

Possibility of using satellite microwave imagery as an alternative technique to obtain rainfall data in Sri Lanka

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Accurate measurement of rainfall is necessary to develop climate models and in disaster management under extreme events endangering the lives, property and resources within a society. The conventional method of measuring rainfall at ground based stations has its own advantages and disadvantages. In Sri Lanka, there are only 24 weather stations. In addition, there are 350 rain gauges located in various parts of the country. With the limited number of stations, the spatial frequency is low and localized variation of rainfall does not reflect in this system.

This communication describes an attempt made to understand the possibility of using satellite imagery techniques as an alternative method to determine the precipitation level in Sri Lanka. In this study, rainfall patterns in Sri Lanka occurring in the monsoon periods within the western coastal region, eastern slopes of central hills, and western slopes of central hills during the period 2009 to 2010 have been considered. Meteorological data were collected from the Meteorology Department, and corresponding satellite data related to rainfall were retrieved using an on-line visualization and analysis system TOVAS. Observations of matching and mismatching of daily rainfall within the two techniques were statistically analyzed focusing attention on separate regions and seasons in Sri Lanka.

It is found that the satellite imagery retrievals considered for 32 occasions on related months, did not exactly coincide with those values of ground based measurements provided by the Department of Meteorology. Results indicate that though rain gauges can give good temporal sampling, their poor spatial sampling can lead to significant errors in estimates of area-averaged precipitation rates. Detailed analysis of these data indicate the necessity of conducting an in-depth study in a selected area in the country with more rainfall measuring gages installed one each in a grid of 4 x 4 km similar to the spatial resolution of satellite images to understand the possibility of using satellite data to supplement ground base rainfall data.