

Atmospheric Sciences 5220
Exercise 5: Boundary Layer Evolution
Due Oct 3, 2013

Problems:

1. WH problem 9.22
2. WH problem 9.25
3. WH problem 9.27 (In this problem, “surface heat flux” refers to $\overline{w'\theta'}$, and the total accumulated surface heat flux is 5100 K m, not 5100 km.)
4. Sketch profiles of potential temperature and wind speed in the boundary layer during fair weather over land in the summer at the following times of day:
 - (a) Mid-afternoon
 - (b) Shortly after sunset
 - (c) Shortly before sunrise
5. (a) List and describe two similarities and two differences between closed-cell and open-cell convection in marine boundary layers.
(b) Which of these two cloud regimes would you expect to have the greatest impact on the surface radiation budget? Explain why.