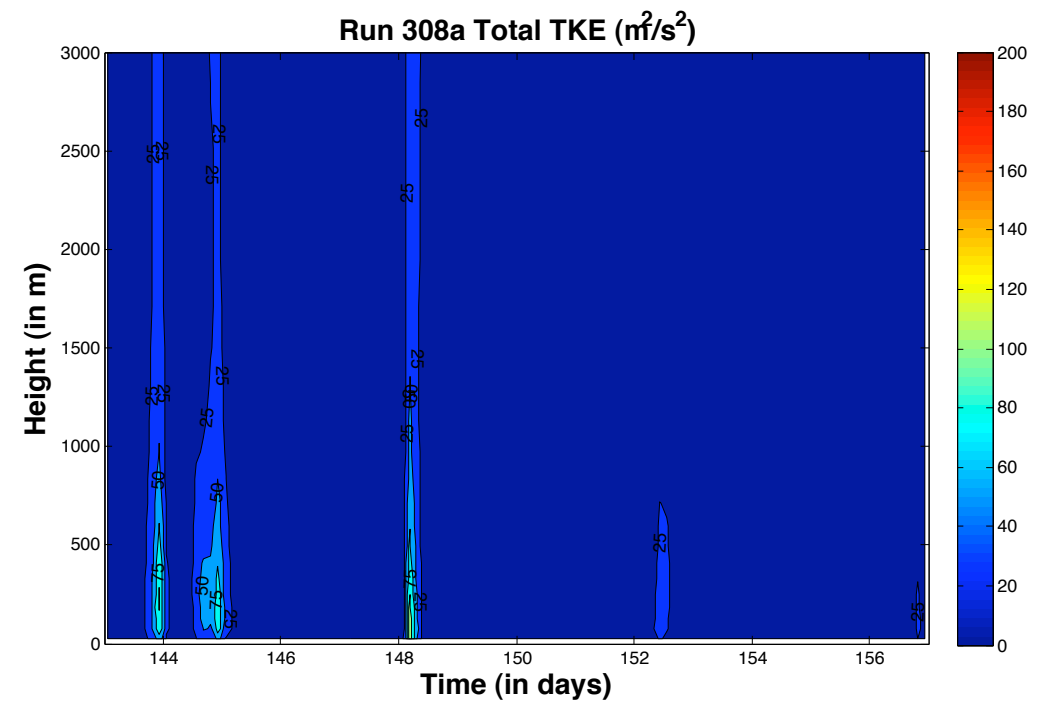
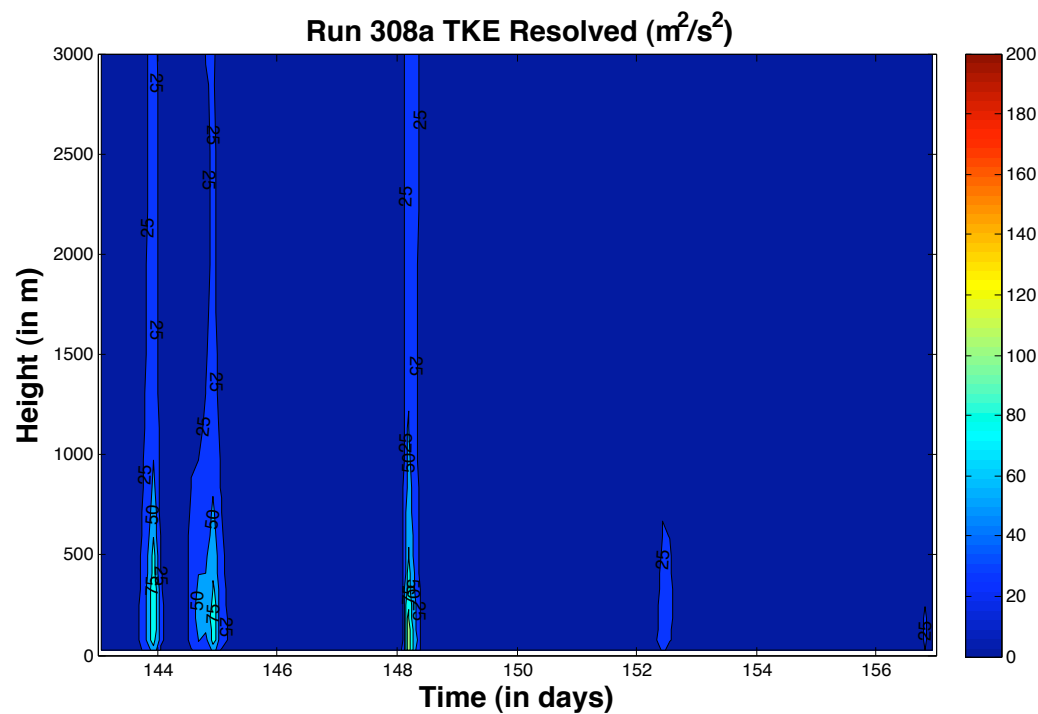
Horiz. Wind and Horiz. Wind Obs.

