# AST 300B – Fall 2018
In-class Problems Due: Monday January 22

3. Assume that the Sun radiates isotropically.

    (a)   Calculate the total specific intensity and the flux emerging from the surface of the Sun? Quote your answer in both cgs and MKS units.

    (b)   Radiogenic heating from the radioactive decay of isotopes in the mantle and crust (predominantly ^{238}U, ^{232}Th, ^{40}K, and ^{235}U) and primordial heat left over from the formation of the Earth result in approximately 47 Terawatts of heat flowing from the interior of the Earth to the surface today. This heat drives plate tectonics and geological processes. How does the geothermal flux coming from the interior of the Earth compare to the flux of radiation from the Sun (quote as a percentage)?

$mW\,m^{-2}$

23 - 45	75 - 85
45 - 55	85 - 95
55 - 65	95 - 150
65 - 75	150 - 450
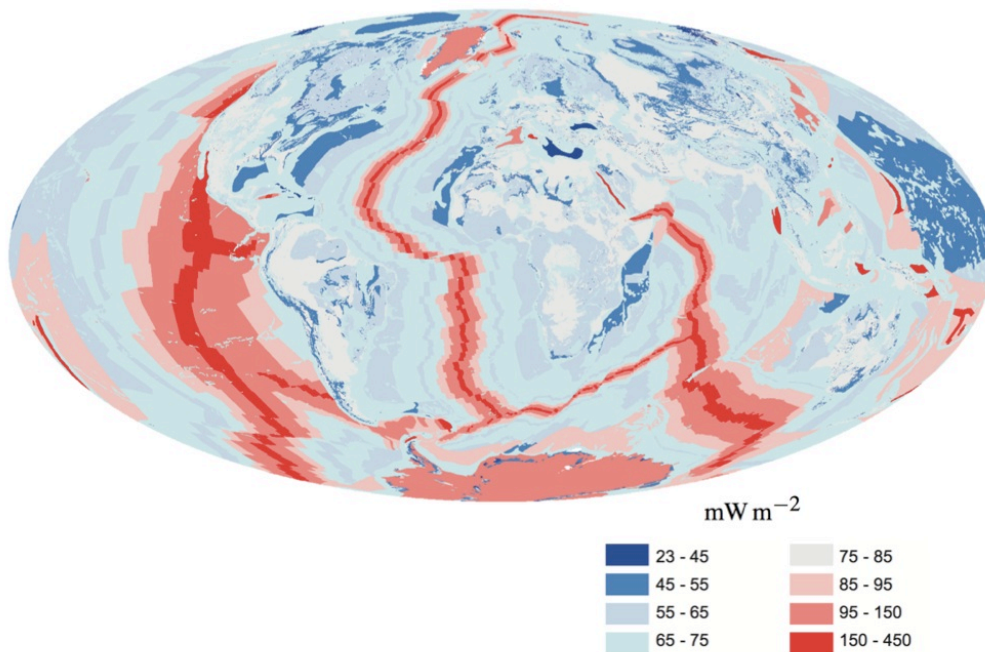
An "internal heat" map of the Earth.

4. Spiral and elliptical galaxies have azimuthally-averaged surface brightness that may be fit by a "Sersic profile":

$$I(\theta) = I_{pk} \exp[-\beta(\theta/\theta_0)^{1/n}]$$

where I_{pk}, θ_0, β, and n are parameters that are constant for a given galaxy. Elliptical galaxies and the bulges of spirals have n ~ 2 – 6 (usually ~4) while spiral galaxies that are disk dominated are found to have n = 1. What is the flux observed for a disk-dominated spiral galaxy? HINT: Make an assumption about the limits of integration to make this simple.

A face-on spiral galaxy