

Statistical study of filament eruptions with emerging flux

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Observations indicate that solar coronal mass ejections (CMEs) are closely associated with reconnection-favored flux emergence, which was explained in the emerging flux trigger mechanism for CMEs by Chen & Shibata (2000). Using numerical simulations, we made a parametric survey of the triggering factors: the polarity orientation and the position of the emerging flux, and the amount of the unsigned flux (Xu, Chen & Fang 2005). A diagram is presented to show the eruption and non-eruption regimes in the parameter space. In this paper a statistical study on the filament eruptions related to emerging flux is performed and it basically supports the theoretical results of our numerical simulation. Our results suggest that whether a CME can be triggered depends on both the amount and the location of an emerging flux, in addition to its polarity orientation. The work provides useful information for the space weather forecast.