- 5. At least for the focus period of day 153-157, the SHOC run has slightly stronger winds at the surface in the late night/early morning while the no-SHOC run has slightly stronger winds in the afternoon/early evening. (153_157_308a minus 208a_horizwind).



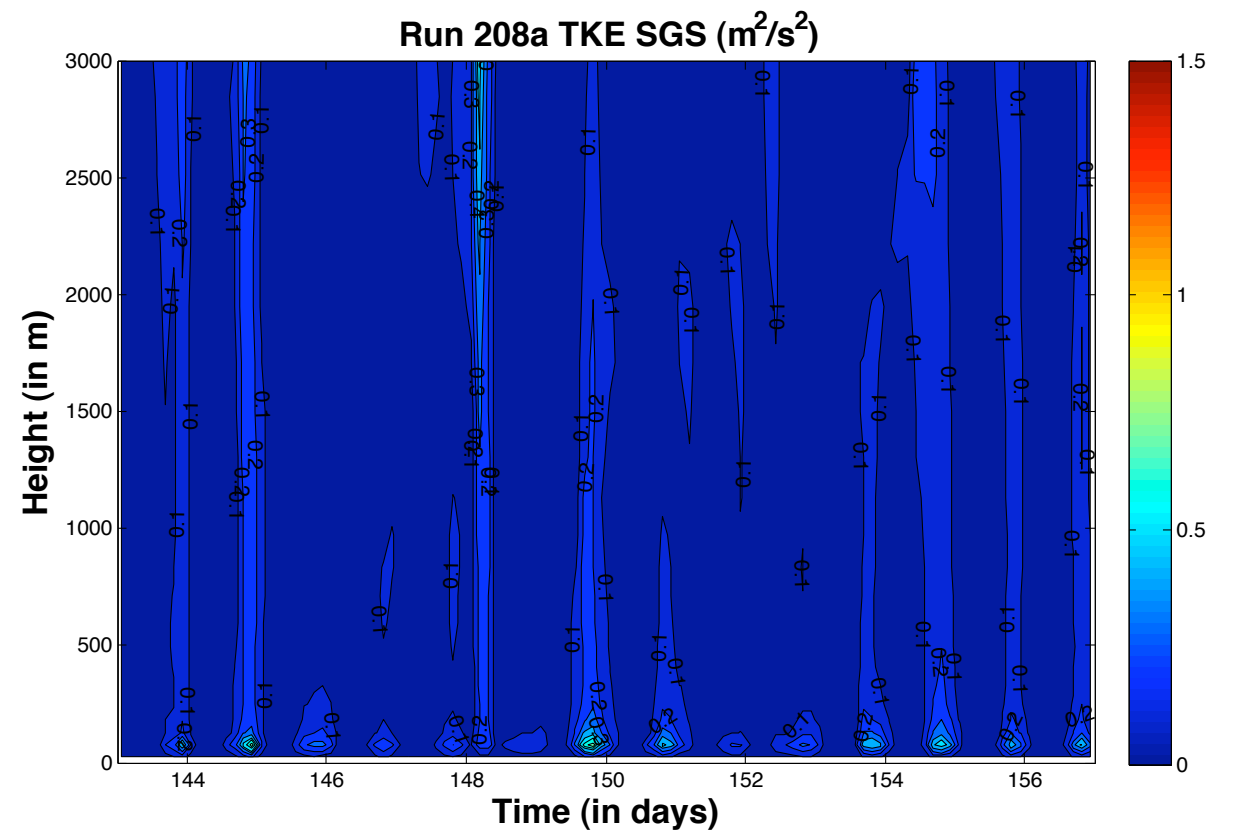
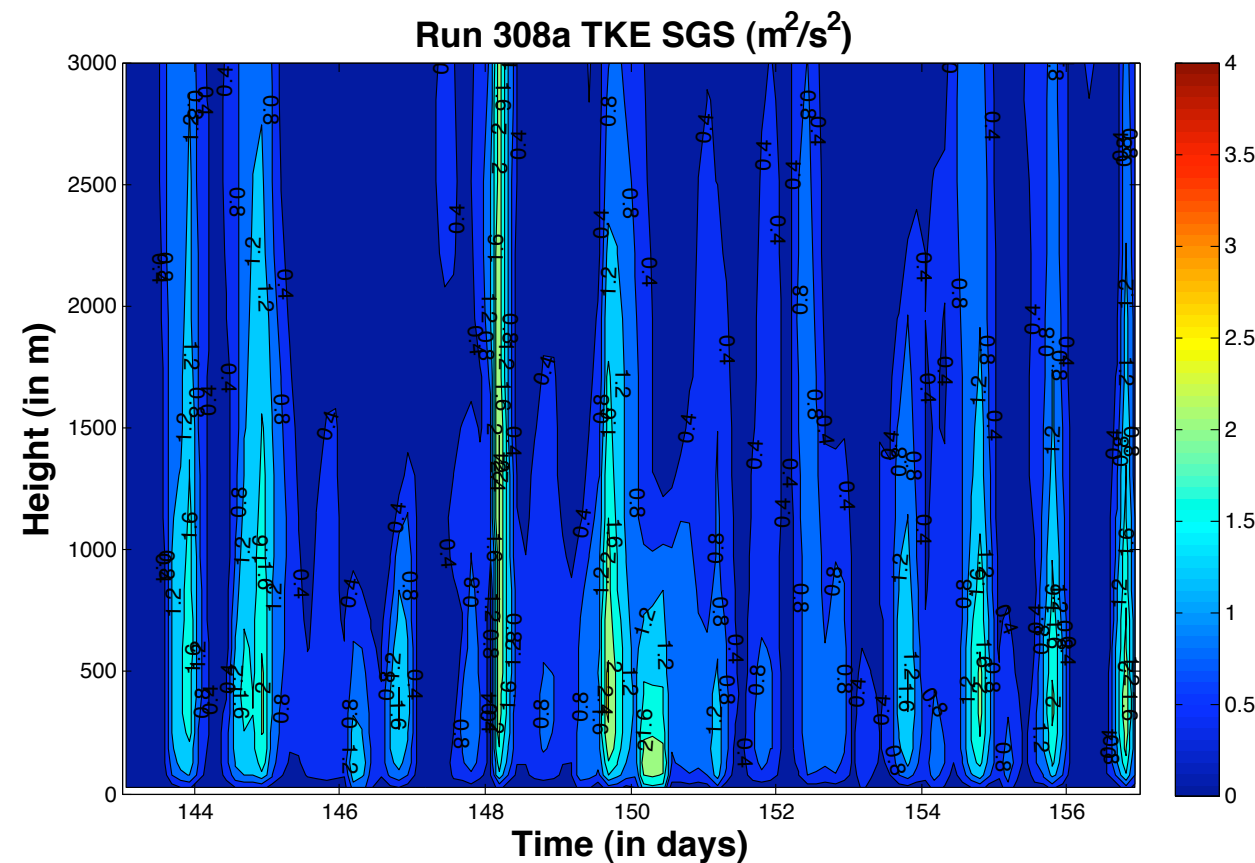
TKEres, TKEsgs, TKEtot

- 1. TKEres and TKEtot, of which TKEres makes the strongest signal, have strongest peaks in the afternoon on convective days. (308a_TKEres, 308a_TKEtot, 208a_TKEres, 208a_TKEtot).



