Japan Geoscience Union Meeting 2012
(May 20-25 2012 at Makuhari, Chiba, Japan)

PEM07-22 Room:304 Time:May 22 16:45-17:00

Spatio-temporal Correlation between Pre-flare Brightening and Magnetic Structure in Flare Productive Active Regions

BAMBA, Yumi[1*], KUSANO, Kanya[1], YAMAMOTO, Tetsuya[1], Takenori Okamoto[2]

[1]STEL, Nagoya Univ., [2]National Astronomical Observatory of Japan

Solar flares are explosive phenomena, in which magnetic energy stored in the solar corona is converted to thermal and kinetic energy. Although it is widely accepted that solar flares are driven by magnetic reconnection, the onset mechanism of flares is not yet well understood, and the predictability of flare occurrence is still severely limited. Recently, Kusano et al. (2012) revealed that the trigger process of solar flares is controlled by the orientation of emerging magnetic flux, and they proposed that there are two different types of flare onset, in which different configurations of photospheric magnetic field are relevant to the trigger of flares. In this study, aiming at the examination of this model, we analyzed the spatio-temporal correlation between pre-flare brightening and magnetic structure in several flare productive active regions. We sampled four different major flares (X3.4 on December 13 2006, X1.5 on December 14 2006, M6.6 on February 13 2011, X2.2 on February 15 2011), which were observed by Hinode/SOT , and analyzed the pre-flare brightening of Ca II H line with the filter magnetograms (SOT/FG). As a result, we can find that all the flares had the ”flare-triggering regions”, which are consistent with the preferential configurations for the flare onset predicted by Kusano’s model. Furthermore, we reveal that the 2006 December 13th event and the 2011 February 13th and 15th events could be classified to the different types of flare onset scenarios, which are called Opposite-Polarity (OP) type and Reversed-Shear (RS) type, respectively.

Keywords: Sun, Solar-flare, Solar active region, Magnetic field