M14b Study on a surge on Aug 30, 2001

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A solar surge event (in AR 9591, Aug 30, 2001) with multi-instrument and multi-wavelength observations is presented. *TRACE* white-light maps, Huairou vector magnetograms and Hβ filtergrams showed that this surge was closely associated with new bipoles that emerged in one hour. Evidence of enhanced magnetic cancellation was revealed from the magnetic field evolution at the footpoints of the surge where we also identify simultaneous surge-flaring and bright points in the Hβ filtergrams and the white light images, respectively.

In particular, interesting findings for this surge are that (1) The magnetic reconnection may occur in low photosphere with pronounced photospheric bright points (nanoflares), (2) In vector magnetograms, fresh transverse field segments seemed to connect the emerging flux with the ambient cancelled field at the base of the surge during its ascending period, (3) The preceding spots of the emerged bipoles quickly disappeared in white-light observations when surge activities stopped, and (4) *TRACE* UV (1550Å) channel showed a bright surge ($\sim 10^5$K) well correlated with the dark Hβ surge ($\sim 10^3 - 10^4$K). The surge was ejected near one footpoint of a large-scale coronal loop system, which became flaring during the surge. We estimate the magnetic energy released from the site of the cancellation, kinetic energy of the surge and the thermal energy for the loop brightening in SXR, finding that the magnetic reconnection could supply enough energy for the surge activities and the loop heating. For this Hβ surge, all the correlated phenomena in other wavelengths (white light, UV, EUV, SXR) were in good temporal and spatial relationship. These facts support the magnetic reconnection model for surges, in which the emerged magnetic flux will reconnect with the pre-existing oblique coronal field.