

Suggested topics: Remote Sensing Applications/ Climate/Environment

Paper title: COMPARISON OF THE RAINFALL RETRIEVAL ALGORITHM FROM MODIS CLOUD PRODUCTS AND TRMM

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for ORAL presentation

ABSTRACT

This study explores the use of infrared and visible bands of the Moderate Resolution Imaging Spectroradiometer (MODIS) to retrieve rainfall estimates. Clouds were classified to low, medium and high level clouds using Cloud-top pressure and Cloud optical thickness (COT) from the MODIS Cloud Products (MOD06). The cloud classification together with Cloud effective radius (CER), Cloud water path (CWP), Cloud-top temperature (CTT) and COT were employed to estimate rainfall using automatic weather stations (AWS) as ground-truth. Rainfall estimates from the TRMM 3B42 product were also evaluated using the same data set from AWS. Rain and no-rain pixels for the developed MODIS rainfall estimate and TRMM versus AWS were assessed using parameters with the following results: Probability of detection- $POD_{MODIS}=0.30$ & $POD_{TRMM}=0.28$; Probability of false detection- $POFD_{MODIS}=0.11$ & $POFD_{TRMM}=0.05$; False alarm ratio- $FAR_{MODIS}=0.13$ & $FAR_{TRMM}=0.44$; Bias index- $BI_{MODIS}=0.67$ & $BI_{TRMM}=0.51$; Critical success index- $CSI_{MODIS}=0.22$ & $CSI_{TRMM}=0.23$; Percentage corrects- $PC_{MODIS}=0.76$ & $PC_{TRMM}=0.83$. The R^2 values of the MODIS algorithm and TRMM were 0.137 and 0.136, respectively. Our findings successfully demonstrate that MODIS cloud products can be used to estimate rainfall rate.

Keywords: MODIS, TRMM, cloud, rainfall, Philippines