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Information content in the rainfall observed by INSAT-3D and IMERG: An intercomparison study over the north eastern region of India

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There has been a noticeable increase in the application of artificial intelligence (AI) algorithms in various areas, in the recent past. One such area is the prediction of rainfall over a region. This application has seen crucial advancement with the use of deep sequential learning algorithms. This new approach to rainfall prediction has also helped increase the utilization of satellite data for prediction. As, AI based prediction algorithms are based on data, the characteristics of it dominates the accuracy of the prediction. And one such characteristic is the information content in the data being used. This information content is classified into redundant information (information of past states in the current state) and new information. The performance of the AI based rainfall prediction depends on the amount of redundant information present in the data being used for training the AI model, more the redundant information (less the new information content) more accurate will be the prediction. Various entropy based measure have been used to quantify the new information content in the data, like permutation entropy, sample entropy, wavelet entropy, etc. This study uses a new measure called the Wavelet Entropy Energy Measure (WEEM). One of the advantages of WEEM is that it considers the dynamics of the process spread across different time scales, which other information measures have not considered explicitly. Since, the dynamics of rainfall is multi-scalar in nature, WEEM is a suitable measure for it. The main goal of this study is to find out the amount of information being generated by INSAT-3D and IMERG rainfall at each time step over the North Eastern Region of India, which will dictate the suitability of the two rainfall product to be used for AI based rainfall prediction.