

Box 1: The Electromagnetic Spectrum (adapted from Mackenzie, 2003)

The major source of energy for the Earth's surface is radiant energy from the sun. The sun's radiation travels through space as electromagnetic radiation. One way to characterize this radiation is by its wavelength. A wavelength (Figure 1.1) is defined as the distance between two consecutive wave crests (e.g. peaks) or troughs. The amount of energy in radiation is dependent upon its wavelength.

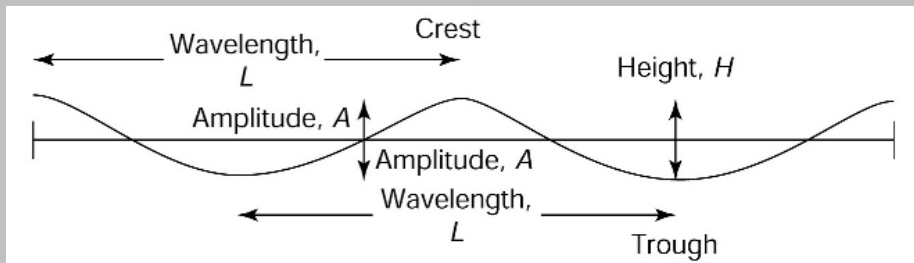


Figure 1.1. Wave description. (After Mackenzie, 2003).

The shorter the wavelength is the stronger the radiation. Hot bodies, like the sun, emit shorter wavelength radiation while cooler bodies emit longer, less intense, radiation. The surface temperature of the sun is 5480°C . Objects in this temperature range emit radiation with wavelengths in the 0.2 to 3.0 micrometer range, which is in the ultraviolet, visible, and infrared range (Figure 1.2). The sun emits 95% of its radiation in this wavelength range. The sun gives off a smaller amount of gamma, radio, and x-ray radiation. Both gamma and x-ray radiation are very powerful, can penetrate most objects, and are very harmful to life. Gas molecules in the outer atmosphere absorb both of these types of radiation. Ultraviolet radiation is also dangerous to life. UV radiation is mostly absorbed in the stratosphere with just a small percentage reaching the Earth's surface. Visible light reaches the Earth and human eyes are sensitive to this wavelength region.

Figure 1.2. Electromagnetic spectrum. (After Mackenzie, 2003).

