

Abstract Submitted
for the 4CF13 Meeting of
The American Physical Society

The behavior of Neutral Densities between 45 and 90 km Determined from Rayleigh Lidar Observations above Logan, Utah¹ DAVID BARTON, VINCENT WICKWAR, LEDA SOX, Physics and CASS, Utah State University, JOSHUA HERRON, Space Dynamics Lab, Utah State University — A Rayleigh-scatter lidar operated at the Atmospheric Lidar Observatory (ALO; 41.7° N, 111.8° W), part of CASS on the campus of Utah State University (USU), and collected extensive data between 1993 and 2004. From the Rayleigh lidar photon-count returns relative densities throughout the mesosphere, from 45 to 90 km, were determined. Using these relative densities three density climatologies were derived, each using a different density normalization at 45 km. The first normalized the relative densities to a constant; the second normalized them to the NRL-MSISE00 empirical model, which has a strong semiannual component; and the third normalized them to the CPC analyses model, which has a strong annual component. In each case the density profile for every night of a composite year was found by averaging the nighttime density profiles in a 31-day by 11-year window centered on that day. Despite the different normalizations, many common features were found in the seasonal behavior of the densities. One is a large seasonal variation maximizing in June at ~ 70 km. Another, above 80 km was a large shift in the maximum to earlier in the year. While these relative densities provide much useful information about mesospheric behavior, the current lidar upgrade will add an absolute.

¹Supported by USU, USU CoS & Physics, SDL.

David Barton
Researcher

Date submitted: 20 Sep 2013

Electronic form version 1.4