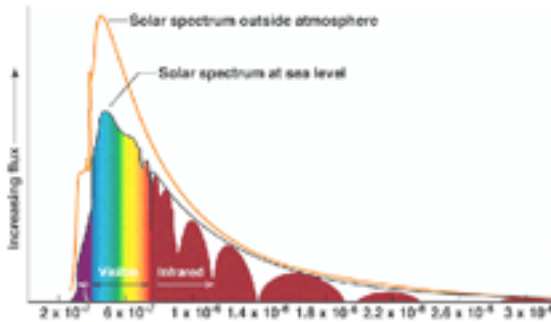


Wavelength, visibility, and temperature

The difference between radiation and sunlight.



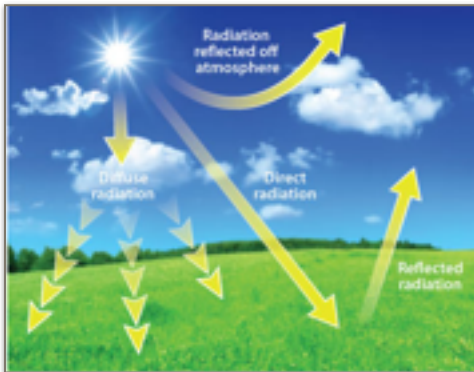
Radiation is one of the three main methods of transferring heat. In particular, the solar radiation is the radiant energy emitted by the sun into the space, produced by the reactions of nuclear fusion that happen in to the sun core. The thermonuclear reactions produce electromagnetic radiation at various frequencies or wavelengths, which propagate in space carrying with it the solar energy.

The sunlight is only a portion of electromagnetic radiation produced by the sun. Indeed, the solar radiation is not concentrated on a single frequency, but it is distributed over a broad spectrum of non-uniform

amplitude. Only a very small part of the spectrum contains radiation visible to the eye (visible range spans 380 to 780 nm). The human eye can not see electromagnetic radiation beyond the violet end of the spectrum (ultraviolet range spans 100 to 400 nm) and the area below the red zone (infrared range spans 700 to 1,000,000 nm).

The atmosphere filters to a certain extent the solar rays, as does every body, causing: a reflection and an absorption which causes an increase in temperature, following which re-emits radiation in all directions (Wien's Law).

The sun is not the only thing that emits radiation. All objects above -273 C (absolute zero) radiate energy, therefore the correlation between temperature and radiation.



Direct radiation: is the that part of the solar radiation that travels directly to the surface of the earth.

Diffuse radiation: also called indirect, is the proportion of radiation that hit at least one particle of atmospheric gases by changing angle of incidence and that still comes down to the ground because of it direction.

Reflected radiation: is that portion of incident solar radiation reflected from the earth's surface due to the albedo (reflection coefficient).

During days with clear sky and the sun is very high, direct radiation is around 85% of the total solar radiation and diffuse radiation is about 15%. As the sun goes lower in the sky, the percent of diffuse radiation keeps going up until it reaches 40% when the sun is 10° above the horizon.

In higher latitude, the percentage of the diffuse radiation is greater than in lower latitude. Also, the percentage of the total radiation that is diffuse radiation tends to be higher in the winter than the summer in these higher latitude. The sunniest places, by contrast, tend to have less seasonal variation in the ratio between diffuse and direct radiation.