

PCC 587 Final Project: Write-up due December 10, 2009

Work individually (no communication with fellow students at all – ask Dargan or Steve if you have questions). Answer both questions.

1. What would the climate of Earth be like if there were no clouds, i.e., if there was no condensed water or ice suspended in air? You can assume that whenever condensation (or freezing) occurs, raindrops (or frozen precipitation) are formed and immediately fall out. Describe in detail (one page) the effects on the climate, including the radiation budget, temperatures over ocean and land, diurnal cycle changes, etc. Would you expect it to be harder or easier to get out of a snowball Earth (i.e., to deglaciate) if there were no clouds?
2. 50 million years ago, there were crocodiles on Ellesmere Island near 80 degrees North, implying much warmer temperatures at high latitudes compared to the present. If you were a palm tree in Wyoming, you would have looked up at the sky and seen that, on average, the clouds were moving more slowly than today. Explain why in detail. You may use words, sketches, or equations, or a combination of both to explain the causes and effects of this situation.