GROUND BASED LIDAR OBSERVATIONS OF AEROSOL AND CIRRUS CLOUDS OPTICAL PROPERTIES IN CENTRAL AMAZON DURING THE DRY SEASON

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A permanent UV Raman Lidar station, designed to perform continuous measurements of aerosols and water vapor and aiming to study and monitor the atmosphere on the weather to climatic time scales, recently became operational in central Amazon [1]. This paper presents its experimental characterization and first results. Data from one week of measurements during a dry season were analysed as a mean to assess the overall system capability and performance of the algorithms used for obtaining the aerosol optical properties. A comparison of the aerosol optical depth from the Lidar and from a co-located AERONET sun photometer showed a root mean square error of about 0.06, small compared to the range of observed AOD values (0.1 to 0.75) and to the typical AERONET AOD uncertainty [2]. By combining night time measurements of the aerosol lidar ratio (50-65 sr), backtrajectories calculations and fire spots observed from satellites we showed that observed particles originated from biomass burning. From the same dataset, our automatic algorithm based on [3] identified Cirrus clouds in 60% of our measurements. Most of the time these were distributed into three layers between 11.5 and 13.4 km. Average lidar ratio was 15-20 sr and optical depth 0.03-0.3. The systematic and long-term measurements being made by this new scientific facility have the potential to significantly improve our understanding of the climatic implications of the anthropogenic changes in aerosol concentrations over the pristine Amazonia.

References

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