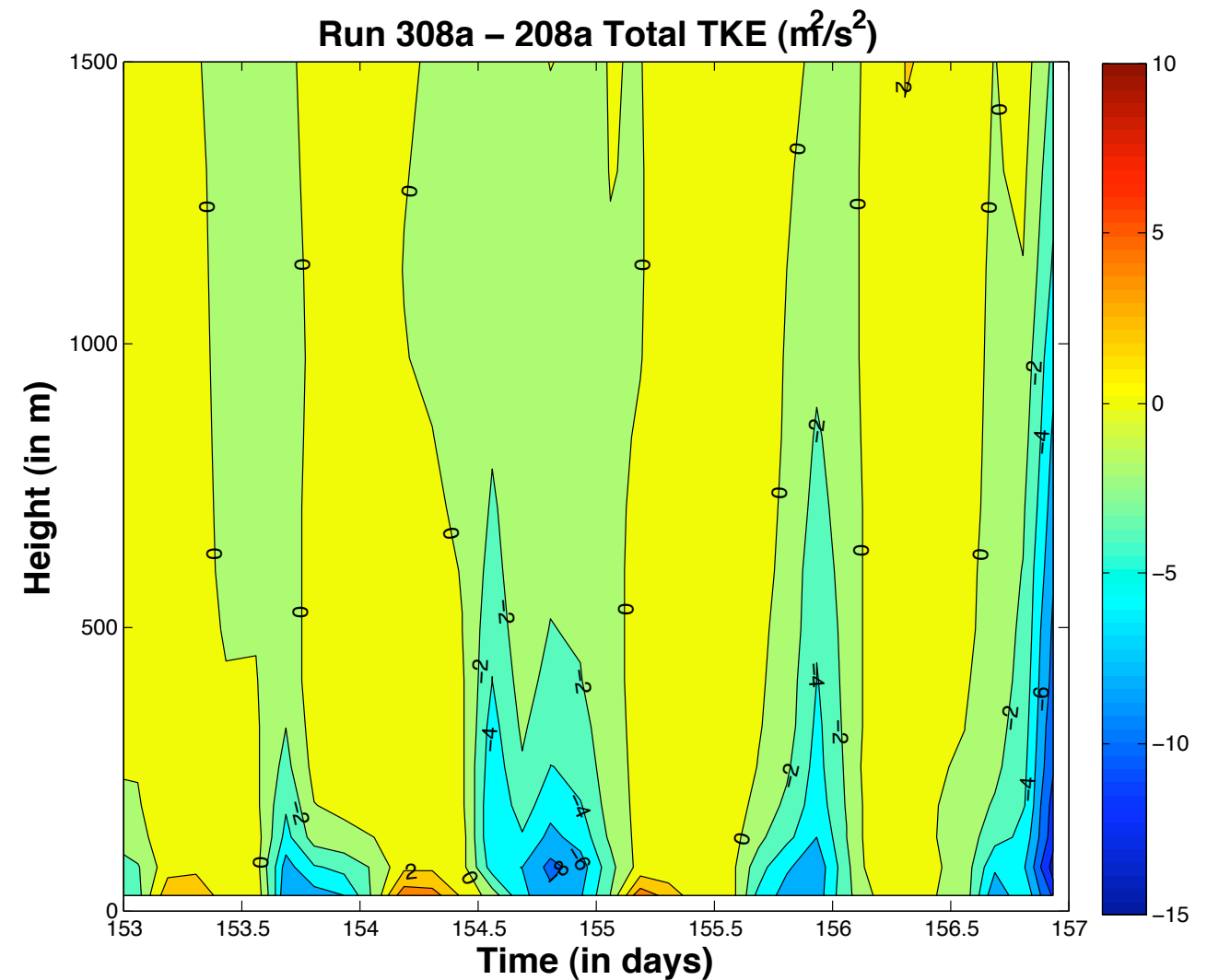
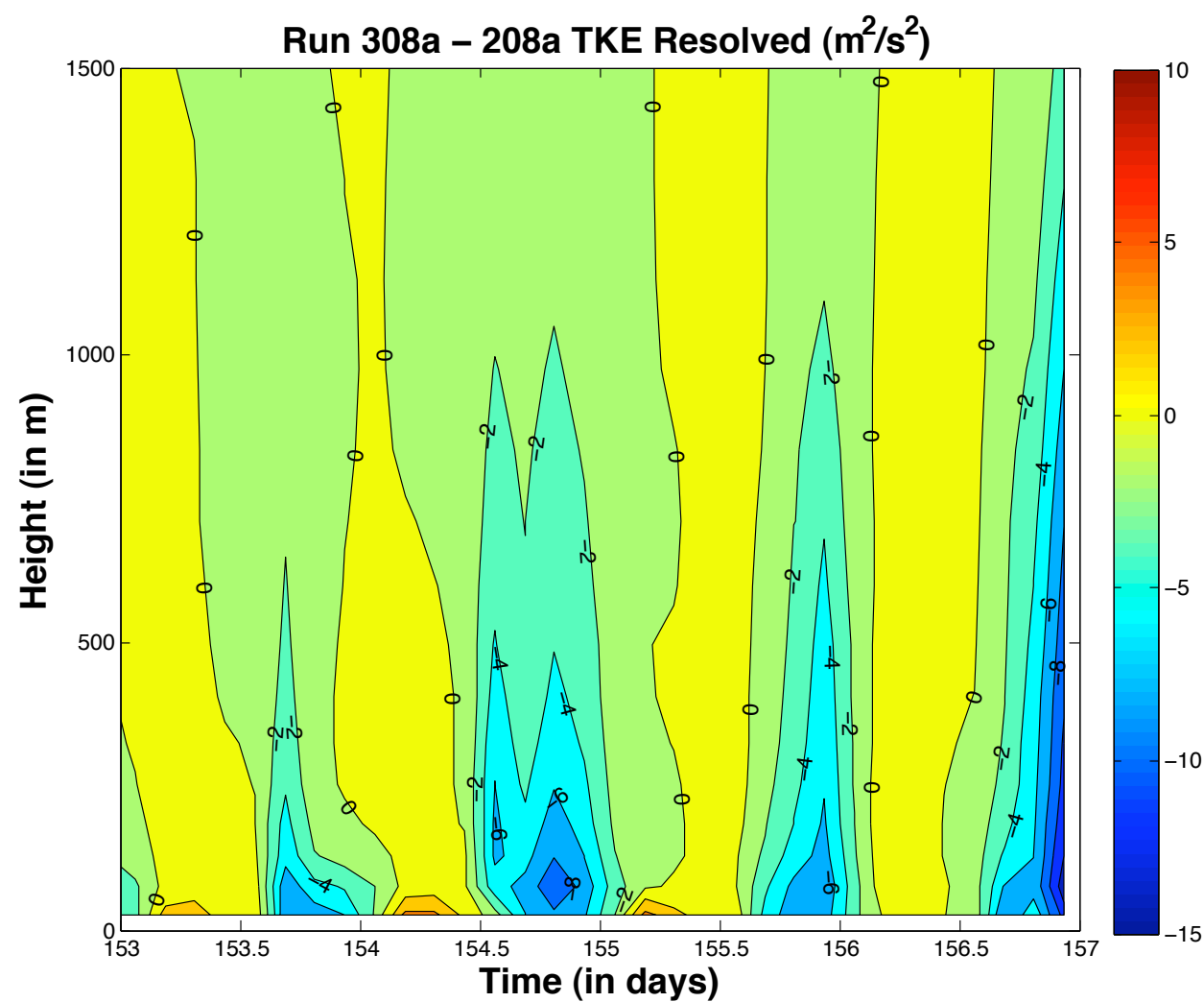
TKEres, TKEsgs, TKEtot

- 2. TKEsgs seems to also peak in the afternoon hours (308a_TKEsgs, 208a_TKEsgs)



