

Gamma-ray bursts (GRBs) are one of the phenomena that still puzzle the astrophysicists. Due to their extreme luminosities, they are visible in cosmological distances. They could provide a tool for understanding the early Universe. This thesis focuses on the estimation of the total energy released by the GRBs, their luminosities and how these quantities depend on the redshift. For a sample of 28 long GRBs with known redshifts, a dependence of their total energies and luminosities on the redshift is found. The thesis further studied if this dependence is either an observational bias or a real astrophysical phenomenon. Firstly, proper use of k-correction revealed that it has little effect on the redshift dependence of these quantities. Secondly, a new approach has been proposed to investigate the redshift dependence of the luminosity function. Thirdly, selection effect has been found, when investigating the sample of bursts with known redshifts, implying a caution when combining data from different sources. All these efforts show that the observational bias can still explain the redshift dependence.