

ABSTRACT

Results are presented from an intensive study of the stratospheric aerosol layer over Kingston (18°N , 76.8°W), Jamaica, made in 1976 and 1978-1979, using a ruby lidar system. The aerosol layer is found to extend up to an altitude of about 36 km, with the layer maximum varying between 20 and 26 km. The average behaviour of the scattering profiles above 26 km has been interpreted in terms of the Junge One-Dimensional aerosol model and a good fit has been obtained. Comparison has been made of the principal layer characteristics with those obtained from other lidar and from direct measurements. Short-term fluctuations in the layer, occurring over a few hours or days, have been studied and are believed to be caused by the movements of irregularities in aerosol concentration. The secondary layer, in the region at about 26 km, seems to be more variable than the 20 km layer. The behaviour in the backscattering at about 26 km height is examined carefully and a detailed study has been carried out to examine any possible relationship to the meteorological conditions. The long-term lidar record from 1965 - 1979 is presented, showing the fluctuating volcanic influence during this period. Except for the Soufriere Volcanic Eruptions of April 1979, there is no indication of any other volcanic contribution to the stratospheric aerosol layer during the

period of observations.

From the observational results, it can be seen that the enhancement during the Winter season at 16 to 18 km range is much stronger than the Summer season. One possible explanation for this, without supporting proof, is the transport of Saharan dust into the lower stratosphere which is expected to exhibit similar behaviour. Anomalous optical scattering was observed, at a height of approximately 16 km between 1st and 5th of May, 1979. This is discussed in relation to the relevant meteorological wind data and is interpreted as being due to the Soufriere Volcanic Eruption of April, 1979.