

EPS-238 2014 Final Project

Assigned Thursday, April 24
Due Monday, May TBD

Calculate the spectrum of the Earth as seen from space as back-scattered radiance I and as the albedo spectrum ($\pi \times \text{radiance} / (\cos(\text{SZA}) \times \text{irradiance})$); 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? (See the GOME slides in eps238_class2.pptx)

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

o3, h2o, and o2 cross sections at 1 nm resolution:

o2forfinal.dat

o3forfinal.dat

h2oforfinal.dat

The solar spectrum at 1 nm resolution:

solarforfinal.dat