TKEres, TKEsgs, TKEtot

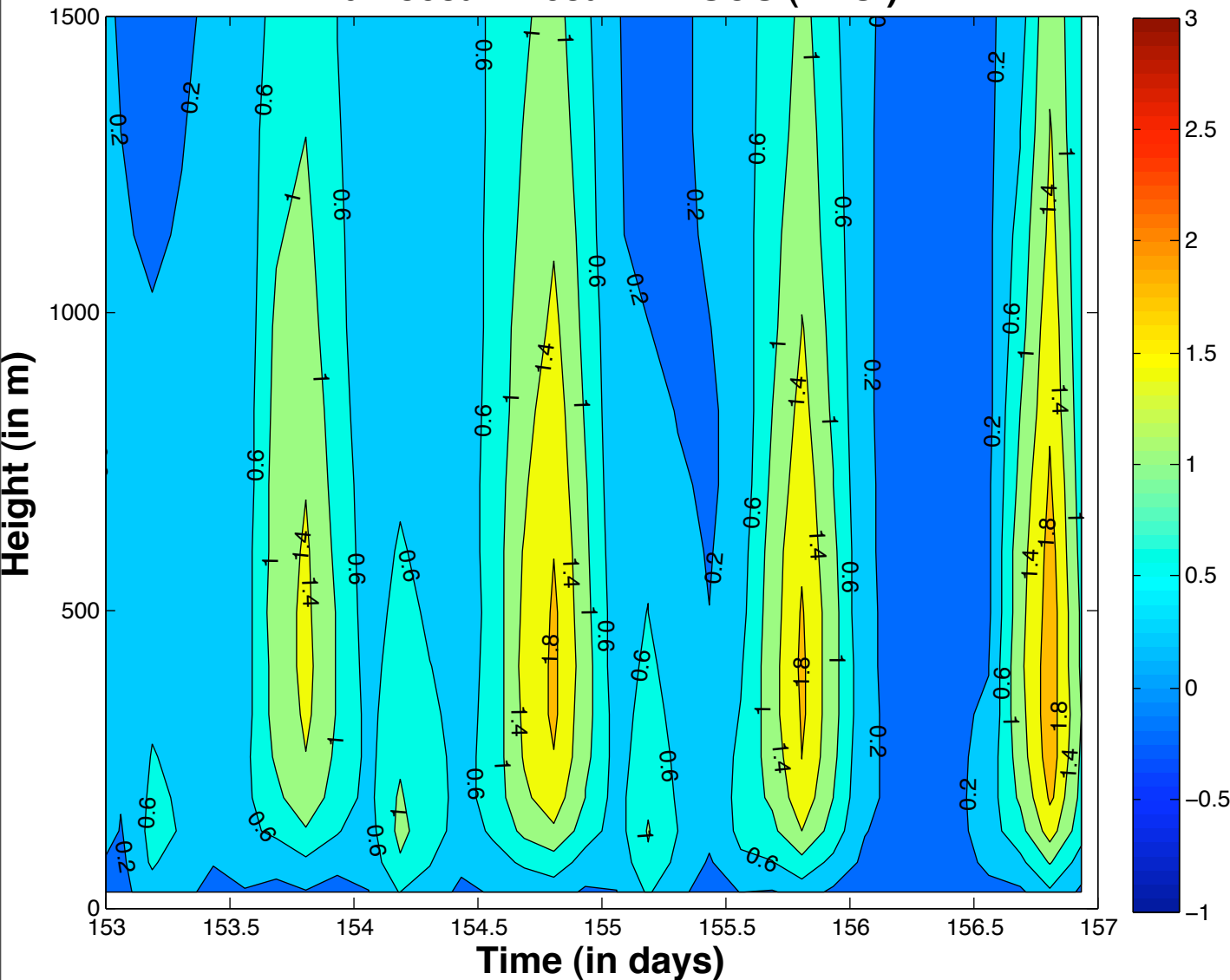
- 3. TKEres and TKEtot are lower for the SHOC run than the no-SHOC run near the surface in the late afternoon, and slightly higher for SHOC in the