

Study Questions - Lecture 5

1. Use the web applet on *modelled extraterrestrial irradiance*¹ to answer the following questions:
 - (a) At what latitude do we expect the highest yearly total K_{Ex} ? What is the consequence of this on global circulation?
 - (b) At what latitude do we expect the maximum daily total K_{Ex} ? How can we explain this?
 - (c) For Vancouver BC, when do you expect the highest K_{Ex} , and when the lowest?
2. If at $\lambda = 600$ nm the spectral absorptivity of a completely opaque object is equal $\zeta_\lambda = 0.75$, what is its spectral reflectivity α_λ ?
3. In the the PAR range, a green leaf shows a reflectivity of $\alpha_{\text{PAR}} = 0.11$ and a transmissivity $\Psi_{\text{PAR}} = 0.08$ (assume constant values across the PAR range). If incident *PPFD* on the leaf is $800 \mu\text{mol s}^{-1} \text{m}^{-2}$, calculate the absorbed *PPFD*.
4. Calculate the bulk Atmospheric Transmissivity Ψ_a for Port Hardy, BC on Vancouver Island, at 14:00 on February 15th if a pyranometer measures $K_\downarrow = 298 \text{ W m}^{-2}$
5. Assume that transmissivity Ψ_a does not change over that day, and calculate K_\downarrow for 10:00 (same location, same day).

¹<http://www.geog.ubc.ca/courses/geob300/applets/latitude/>