M11b The Proper Motion of Sunspots and Its Relation to Flare Onset

○ C. Yatini(LAPAN)、Y. Suematsu(NAOJ)

Solar flares have been believed to be due to a sudden energy conversion process prior to their onset. The suddenness of energy release especially at the beginnings of solar flares and the acceleration of particles to high energies has led most theoreticians to look to magnetic energy as the storage mechanism for flares and plasma instabilities as the triggering device. The movement of sunspot renders interesting problem for flares studies, because it is directly associated with magnetic energy releasing mechanism. It is well known that the probability of flare occurrence increase when sunspot proper motion suggest collision or other stressful configuration. It also generally accepted that flares usually appear in the vicinity of fast-moving new spots and at the places of high magnetic gradients, and might be triggered by this aggressive motion. It is suggested that the proper motion of the sunspots should have close correlation with flare. Therefore it seems to be useful to know how and when the magnetic energy is transformed into the flare energy. Four active regions were studied as to their spot motions before the flare onset. We used Hα flare and active region (sunspot) images from the Solar Flare Telescope, NAOJ. Using a local correlation tracking technique, we found that the sunspots located on the flaring region underwent motion before the flare onset. These movements took place on bipolar spots, which changed their moving direction before flare started. The changes of such bipolar spots started 2.5 hours to 30 minutes before flare onset. Such changes are not found in non-flaring period of an active region. We found that these movements of spots are agreeable with the emerging flux tube geometry proposed by van Driel-Gesztelyi and Leka (1994).