The long-term X-ray flux distribution of Cygnus X-1 using RXTE-ASM/PCA and MAXI observations

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Cygnus X-1 is one of the brightest x-ray sources. It consists of a blue supergiant star and a blackhole that orbit around each other. The source shows variability on different time-scales ranging from seconds to months. We studied the long-term flux distribution of Cygnus X-1 using RXTE-ASM and MAXI lightcurves. For MAXI data, each of the components of the histogram is better fitted by a log-normal distribution, rather than a Gaussian one. Their best fit centroids and fraction of time the source spends being in that component are consistent with those of the Hard and Soft spectral states. Thus, the long-term flux distribution of the states of Cygnus X-1 has a log-normal nature which is the same as that found earlier for much shorter time-scales. For RXTE-ASM data, one component corresponding approximately to the Hard state is better represented by a log-normal but for the other one a Gaussian is preferred and whose centroid is not consistent with the Soft state. Fitting the flux distribution with three components did not provide an improvement for either RXTE-ASM or MAXI data, suggesting that the Intermidiatory observations may not represent a separate spectral state, but rather they represent transitions between the two states. Analysis of an enormous number of pointed observations by a more sensitive instrument like the RXTE/PCA will provide significantly better information than the sky monitor data used here. We will be detailing the results obtained by analyzing the data obtained from the RXTE-PCA (Proportional Counter Array). We will see how flux obtained from ASM and PCA are correlated to each other.