[구SE-15] On the Optical Characteristics of Solar X-Ray Telescopes: Possible Relation between Vignetting Effect and Mirror Scattering

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Since early 90's, the solar X-ray telescopes such as Yohkoh SXT and Hinode XRT have observed coronal magnetic structures on the Sun's surface in the range of about 40' x 40' field-of-view (FOV) covering the full solar disk. Thus it has been stressed by the scientists that the optical structure of solar telescopes should be designed with care for improving the uniformity over a wide FOV. There would be, however, no unique solution in designing the optical system of a telescope for overcoming perfectly the problem of off-axis response variation. As a consequence, the correction of optical imperfectness of telescopes has become an important calibration step that should be performed beforehand when the observed images are to be used for photometric purposes. In particular, a special care should be taken when performing the temperature analysis with thin and thick filters for flaring activities observed at the periphery of the full FOV. From the analyses of both pre-launch calibration and in-flight observation data, the optical characteristics for describing the performance of solar X-ray telescopes, especially in view of their energy dependence, will be introduced and discussed in our presentation.

[초SE-16] Study of Short-Term Sunspot Motion toward Flare Onset Prediction

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Proper motion of sunspots in several active regions was studied to detect their indicator on flare onset, using data from the Solar Flare Telescope at Mitaka (four flaring active regions), TRACE (e.g. NOAA 0424, M1.7 flare on 5 Aug. 2003) and Hinode (e.g. NOAA 10930, X3.4 flare on 13 Dec. 2006). The proper motion of individual sunspots was derived using a local correlation tracking method. As a result, we found that the sunspots that are located under or close to a part of chromospheric flaring patches showed a change in their moving direction prior to the flare onset. The change in their movements took place a half to two hours before the flare onset. On the other hand, sunspots in non-flaring areas or non-flaring active regions did not show this kind of change. It is likely, therefore, that if a sunspot shows the particular movement, a chromospheric flare is to occur in its nearby region. In the most active regions, the part of flare ribbons was located on an emerging bipolar pair of sunspots. The disturbance in the usual motion of the bipolar sunspots and in other sunspots as well can be interpreted as a sign of magnetic shear development leading to final magnetic energy buildup before its sudden release. We suggest that the change in sunspot motion in a short time scale prior to the flare onset can be regarded as a good indicator in predicting the onset timing and location of chromospheric flares.