Flaring Time Intervals of Solar X-ray Flares

Moon, Yong-Jae[1], Choe, Gwangson[2], Yun, Hong Sik[3], Park, Young-Deuk[1]

[1]Bohyunsan Optical Astronomy Observatory, Korea Astronomy Observatory
[2]Princeton Plasma Physics Laboratory, USA
[3]Astronomy Program, SEES, Seoul National University

Observed flaring-time intervals are examined using a set of X-ray flares stronger than C1 class erupted during the solar maximum between 1989 and 1991. The observed distribution of the flaring-time intervals is found to be well represented by a Poisson probability function, $P(t) = m\exp(-mt)$ with a mean flaring rate, m. Since the function is described by only one parameter m, it would be very helpful to forecast the occurrence of major X-ray flares.

For this purpose we have considered six flare producing active regions, AR 5395, AR 5747, AR 6233, AR 6545, AR 6659 and AR 6891 and showed that their flaring-time interval distributions are approximated by Poisson probability functions. As the result, the average flaring-time interval is found to range from 3.1 hour to 6.5 hour. It is also found that there is no systematic relation between flaring time intervals and X-ray fluxes. These findings support not only Rosner and Viana(1978) who claimed that flares occur as a Poisson process in time but also Wheatland et al. (1988) who showed that the flaring-time interval distribution of two dimensional "cellular automation" model is based on a Poisson process. It is concluded that solar flares appear to be triggered by random processes such as filament eruptions and emerging fluxes.