evening hours at the surface. (153_157_308a minus 208a_TKEres, 153_157_308a_minus208a_TKEtot)



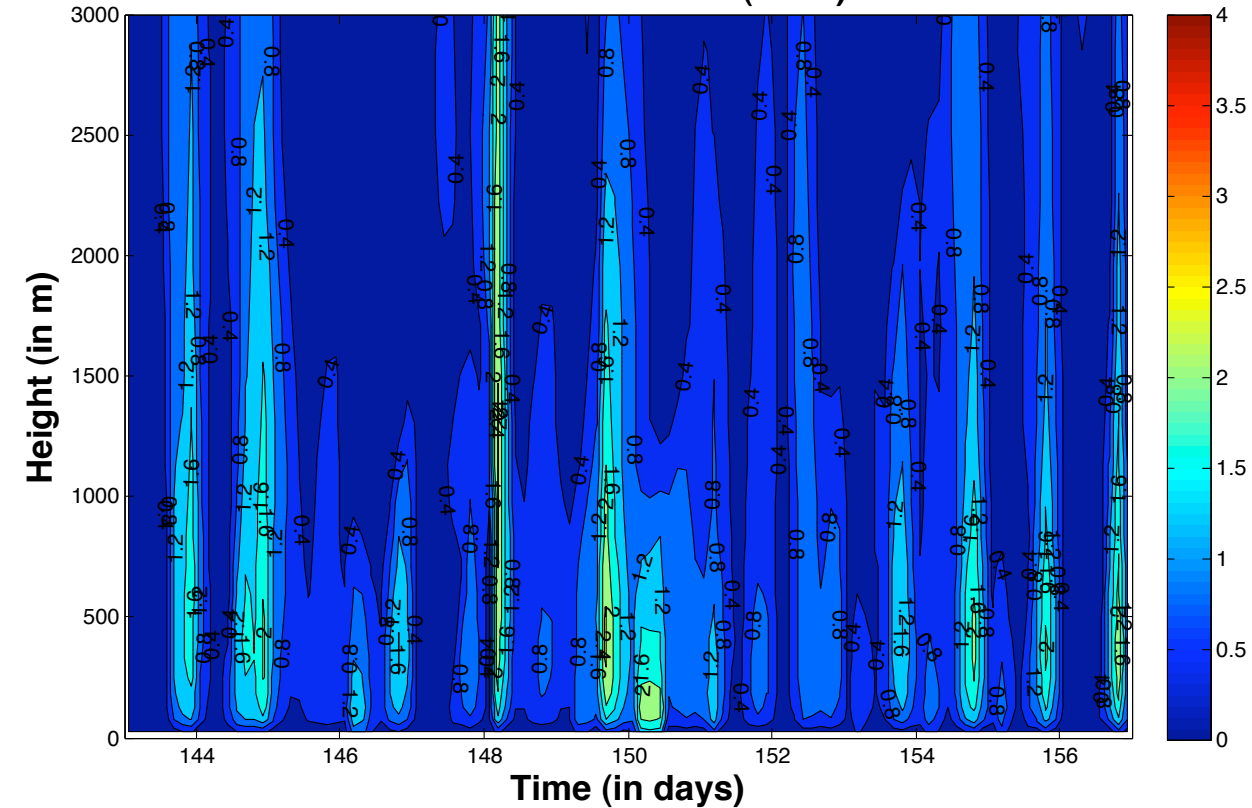
TKEres, TKEsgs, TKEtot

- 4. TKEsgs in the SHOC run has a magnitude