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TITLE: AIRBORNE CW LIDAR MEASUREMENTS OF ATMOSPHERIC BACKSCATTER AT 9.1 AND 10.6 μ M

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SIGNIFICANT ACCOMPLISHMENTS:

Atmospheric backscatter data collected during the GLOBE I and GLOBE II backscatter survey missions have been partially analyzed. These data were collected using the Marshall Space Flight Center's 9.1 and 10.6 μ m focused continuous wave (CW) CO₂ coherent detection lidars. In general, both data sets have shown reasonably good agreement with data collected by the Jet Propulsion Laboratory's pulsed nadir and zenith viewing CO₂ system and with the ground-based, pulsed CO₂ system operated by NOAA's Wave Propagation Laboratory. Generally good agreement was also noted with IR backscatter estimates produced by Mie calculations using aerosol size and composition data obtained during the GLOBE I and GLOBE II missions.

FOCUS OF CURRENT RESEARCH AND PLANS FOR NEXT YEAR:

Analysis of the GLOBE I & II data sets is to continue. In addition, a series of laboratory experiments have been defined and partially completed to improve understanding of the performance of the signal analysis equipment. The results of these investigations will be invaluable in producing the final data sets to be submitted to the GLOBE data base.

PUBLICATIONS:

Refereed Publications:

Gras, J., Platt, C., Jones, W., Huffaker, R., Young, S., Banks, S. and Booth, J., "Southern hemisphere tropospheric aerosol backscatter measurements -- implications for a laser wind system." Journal of Geophysical Research 96, Number D3, 5357-5367 (1991).

Conference/Symposia Presentations:

Rothermel, J., Jones, W., Srivastava, V., Jarzembki, M., and Hampton, D., "In-situ backscatter measurements over the Pacific Ocean using two coherent focused CO₂ lidars." Proceedings of the 71st Annual Meeting of the American Meteorological Society, Paper J-14.2, New Orleans, LA, January 13-18, 1991.

Hampton, D., Jones, W. and Rothermel, J., "A digital signal processing system for coherent laser radar." 7th Annual Technical and Business Symposium/Exhibition, Huntsville, AL, May 14-15, 1991.

Hampton, D. and Jones, W., "Design and performance of a digital signal processing system for coherent laser radar." Accepted for presentation at the 6th Topical Meeting on Coherent Laser Radar: Technology and Applications, Snowmass-at-Aspen, CO, July 8-12, 1991.

Rothermel, J., Jones, W., Srivastava, V., Jarzembski, M., and Hampton, D., "Remote tropospheric backscatter measurements at 9.1 and 10.6 micrometers with airborne focused Doppler lidars." Accepted for presentation at the 6th Topical Meeting on Coherent Laser Radar: Technology and Applications, Snowmass-at-Aspen, CO, July 8-12, 1991.