AVERAGE AEROSOL SCALE HEIGHTS IN THE EKMAN LAYER

W. M. Culkowski and S. D. Swisher

Atmospheric Turbulence and Diffusion Laboratory
National Oceanic and Atmospheric Administration
P. O. Box E
Oak Ridge, Tennesse 37830

ABSTRACT

Routine daily vertical probing with a neodymium laser has produced, over a sixteen month period, a fairly complete picture of hourly and seasonal averages of aerosol scale heights in the Ekman sublayer of the troposphere. The afternoon scale heights correlate very well ($r = +0.94$), with the average daily solar radiation. Averaging the vertical diffusivities (K_z) in a manner similar to that used by G. I. Taylor for temperature differences, and comparing the results with a formula by Priestley for the heat flux component of eddy diffusivity (K_H), a correlation coefficient of $r = 0.95$ is obtained. Estimated residence times of the aerosols are about eight hours.