Lidar Measurements of Stratospheric Ozone, Temperature and Aerosols at 34.4°N (California) and 19.5°N (Hawaii).

1. Stuart McDermid and T. Daniel Walsh

Jet Propulsion Laboratory, California Institute of Technology
Table Mountain Facility, P. O. Box 36'7, Wrightwood, CA 92397, U.S.A.

Lidar measurements of stratospheric ozone, temperature and aerosols have been made at Table Mountain (TMF, 34.4°N, 117.7"W), California, since February 1988 and at Mauna Loa (MLO, 19.5°N, 155.6°W), Hawaii, since July 1993. Typically about 100 measurements have been made each year at each site and for each of the parameters. The measurements are fairly evenly spread throughout the seasons,

The poster will present three main themes:

A pre-Pinatubo climatology of ozone was established from four years of measurements prior to the eruption in June 1991. While the aerosol loading was still high measurements of ozone within the layers was not possible with the TMF lidar. However, since July 1994 the aerosol had receded sufficiently to re-enable measurements down to 15 km altitude. The monthly ozone concentration profiles observed since July 1994 will be compared with those from the pre-Pinatubo climatology. The evolution of the aerosol loading at TMF will also be summarized.

The newer lidar system at MLO can make ozone measurements in aerosol layers by using a Raman augmentation to the lidar technique. This technique also permits temperature measurements in regions where aerosols are present and improves the aerosol measurements by providing a measured atmospheric density profile to compare to rather than a model. While it has fallen substantially there is still enhanced aerosol at MLO from the eruption of Mt. Pinatubo. We will show examples of ozone profiles measured in regions with high aerosol. Comparison of the absolute and seasonal variations in the ozone, temperature and aerosol profiles between TMF and MLO will also be presented.

During the winter of 1994/95 very low ozone levels were observed at MLO. The NOAA Dobson indicated column amounts below 200 DU. The lidar profiles can be integrated to give the column amounts in the stratosphere, above 15 km, and it was found that the variations as a function oftime in the stratospheric (lidar) and total column (Dobson) were the same. The lidar profiles can be used to observe the time variations at specific altitudes. While the maximum ozone reduction appeared to be near 30 km the entire profile to >40 km was affected.

Acknowledgment: The work described here was carried out by the Jet Propulsion Laboratory, California Institute of Technology, under an agreement with the National Aeronautics and Space Administration.