

TITLE: Overview of Global Scale Research Doppler Lidar Activities

Research Investigator: D. E. Fitzjarrald
Atmospheric Sciences Division
Mail Code: ED42
Marshall Space Flight Center, AL 35812
(205) 453-3104

Significant Accomplishments to Date in FY84:

1. Ground-based lidar experiments: The system sensitivity is being carefully calibrated and checked by means of ground-based tests. Sensitivity analysis is necessary to use the data in the determination of backscatter distribution.
2. Satellite lidar and backscatter: Analysis of ground-based data, system calibration, and planning for a global backscatter mission have been the primary activities in this area. The ground-based data and other analyses indicate that the system is not sensitive enough to measure the backscatter distribution adequately for a satellite lidar system assessment. The 84/85 data should provide a good start, however.

Plans for FY85:

We expect to have from the fall 1984 flights some quick-look publications on backscatter distribution before the start of the spring 1985 flights. Following the flights there will be data evaluation, quick-look science, and the starting of scientific analysis of the data.

The global backscatter mission will be planned. Cooperation between the various NASA centers will be arranged. We will investigate the possibility of cooperating with another center to get a more powerful laser to make backscatter measurements, upon completion of the 85 flight program.

Recommendations for new research:

Satellite Doppler lidar should be started on its way by making a global backscatter assessment, by design studies, and by performance studies.

SATELLITE DOPPLER LIDAR

2. Backscatter Data Analysis

- a. G. Kent, IFAORS
 - o SAM/SAGE
 - o GAMETAG
- b. W. Jones, MSFC
 - o focussed 10.6 lidar
 - o focussed 9.1 lidar
 - o pulsed lidar
- c. J. Rothermel, USRA
 - o ground-based pulsed lidar

SATELLITE DOPPLER LIDAR

1. Aerosol Physics/Backscatter

- a. D. Bowdle, USRA
 - o cv990 FSSP data
 - o MSFC focused, pulsed lidars
- b. G. Kent, IFAORS
 - o backscatter modelling
- c. C. Bohren, Penn State
 - o backscatter modelling

SATELLITE DOPPLER LIDAR

3. Satellite simulation/assessment

- a. D. Emmitt, Simpson Assoc.
 - o coherent mesoscale structures
 - o scanning, pulse requirements
- b. J. Bilbro, MSFC
 - o aircraft experiment

SATELLITE DOPPLER LIDAR

4. Backscatter Measurement

- a. W. Jones, MSFC
 - o focussed lidar
- b. J. Bilbro, MSFC
 - o pulsed lidar, calibration
- c. D. Fitzjarrald, et al., MSFC
 - o FY84/85 ADLS flights
 - o Proposal for FY85/86