The potential effects of air pollution are a major concern both in terms of the environment and in relation to human health. In order to support environmental policy there is a need for accurate measurements of the concentrations of pollutants. Here, we explore the topic of preferential sampling, specifically the situation where monitoring sites in environmental networks are preferentially located either by design or dynamically over time. This means the data arising from such networks may not accurately characterize the spatio--temporal field they intend to monitor. Specifically, we examine long term changes in concentrations of black smoke using data from an extended period (1966-1996) from a long established network in the UK. Over this period, the number of sites reduced dramatically and there is the possibility of selection bias if the monitoring sites are kept in polluted areas. Bayesian models were used to model concentrations over time and space and to assess the evidence of preferential sampling. In cases such as this, with large spatial datasets, inference using MCMC can be a challenge due to computational issues and here we use Integrated Nested Laplace Approximations. The results presented here give support to the hypothesis of preferential sampling which has largely been ignored in environmental risk analysis and we explore strategies that may be used to adjust the annual averages to compensate for preferential sampling and the effects of estimates of risk to health.