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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Long-term trends of instability and associated parameters over the Indian region obtained using radiosonde network" *by* Rohit Chakraborty et al.

Anonymous Referee #2

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This paper estimates the atmospheric stability parameters from the radiosonde data over the Indian sub-continent (sub classified to six regions) and discusses the long-term trends. From meteorological point of view, the analysis of atmospheric stability parameter is important in examining the convective weather development. The manuscript is of interest, however needs major revision and careful consideration of the issues listed below.

Ln 40: projected a 236 % increase. Increase in a year/decade?

Ln 50: strong relationship. Whether the relationship is positive or negative. Elaborate.

Ln 76: How the homogeneity and the quality of the radiosonde data have been as

assessed. How the authors have taken care in raining condition or when there is saturation in humidity measurement?

Ln 96: In 37 years of data, how number of profile is more than ∼13514 (if there is one profile per day)

Lnb 104: Any reason for choosing cubic spline interpolation? Why not linear ?

Ln 105: Calculations of LCL, LFC, EL, CAPE, MLC, CINE etc are the key points of your manuscript. Please mention the formulas in the manuscript. Radiosonde measurement depends on balloon burst altitude. Is the calculation of instability parameters is performed for available radiosonde measurement height or the authors have restricted their analysis when the data is available up to minimum height level (like 20 km). Please discuss those points in detail for each station?

Ln 113: Do the radiosonde measure surface wind? How reliable is the surface wind data?

Ln131: Why the PCA is performed on the yearly data? Do the analysis is performed for all days or only for TSS and TSO days?

Ln 160: Why the authors need to compare with Chennai? Also couldn't find any comparison dataset? Is this monthly/yearly mean data? What the error bar describe? Why TSO, TSS, WRF and SRF don't have error bar? How trend is calculated? What is the slope value? What information one can extract from such trends? What the positive and negative value means? What is the meaning of increasing CAPE in the atmosphere?

Ln 168: What height?

Ln169: reduction in temperatures near 100 hPa (Fig.3l) plays an important role in modulating the total atmospheric instability and CAPE. Why 100 hPa? Do the authors have any hypothesis to demonstrate it?

Ln217: What is ttset analysis?

Ln241: Hence, the mid and upper tropospheric moisture plays a crucial role in modulating the Indian climate. This sentence is not clear.

Ln290: You dataset is for 37 years, how you can get periodicity up to 20 years?

Ln319: trends before and after the period 1996-2000 are significantly different from each other. Any reason? Any change in radiosonde sensor?

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