

LIDAR DIRECTORY FORM

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LIDAR LOCATION (CITY, COUNTRY, LAT., LONG.): Madrid, Spain, 40.458N, 3.725W

SITE ELEVATION: 665 m

PARAMETER(S) OR CONSTITUENT(S) MEASURED:
Aerosols: extinction and backscatter coefficients profiles, ABL height

RESEARCH OBJECTIVES AND SPONSOR: Air pollution and climatological studies
(CIEMAT, Spanish Ministry of Education and Sciences, Spanish Ministry of
Environment, European Union, European Space Agency)

MEASUREMENT TECHNIQUE: Elastic backscatter and Raman lidar

MEASUREMENT RANGE: 0.25 – 10 Km

VERTICAL RESOLUTION: 3.75 m raw resolution, 15 m typical

FREQ. OF MEASUREMENT (TYPICALLY): 2-3 times/week

MEASUREMENT TIMES (TYPICALLY): 14.00 UTC and around sunset

LASER TYPE AND WAVELENGTH (s): Continuum Nd:YAG at 532 nm

LASER ENERGY/PULSE: 100 mJ/pulse

PULSE REPETITION RATE: 20 Hz

RECEIVER SIZE AND CONFIGURATION: 30 cm Newtonian telescope, co-axial configuration

DETECTORS USED: Licel PMT (Hamamatsu R7400U) at 532 nm and 607 nm

SIGNAL PROCESSING: Klett algorithm for daytime measurements and Ansmann algorithm for nighttime measurements (Raman channel operative)

ANALOG-TO-DIGITAL CONVERTER: Licel transient recorder: 12 bit, 40 MHz in analog mode and 250 MHz in photon counting mode.

COMPUTER: PC Pentium 4 , 2.8 GHz

PLATFORM (if applicable): Mobile Laboratory (truck)

PUBLICATIONS (5 recent and/or significant): [1-5]

- [1] F. Molero and F. Jaque, "The laser as a tool in environmental problems," *Optical Materials*, vol. 13, pp. 167-173, 1999.
- [2] F. Molero, M. Pujadas, J. M. Fernandez, M. P. Utrillas, J. A. Martínez-Lozano, R. Pedros, L. Alados-Arboledas, J. Lorente, V. Cachorro, A. M. D. Rodriguez, A. Labajo, B. D. I. Morena, J. A. Rodrigues, A. M. Silva, and H. Horvath, "Aerosol optical depth derived from lidar measurements during VELETA-2002 campaign," presented at Remote Sensing of Clouds and the Atmosphere VIII, 2004.
- [3] F. Molero, L. Alados-Arboledas, M. Pujadas, A. Alcántara, V. Cachorro, V. Estellés, F. J. Olmo, J. A. Martínez-Lozano, J. Lorente, J. P. Diaz, A. Labajo, B. D. L. Morena, H. Horvath, and A. M. Silva, "Comparison of aerosol size distributions measured at ground level and calculated from inversion of solar radiances," presented at Remote Sensing of Clouds and the Atmosphere X, 2005.
- [4] F. Molero-Menendez, L. Nunez, M. Pujadas, and F. Jaque, "Assessment of the performance of a DIAL system by comparison with a correlation spectrometer COSPEC V in SO₂ mode," presented at Spectroscopic Atmospheric Environmental Monitoring Techniques, 1998.
- [5] F. Molero-Menendez, L. Núñez, P. Salvador, M. Pujadas, and B. Artíñano, "Application of a lidar system to the estimation of the ambient aerosol source," presented at Lidar Remote Sensing for Industry and Environment Monitoring II, 2002.

COMMENTS: Lidar system in continuous improvement process.

PICTURES: