Eruptive phenomena on the Sun

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Abstract

The emergence and evolution of solar active regions is often accompanied by eruptive events that can release energy in the solar atmosphere and in some cases can be responsible for the ejection of magnetized plasma from the Sun. In this scenario, solar flares may involve several mechanisms, from the destabilization of filaments, to the reconfiguration of the magnetic field through the process of magnetic reconnection, and to the acceleration of particles that can heat the plasma at different atmospheric heights. On the other hand, solar flares and filament eruptions are sometimes correlated to coronal mass ejections that, traveling through the interplanetary space, might reach the Earth magnetosphere and give rise to phenomena studied in the framework of Space Weather.

We will review some recent improvements in our understanding of these phenomena and describe how new observations could help us in providing the answers to some questions that are still open.