

## LIDAR first campaign in the industrial sites of Volta Redonda-RJ and Lorena-SP, Brazil

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**Abstract:** Air pollution is recognized as a risk factor for health. The emission of toxic gases and particulates, specially with diameter size smaller than 10  $\mu\text{m}$ , into the atmosphere by industries is correlated with increasing respiratory problems, mortality and cancer in some urban areas. Additionally the aerosol particles play an important role in the Earth's radiation budget and the understanding of their properties is important to address their effects on the climate and weather conditions. In this study we will present some results of aerosol vertical distribution retrieved using a mobile lidar system and the lidar system on board of the CALIPSO satellite platform. The synergetic use of these platforms helped to understand the impact of the aerosol suspended in the atmosphere in terms of its optical properties in two different sites between two main metropolitan areas of Brazil, which are São Paulo and Rio de Janeiro. In order to obtain a statistical characterization of the aerosol optical properties, level 2-version 4 data from CALIPSO were employed to retrieve the AOD and Lidar ratio values at 532 nm for Volta Redonda and Lorena sites. Lorena campaign was performed during a very dry period in the 2014 Southern hemisphere winter, where it detected the vertical distribution profile with several layers detached from the aerosol boundary layer (ABL) on 26th of June 2014. Volta Redonda-RJ campaign performed from the beginning of November until mid of December of 2018 provided detection of aerosol layers detached from ABL on 4th of December of 2018. We will present a brief description of the experimental apparatus, the data taking, the methodology and the main results which open up the possibility to investigate emission of toxic gases and particulates at this region which has high contribution to local atmospheric pollution due to the Presidente Dutra highway (BR 116), the Companhia Siderúrgica Nacional (CSN) and other metallurgical and cement factories.

**Keywords:** Lidar; CALIPSO satellite; tropospheric aerosol.

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