EPS-238
2012 Final Project

Assigned Thursday, April 19
Due Monday, May 07 COB - Electronically, to my office, or by arrangement

Calculate the spectrum of the Earth as seen from space as back-scattered radiance *I* and as the albedo spectrum ($\pi \times$ radiance / (cos (SZA) $\times$ irradiance)); or, alternatively, and after some discussion, another planet of your choice.

Calculate from 280-1000 nm @ 1 nm resolution, then try degraded resolutions to see where essential features of the Earth's I/I_0 spectrum may be detected in broader spectral bands.

Include Rayleigh scattering.

Estimate average fractional cloud coverage, use cloud albedo of 0.8, and put clouds at 5 km.

Treat reflectance as Lambertian (which makes the spherical surface into a disk problem).

Note where the vegetation red edge would affect the spectrum had you included it. Might it be useful for extrasolar planet searches?

Wavelength-dependent surface reflectance values for various surface types are in albedo.dat (see notes therein); a splined version is also available.

O_3, H_2O, and O_2 cross sections at 1 nm resolution:
o2forfinal.dat
o3forfinal.dat
h2oforfinal.dat

The solar spectrum at 1 nm resolution:
solarforfinal.dat

I will be in the classroom April 26 for consulting on the project, and also generally available.