[구SE-15] Predictability of the f/g time series

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Large solar flares are associated with various aspects of space weather effects. Numerous attempts have been made to predict when the solar flare will be occurred mainly based on the configuration of the magnetic field of its flaring site. We analyze the time series of f/g which indicates a representative measure of the sunspot complexity to see whether it shows a possibility to be predicted without huge amounts of observation. Two kinds of analysis results are presented. One is from its power spectrum giving that there's no significantly persistent periodicity within a few days. Its de-trended fluctuation shows the Hurst exponent larger than 0.5 implying that the f/g time series has a long-term memory in time scales less than 10 days.

[구SE-16] Solar Flare Occurrence Probability depending on Sunspot Group Classification and Its Area Change

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We investigated solar flare occurrence probability depending on sunspot group classification and its area change. For this study, we used the McIntosh sunspot group classification and then selected most flare-productive six sunspot groups : DKI, DKC, EKI, EKC, FKI and FKC. For each group, we classified it into three sub-groups according to the sunspot group area change : increase, steady and decrease. For sunspot data, we used the NOAA's active region information for 19 years (from 1992.01 to 2010.12). As a result, we found that the probabilities of the all "increase" sub-groups is noticeably higher than those of other sub-groups. In case of FKC McIntosh sunspot group, for example, the M-class flare occurrence probability of the "increase" sub-group is 65% while the "decrease" and "steady" sub-groups are 50% and 44%, respectively. In summary, when sunspot group area increases, the probability of solar flares noticeably increases. This is statistical evidence that magnetic flux emergence is an very important mechanism for triggering solar flares.