

B22a Observations of magnetic field reconnection at the base of EFR surges

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We found conspicuous $H\alpha$ surge activities at the earliest stage of active regions and suggested that the $H\alpha$ surge is one of the first manifestations of the active region birth (Kurokawa 1988). We call such $H\alpha$ surges as EFR surges. From the morphological studies of EFR-surges, we presented a schematic model in which the surge is produced by the reconnection between the emerging flux and the pre-existing surrounding magnetic field of opposite polarity (Kurokawa and Kawai 1993). Yokoyama and Shibata (1996) succeeded to reproduce it by numerical simulation. We found longitudinal magnetic field flux of an isolated polarity increased at the bases of most surges during and after the surge activities (Sano and Kurokawa 2005). We also found magnetic field cancellation between one polarity of emerging flux and the surrounding opposite polarity at the surge base (Yoshimura et al. 2003, Brooks and Kurokawa 2005). Those observational evidences are all compatible with the reconnection model of the EFR surge. Liu and Kurokawa (2004) pointed out the changes of transversal magnetic field at the surge base as an evidence of magnetic field reconnection. We have never obtained yet, however, any conclusive evidences of the magnetic field reconnection due to the lack of any continuous vector magnetic field measurements with high accuracy and high spatial resolution up to now. The vector magnetograph of SOT aboard Solar-B will first give us opportunities to make accurate observations of the temporal changes of three-dimensional magnetic field during the surge activities at the colliding edges of emerging flux regions. We will challenge to find some clear evidences of magnetic field reconnection there with SOT and EIS.