

AGU  
100  
ADVANCING EARTH  
AND SPACE SCIENCE

FALL MEETING

San Francisco, CA | 9-13 December 2019

## A13S-3172 - Long Term Characterization of Brown Carbon in Amazonia using AERONET and in situ Measurements

Monday, 9 December 2019

13:40 - 18:00

Moscone South - Poster Hall

### Abstract

Optical properties of aerosols in Amazonia have been measured over the last 19 years at several AERONET sites using CIMEL sunphotometers. Ground based measurements of aerosol absorption properties using AE33 Aethalometers were performed in several sites in Amazonia. Measurements were done in Central Amazonia (ATTO tower), as well as in Rio Branco, Cuiabá, Ji-Paraná, and Alta Floresta. The results show an important contribution to absorption by the brown carbon (BrC) component together with black carbon (BC). This behavior can be strongly observed at the wavelengths of 440nm and 470nm, for AERONET and AE33 measurements, respectively. Results from AERONET showed that, in sites dominated by biomass burning such as Alta Floresta, Rio Branco and Ji-Paraná, the BrC was about 20% of BC. In special, for the dry season of 2018 at Rio Branco, the BrC was about 9% of BC, with values of  $3.28 \pm 3.45 \mu\text{g m}^{-3}$  and  $0.34 \pm 0.58 \mu\text{g m}^{-3}$  for BC and BrC, respectively. The measured high variability in the ratio BrC/BC was due to different aging of biomass burning plumes that reached the site, some with high BC values of up to  $24 \mu\text{g m}^{-3}$ . On the other hand, in situ measurements at the ATTO Tower showed that the BrC component can account for 30% of total absorption. For the wet season of 2019, it was observed that BrC accounts for 28 % of BC, with mean values of BC and BrC of  $0.23 \pm 0.16 \mu\text{g m}^{-3}$  and  $0.054 \pm 0.075 \mu\text{g m}^{-3}$ , respectively. The high variability in this case was due to plumes of African biomass burning that reached the site in different periods. For central Amazonia, ground based in situ measurements and AERONET agree quite well in the in situ BrC determination, showing a well-mixed atmosphere due to strong convection.

### Authors

[Fernando Morais](#)

University of Sao Paulo

[Eduardo Landulfo](#)

IPEN/CNEN

[Paulo Artaxo](#)

University of Sao Paulo

[Marco Aurélio Franco](#)

University of Sao Paulo

[Joel Schafer](#)

Science Systems and Applications, Inc.

[Brent Holben](#)

NASA Goddard Space Flight Center