Dealing with Temperature of Star

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The sun has been getting hotter over time, which increases the radiation emitted from our star. The rate of increase for both temperature and radiation was at roughly a steady rate since it formed 4.5 billion years ago until the present, but it will be transitioning to a greater rate of emission with time in the future (http://faculty.wcas.northwestern.edu/~infocom/The%20Website/evolution.html and https://www.space.com/58-the-sun-formation-facts-and-characteristics.html). The following data were calculated using the BlackbodyRadiation software at sciencepickle.com/energy.

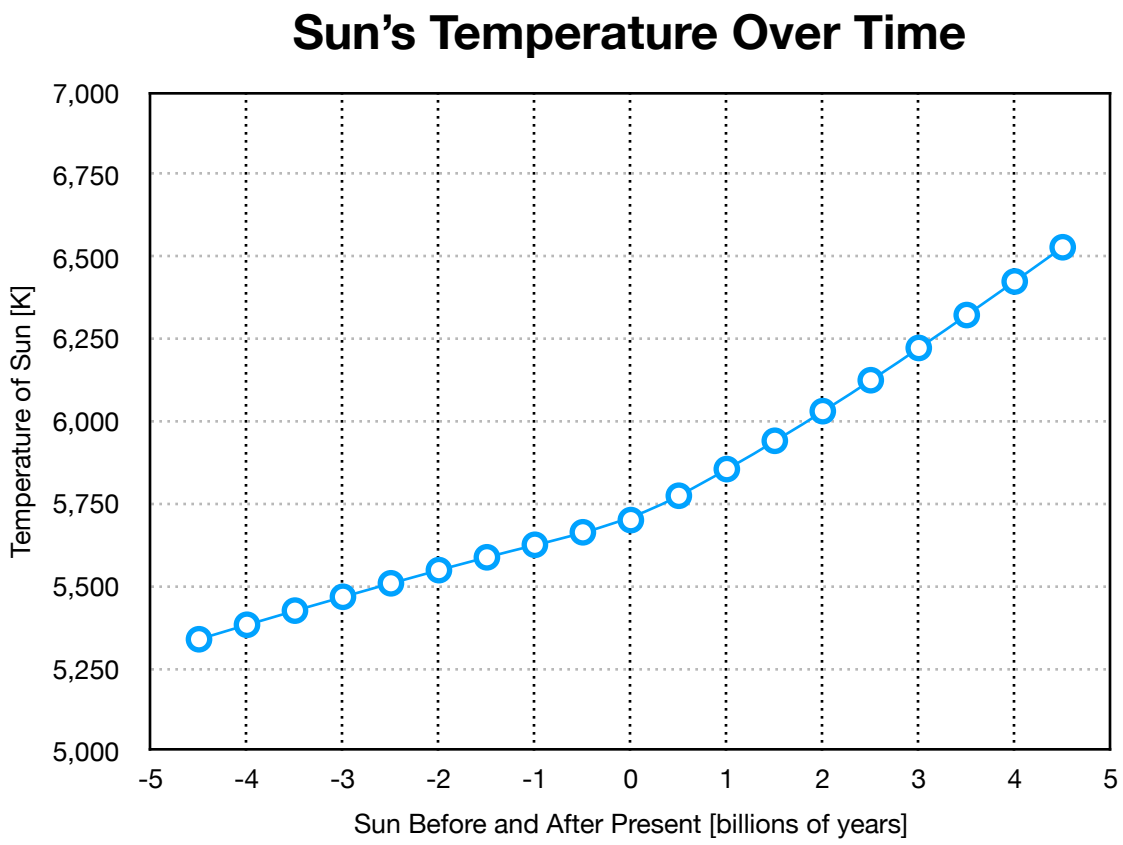

Figure 1. The Sun's temperature over its expected life time in billions of years.

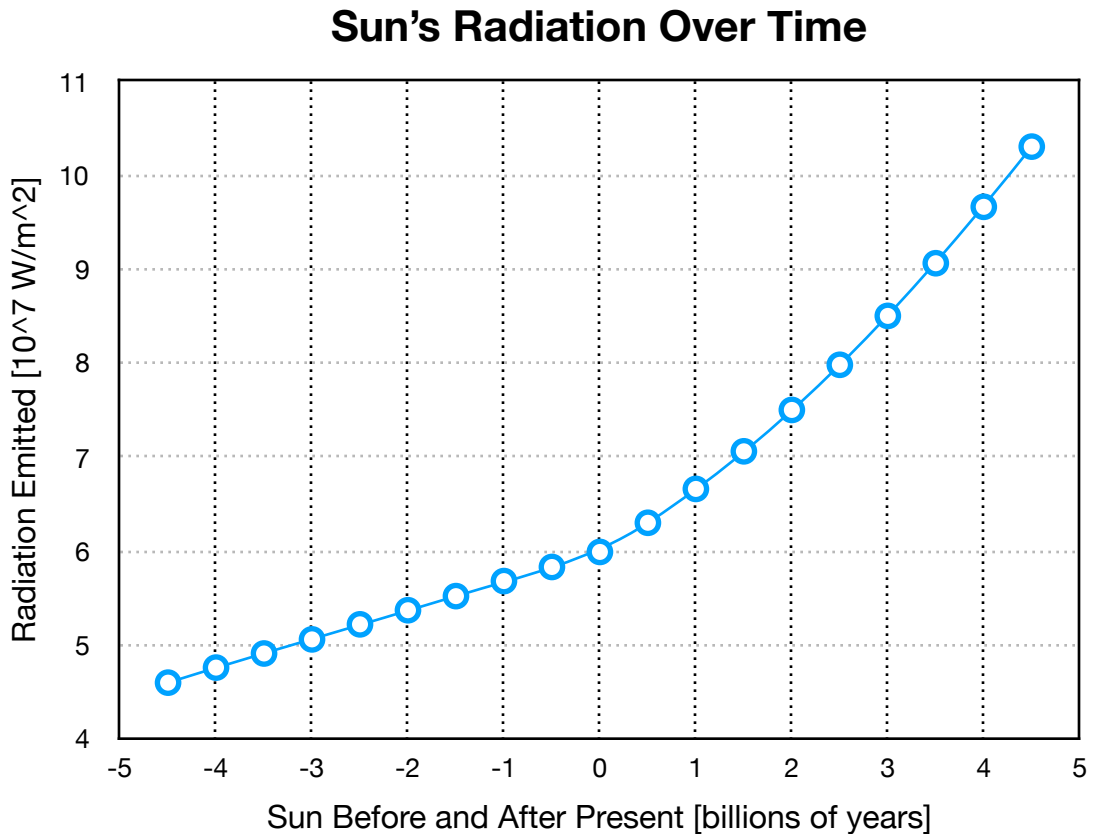

Figure 2. The Sun's radiation emitted over its expected life time in billions of years.

To relate *total daily solar radiation* values from Star-Planet Connection software (sciencepickle.com/star-planet-connection) to a star with a different temperature than our Sun, multiply the values by the ratio of the emitted radiation of the star to the radiation emitted by our present day Sun.

Example: Say the temperature of the star is 5000 K, then the star is emitting 3.54 x 10^7 W/m^2. This is 59.1% of what the Sun currently emits (3.54 x 10^7 W/m^2 / 5.99 x 10^7 W/m^2 = 0.591). If a latitude receives a total daily solar radiation of 4000 Wh/m^2 for a given time of year based on the current Sun's radiation, the same latitude on the planet with the cooler sun would receive 2364 Wh/m^2 (.591 * 4000) for the same orbital settings.