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Solar Activity and Space Weather

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Our star, the Sun, is the primary source of disturbance in the so-called “space weather” that is the dynamically variable state of the heliospheric environment including the Earth’s magnetosphere, ionosphere and atmosphere. Among various solar activities, the following three are typically considered as large eruptive events that propagate into the interplanetary space and may significantly impact the space weather: (1) solar flares (i.e., sudden and intense brightenings at wavelengths from radio to gamma-rays), (2) solar energetic particles (in the energy range of keV to GeV), and (3) large-scale ejection of magnetized plasma (such as coronal mass ejections and high-speed solar wind streams with the southward magnetic field). In this talk, we will address the key characteristics of the solar eruptive events obtained from extensive observations as well as examples of extremely large events both at the maximum and minimum of the solar activity cycle.