

Cirrus clouds observations over the Amazon: Results from 3 lidar systems and radiosondings during the GoAmazon 2014/15 experiment

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The Green Ocean Amazon experiment took place in Manaus-Brazil, a large metropolitan area within a pristine forest, from January 2014 to December 2015. It aimed to study the interaction of the Manaus pollution plume with the biogenic aerosols, and the effects on cloud and aerosol life cycles. In this paper, we investigate the characteristics of the cirrus clouds as measured by three lidar systems, which were operated in different experimental sites during GoAmazon2014/15. The first is a UV Raman lidar, which is running operationally since 2011 at site T0e (2.89°S 59.97°W) 30 km upwind of Manaus. The second is the Visible Micropulse Lidar (MPL) of the DOE/ARM mobile facility installed at site T3 (3.21°S; 60.59°W) 80 km downwind of Manaus and measuring polarized elastically backscattered light. The third was the mobile visible Raman lidar system from IPEN operated during IOP2 (from Aug to Oct 2014) at site T2 (3.13°S, 60.13°W), 5 km downwind of Manaus. An evaluation of cirrus clouds base and top altitudes, temperature, optical depth and extinction-to-backscattering ratio distributions will be presented. Finally, an instrument comparison will be given, based on data acquired simultaneously when the mobile lidar was brought to operate side by side with the other systems. We show the results from this intercomparison for the range-corrected raw signals, backscattering coefficient profiles and cloud properties, taking into account the different laser wavelengths, and instrumental characteristics.