

# ALGORITHMIC ANALYSIS OF TROPOPAUSE HEIGHT VARIABILITY IN SÃO PAULO UTILIZING RADIOSONDE DATA

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## Abstract

The tropopause, a fundamental boundary between the troposphere and stratosphere, serves as a crucial indicator of atmospheric stability, influencing the distribution of key trace gases. This paper offers a comprehensive decade-long analysis (2013–2023) of tropopause height variations over São Paulo, examining two distinct definitions: the Cold Point Tropopause (CPT) and the Lapse Rate Tropopause (LRT).

Utilizing Radiosonde data to capture vertical profiles of temperature and pressure, our algorithm calculates both CPT and LRT, illustrating their evolution over time. This analysis enables the exploration of seasonal, interannual, and long-term trends, providing valuable insights into the region's atmospheric stability and potential correlations between tropopause variations and significant meteorological events.

The results underscore the algorithm's efficiency in extracting tropopause heights from radiosonde data,

elucidating the strengths and limitations of both CPT and LRT definitions. Additionally, the findings shed light on the region's climate patterns, offering a foundation for future atmospheric sciences and climate research.

**Keywords:** tropopause height; radiosonde; algorithm.

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