

ANALYSIS OF THE HORIZONTAL VARIABILITY OF THE ATMOSPHERIC BOUNDARY LAYER HEIGHT IN THE SÃO PAULO CITY USING CEILOMETER AND ELASTIC LIDAR DATA

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Abstract

Understanding the dynamics of the Atmospheric Boundary Layer Height (ABLH) is essential for carrying out studies on pollutant dispersion and/or air quality, since this atmospheric variable acts as a vertical limiter in the distribution of aerosols in the troposphere. Currently, ground-based remote sensing equipment elastic lidar and Doppler, microwave radiometer, etc. has been widely used to estimate the ABLH, providing results with high spatial and temporal resolution. However, such systems have low vertical representation, since they only represent a specific point. In this scenario, seeking to understand the vertical variability of the CLP in the city of São Paulo, this work presents a comparison between the ABLH estimated from data from an elastic lidar system located at IPEN (23.560° S; 46.752° W and a ceilometer, belonging to the Metroclima project (<http://www.metroclima.iag.usp.br/>), located in the CIENTEC park (-23.649° S; 46.623° W)). Measurements taken between 2021 and 2023, from 9 am to 6 pm, were compared, with the aim of evaluating only the convective period and also considering only the period in which the Convective Boundary layer is above the overlap of both instruments. The results demonstrate that in the absence of low clouds, the results obtained in both locations only present differences arising from the topography. This result validates some previous studies that were carried out, but with a shorter time interval. In addition, it was possible to validate the horizontal representativity of ABLH estimated from lidar/ceilometer data in non-complex regions.

Keywords: Elastic Lidar; Ceilometer; Atmospheric Boundary Layer Height.

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