

## ***Interactive comment on “Retrieval of convective available potential energy from INSAT-3D measurements: comparison with radiosonde data and its spatial-temporal variations” by Uriya Veerendra Murali Krishna et al.***

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### Response to Reviewer # 1's Comments

Comment. 1 The INSAT-3D is a new satellite and the basic datasets need to be validated before CAPE calculation. So I suggest the authors to provide some analysis on how the INSAT temperature, humidity etc. performs over the Indian region, by comparing with radiosonde or reanalysis data. Since India has a large latitudinal extent from near equator in South to subtropics in the North, it is essential to investigate whether INSAT

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data compares well everywhere or there is some spatial inhomogeneity.

Response : We agree with the referee's suggestion that the Indian region has a large latitudinal extent and spatial inhomogeneity can exist in the retrieval of the satellite data sets. Earlier studies by Mitra et al. (2015) and Ratnam et al. (2016) assessed the temperature and humidity retrievals from the INSAT-3D measurements using GPS sonde, reanalysis and other satellite measurements over the Indian region. They found a good agreement of INSAT-3D retrieved temperature with GPS sonde, reanalysis and satellite estimates below 25°N. The temperature difference was 0.5K with a standard deviation of about 1K, and for humidity, a dry bias (20-30%) was observed between INSAT-3D and GPS sonde data. This is already mentioned in the manuscript.

Comment. 2 The authors need to highlight the advantages of their present study i.e. what new can we extract about CAPE by using the INSAT data. The authors mention in abstract that "In this work, an attempt is made for the first time to estimate CAPE from high spatial and temporal resolution measurements of the INSAT-3D over the Indian region". But there are many other satellites available back from many years and there are several studies related to CAPE over Indian region. So the authors need to discuss the why their work is important and how better it is from the previous estimates.

Response: Several satellites measurements are available which can provide profiles of temperature and water vapour with reasonable accuracies. Most of them are polar orbiting satellites and have limited overpasses especially in the tropics. The other limitation of these polar satellite measurements is poor temporal resolution, even though they have global coverage. The significance of the INSAT-3D is its geostationary orbit, providing the profiles of temperature and water vapour with high temporal (1 hour) and spatial resolution (0.1° × 0.1°) over the Indian and the surrounding oceanic regions. In the present study, the authors attempted to calculate CAPE from these high spatial and temporal resolution measurements of INSAT-3D and its performance assessment. To date there are no studies utilizing such high resolution data for such a long period to evaluate and understand the variability of CAPE. Hence, this study provides the direct

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usability of INSAT-3D data sets in the numerical weather prediction models for now-casting of thunderstorms and for severe weather conditions, which is lacking over the Indian region. The relative sentence has been added in the revised manuscript.

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