
Global magnetic field cycle evolution and prominence eruptions

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Abstract

It has been shown that the evolution of the solar global magnetic field is characterized by relatively sudden rearrangements of the structure. It has also been found that the coronal magnetic field strength follows the global magnetic field structure evolution and undergoes abrupt changes, reflecting changes in activity within the large-scale magnetic patterns. The field strength decreases during the times of the reorganizations of the global magnetic field. The prominence eruptions can be the result of the removal of the restraining coronal magnetic field. When the coronal magnetic structure is destroyed and the field diminishes, the force, which prevent a filament from eruption, decreases and a prominence can erupt. This explains destabilization and eruption of prominences not associated with flares, and processes in active regions, or with a new magnetic flux emergence. Furthermore, during such a global magnetic field structure reorganization, the number of prominence associated coronal mass ejections increases. The properties of prominences and coronal mass ejections associated with the global magnetic field structure reorganization are analyzed and an eruption scenario is proposed.

Keywords: global magnetic field, prominences, coronal mass ejections, solar cycle

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