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CACGP ABSTRACT:

Three Dimensional Investigation of Lower Tropospheric Aerosol and Water Vapor during ACE-2 by Means of Airborne Sunphotometry

Spectral (380 to 1558 nm) aerosol optical depth (AOD) and columnar water vapor (CWV) measurements obtained during the second Aerosol Chracterization Experiment (ACE-2) with the newly developed NASA Ames airborne tracking 14-channel sunphotometer (AATS-14) will be presented. Based in Tenerife (28.5^O N, 16.3^O W) AATS-14 was operated aboard a single-engine modified Cessna airplane (the Pelican) during 17 flights. The Pelican was able to fly as low as 30 m above the ocean surface allowing measurement of the entire overlying atmospheric column. Maximum (but constant) altitude (~3.8 km) flights during sunset allowed us to perform three successful in-flight Langley-plot calibrations of AATS-14. Having the Pelican fly narrow up or down spirals allowed us to retrieve vertical profiles of AOD and CWV. Differentiation of those profiles leads to aerosol extinction and water vapor density profiles. Finally, we estimate aerosol particle size distributions by inverting layer AOD spectra. Special emphasis will be placed on results derived from flights performed on July 8 and 17, 1997. On both days, the marine boundary layer and a higher layer containing Sahara dust can be characterized. Comparisons will be made with an aerosol lidar, ground-based sunphotometers, satellite retrievals and in-situ measurements aboard the Pelican.