Homework # 1; due Wednesday, Feb. 1

Reading: Chapters 1-3 of Boecker and Grondelle's *Environmental Physics*

1. Look up numbers for the amount of heat generated in the interior of the Earth and Jupiter, and make a table with the following entries: radius of the planet, distance from the Sun, the appropriate Solar constant (in W/m^2), and internal heat per surface area; also in the same units. What are the sources of the internally generated energy, and whatever happens to it?

2. In class, we discussed that when the solar spectrum is plotted as radiation power per unit wavelength as a function of wavelength, the spectrum peaks in the green (around 500 nm); however, if one plots the spectrum as light power per unit frequency as a function of light frequency, one finds that the spectrum peaks in the infrared. Explain this using the basic relations between wavelength and frequency of light.

3. Estimate (only an order-of-magnitude estimate is required) the average number of solar photons reaching a square meter of the Earth surface.

4.
    a. Estimate (to within a factor of two) the characteristic height of the Earth atmosphere.
    b. What is the cruising altitude of commercial passenger airplanes? Is there relation to (a)? (Please explain.)
    c. What is the height of highest mountains on Earth? Is there relation to (a)? If not, please explain why there are no mountains that are higher.