

A FILAMENT ERUPTION OBSERVED IN ACTIVE REGION NOAA-11164 ON 2011 MARCH 07 AND ITS ASSOCIATION WITH A CORONAL MASS EJECTION

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Abstract:

Recent observations and theoretical studies have demonstrated that filaments and prominences eruption contribute to the initiation of coronal mass ejections (CMEs), which causes global disturbances in the solar atmosphere and interplanetary space. Therefore, investigations of filaments and prominences before and during their eruptions are crucially important. We present a detailed examination of a filament eruption associated with an M3.7-class flare that occurred on 2011 March 07 in active region NOAA 11164 (N24°, W60°). This event was captured in the H α spectral line (H α center, H α +0.8, and H α -0.8 Å) by the Flare Monitoring Telescope (FMT) located at the National University San Luis Gonzaga, Peru. Combining observations at H α +0.8 and H α -0.8 Å and applying the Cloud model, we quantitatively estimate the line-of-sight (LOS) velocity during the initial phase of the filament eruption. We found that the filament at this period of time was moving to the Earth with a LOS velocity of about 20 km s⁻¹. Furthermore, the propagation speed of the filament eruption in the plane of the sky was estimated by using the FMT H α data and AIA observations at 304, 193, and 171 Å. The erupting material attained a maximum velocity of about 500 km s⁻¹ in H α and 1000 km s⁻¹ in EUV. Additionally, we calculate the propagation speed of the CME by using the SOHO/LASCO-C2 observation, resulting in 2 200 km s⁻¹. Based on the morphology and kinematics of the filament eruption, we found a close association between the erupting material and the propagation of the CME, suggesting that eruption may have played an important role during the initial phase of the CME.

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