

sciforum-120655: Applying remote sensing techniques to investigate the trajectory of smoke plumes during biomass burning events

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The wildfires in Brazil in 2024 reached unprecedented levels, serving as yet another indicator of the effects of climate change. LIDAR measurements conducted in São Paulo detected intense aerosol plumes generated during the wildfire period in August and September in the Mato Grosso do Sul and Pará regions. This study investigates the potential transport of aerosol plumes generated by these wildfires to São Paulo. To analyze the relationship between these plumes and wildfires in other regions of Brazil, data from the recently launched EarthCARE satellite, backward trajectory analysis using the HYSPLIT model, and AERONET sun photometers and Raman-LIDAR measurements were utilized. As part of the EarthCARE satellite calibration and validation process, this study compared three days of LIDAR data collected for São Paulo. After validating the backscatter and extinction coefficients and the LIDAR ratio, the HYSPLIT model was used to determine the potential trajectories of the aerosol plumes on the days with the highest heat source index. Once the source locations were identified, their correlation with wildfire-affected areas was examined. Sun photometer data were analyzed to infer the properties of the aerosol plumes. The results indicated three trajectories that coincided with fire hotspots, enabling the identification of wildfires in the city of Corumbá (Mato Grosso do Sul) and São Félix do Xingu (Pará) as the likely primary sources of the aerosol plumes observed in São Paulo.



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