

Evidence of coronal loop interaction in a flare-CME event

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Abstract. The radio and multi-wavelength signature of coronal loop interaction is discussed in the event on November 28, 1998 with X-class flares and CMEs, observed by Nobeyama Radioheliograph (NoRH), YOHKOH/SXT/HXT, SOHO/EIT/LASCO, and Chinese radio spectrometers (2.6-3.8 GHz). The fluctuations at rising phase with bi-directional drift rates may show the signature of magnetic reconnection caused by loop interaction. There are two or three peaks in radio time profiles and spectra, which show that two or three flares are triggered in the process of loop interaction. The 17 GHz sources are composed of three parts with different time profiles and polarization feature. The formation of twisted loops in post-flare phase may indicate the start time of the CMEs in this event.

1. Observations

The general information of the event is shown in Table 1.

The H_{α} telescope of Purple Mountain Observatory shows a multi-ribbon flare at 05:31 UT (pre-flare), 05:41 UT (maximum), and 06:02 UT (post-flare), which is well coincident with the time evolution of YOHKOH/SXT loops studied by Li et al. (2000).

The NoRH 17 GHz sources at A, B, and C (maximum) in Fig.2a are coincident with the optical ribbons in Fig.1. Fig.2b shows a SOHO/EIT/MDI loop with two foot-points at A and C, and one loop-top at B. Fig.2c shows the formation of a twisted loop system at the post-flare phase associated with three CMEs by SOHO/LASCO.

There are multi-peaks of time profiles and spectra observed by Chinese radio spectrograph at 2.6-3.8 GHz (Figs.3a-b), which may be contributed by multi-sources and confirmed by NoRH data. Moreover, the dynamic spectrum in Fig.3c shows some bi-directional frequency drifts at initial phase, which may support the model of loop interaction to trigger magnetic reconnection and energy release.

The full paper will be done in near future in co-operation with Dr. H. Nakajima and the other Japanese colleague.

Acknowledgements

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References

Li, H., T. Sakurai, K. Ishimoto, and S. UeNo, 2000, PASJ, 52, 465

Table 1. The multi-wavelength data of a flare-CME event on November 28, 1998

Wavelength	Star Time	Maximum	End Time	Feature
H_{α}	05:32 UT	05:48 UT	06:35 UT	Multi-ribbons
YOHKOH/SXT	04:54 UT	05:52 UT	06:45 UT	Multi-loops
YOHKOH/HXT	05:35 UT	05:41 UT	05:50 UT	Foot-point
NoRH/NoRP	05:35 UT	05:42 UT	05:50 UT	Multi-sources
BAO Spec.	05:37 UT	05:42 UT	05:50 UT	Multi-peaks
SOHO/LASCO	05:30 UT			Multi-CMEs

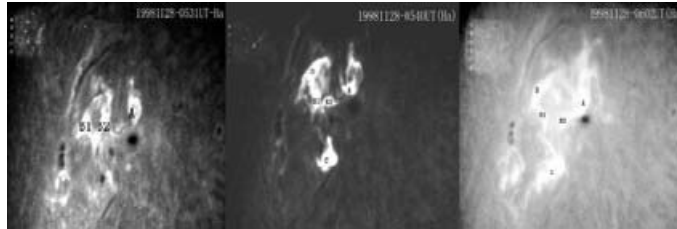


Figure 1. The images of H_{α} at initial, maximum, and decay phases

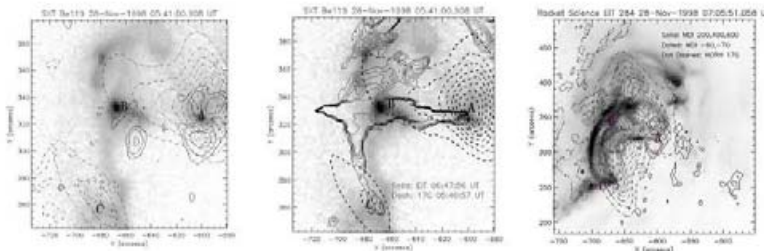


Figure 2. a. Color: YOHKOH/SXT. Solid and dashed: SOHO/MDI. Dot-dashed: NoRH 17 GHz. b. Color: YOHKOH/SXT. Solid: SOHO/EIT. Dashed: NoRH 17. c. Color: SOHO/EIT. Solid and dashed: SOHO/MDI. Dot-dashed: NoRH 17.

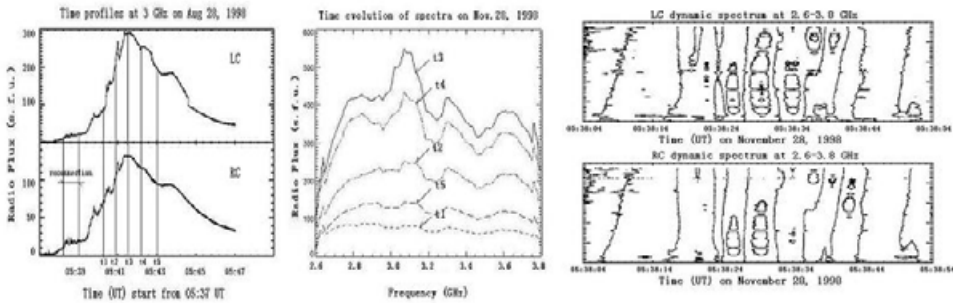


Figure 3. 3a. Time profiles of LCP and RCP at 3GHz. 3b. The spectra at t1-t5 in Fig.3a. 3c. The dynamic spectrum at initial phase in Fig.1.