more than double that of the no-SHOC run during the day between 100 and 3000m. (153_157_308a minus 208a_TKEsgs, 308a_TKEsgs, 208a_TKEsgs, also plots on following slide)

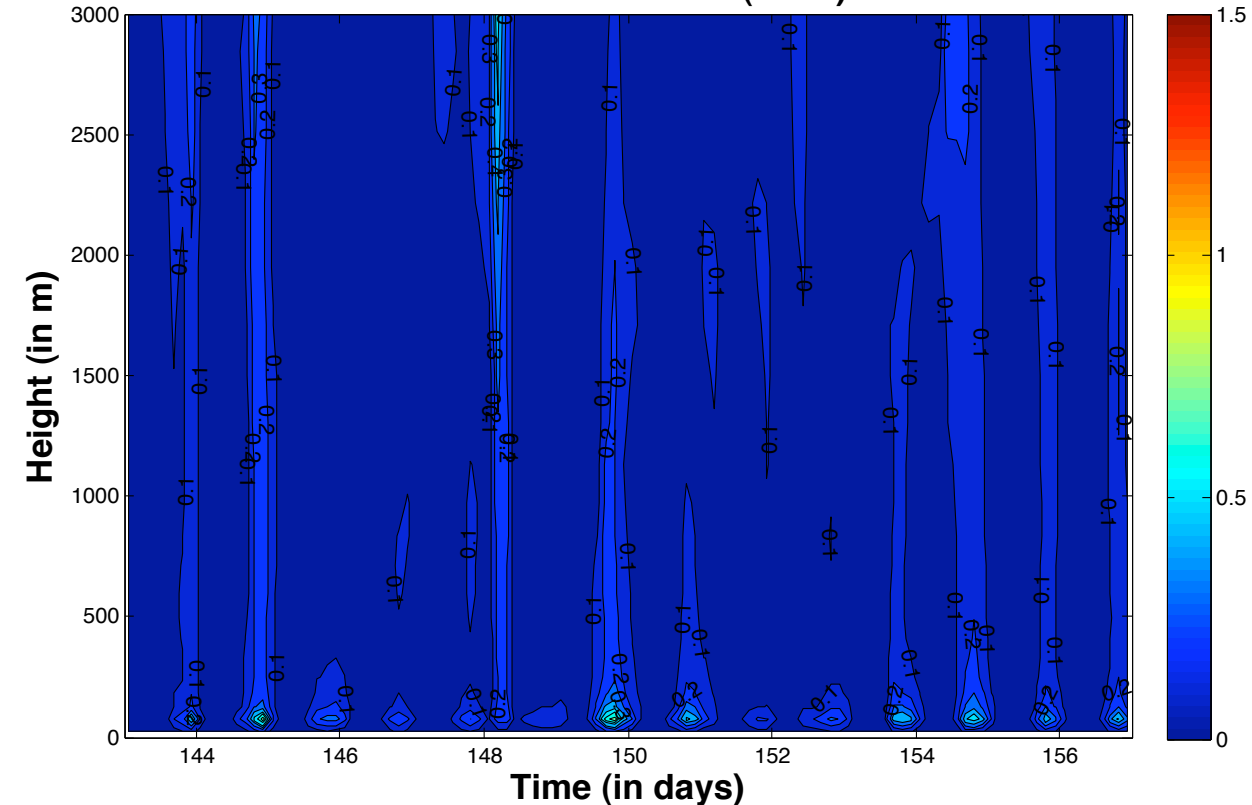
Run 308a – 208a TKE SGS (m^2/s^2)



Run 308a TKE SGS (m^2/s^2)



Run 208a TKE SGS (m^2/s^2)



TKEres, TKEsgs, TKEtot

(time_hgt_153_157_run308a_TKEsgs, time_hgt_153_157_run208a_TKEsgs)

