

AST 301

Homework #11

Due Wednesday Dec. 3

1. On a computer with an internet connection, go to phet.colorado.edu.

Choose 'Play with sims'.

Choose 'Heat and Thermo' (on left).

Choose 'The Greenhouse Effect'.

Choose 'Run Now!'.

Fly me in.

Slide 'Greenhouse Gas Concentration' to None.

- a) Describe what is happening. Wait for the temperature to stabilize and watch the temperature for a while. Note the average temperature. Why are there more infrared photons going out than visible sunlight photons coming in? Is this an equilibrium?
- b) Add a cloud or two. Describe how things change. Note the average temperature after it stabilizes. Note that fewer sunlight photons are reaching the ground now, but the temperature went up a bit. Why is this?
- c) Remove the clouds and add greenhouse gasses by choosing 'Today'. Note that infrared photons now scatter off of molecules in the atmosphere and some return to the ground. What is the average temperature now? Why did it change in the way it did?
- d) Try other options, like different times, or different greenhouse gas concentrations, or clouds with greenhouse gasses, and describe what you see. Give an explanation for the way the temperature changes.