

Relation between downflow motion seen above post-flare loops and energy release

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Recently, downflow motions above post-flare loops have been observed with Yohkoh and Transient Region And Coronal Explorer (TRACE), as one of flare-associated phenomena. They are thought to be the phenomenon which supports the magnetic reconnection model (McKenzie and Hudson 1999, McKenzie 2000).

We studied the X4.8 class flare which occurred on July 23, 2002 UT in the active region NOAA 0039. The H-alpha monochromatic images are obtained with the Sartorius Telescope at Kwasan Observatory, Kyoto University, and they clearly show the evolution of the post-flare loops and the separation of the two ribbons. Moreover, the extreme ultraviolet (EUV) images of the flare, which was taken with TRACE, show dark downflow motions above the post-flare loops.

We examined the relation in detail between the downflow motions and the energy release. At the time of the downflow motions, the bursts of nonthermal emissions in hard X-ray and microwave, whose data are obtained with RHESSI and Nobeyama Radioheliograph, respectively, are seen. This result means that the downflow motions occurred when strong magnetic energy was released, and that they are, or strongly correlated with, the reconnection outflows.