AOGS 2005

Solar wind extremes and their effects on the planetary environment

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Solar wind is a continuous flow of hot plasma from the solar corona. This flow is supersonic and a largely caused due to very high coronal temperature which helps plasma overcome the gravitational attraction of the Sun. The flow is largely radial in nature and fills the entire heliosphere around the Sun. The density and speed of this flow is highly variable both in time and space. This results into the common occurrence of the plasma irregularities in the medium around planets. These irregularities give rise to a very interesting phenomenon of radio astronomy called as interplanetary scintillation. By observing scintillation of a number of compact radio sources it is possible to estimate the solar wind speed and spectra of plasma density in the regions of interplanetary medium (which is largely inaccessible by satellites) around the Sun. Thus the technique of interplanetary scintillation provides very valuable information about solar wind. The solar wind speed and density is also regularly monitored by satellites. It is found that the flow of solar plasma is also controlled by the energetic events e.g. solar flares, filament eruptions, coronal mass ejections, coronal holes etc.. The volumes of data that have been collected over the last several decades have provided evidence of many extremes (both high and low type) in solar wind density and speed. Many low density and speed events are found to correlate with the co-rotating coronal streams. The environment of all the planets including the Earth is affected by both the high and low extremes of the solar wind in a variety of ways. Here some typical examples of solar wind extremes will be presented and their effect on the planetary environments will be discussed.