## EAPS 53600: Introduction to General Circulation of the Atmosphere HW 01: Climate context for large-scale circulations

Reminder for quantitative problem-solving (when applicable): 1) manipulate equations first, plug in numbers last. 2) Double-check units.

Motivating question: would our atmosphere be different if air didnt move?

Let's translate this into a specific, testable hypothesis: If air didnt move, the equator-pole surface temperature gradient would be stronger than it is today.

Quantitatively test this hypothesis using a combination of Hartmann Ch 2-3 and a simple model for a single atmospheric column. There are two types of models available online that you may choose from:

- 1. Radiative equilibrium: http://singh.sci.monash.edu/Nlayer.shtml
- 2. Radiative-convective equilibrium: http://rcmodel.mit.edu/

For temperatures on the real Earth, you may simply use figures from either book, though you are welcome to analyze and plot your own data (e.g. reanalysis) if you like.

For your answer: 1) succinctly state your methodology for testing the hypothesis and explain why you chose this method, 2) make a plot of your quantitative results accompanied by a concise explanation, 3) state your conclusions in the context of your hypothesis, and 4) describe key assumptions in, or limitations of, your analysis and what methods could be used to more robustly test your hypothesis.