NEW SCHEME TO IMPROVE THE DETECTION OF RAINY CLOUDS IN PUERTO RICO

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The Short Term Rainfall Prediction (STRaP) algorithm was designed for predicting rainfall rate. STRaP algorithm perform three principal tasks: (1) identify potential rainy clouds cells, (2) calculate the cloud motion vector to determine rainy cells displacement and (3) forecast the rain rate at each pixel in rainy cells. STRaP rainfall algorithm is based on radar and/or satellite data with linear and no linear regression equations. Six rainfall events were used to validate our proposed model. Puerto Rico was used as a testbed to study the warm raining clouds, since warm rain usually occurs in low-level liquid water clouds with no ice-phase process. Puerto Rico is heavily affected by rainfall due to warm-top convective processes that are induced by local sea breeze and/or orographic features. Validation results show that the algorithm underestimate rain rates. In order to improve the performance of the algorithm several sensors in different spectral ranges are being studied. Specifically, this work will focus on detecting warm rainy clouds using MODIS, GOES and NEXRAD data. The studied microphysical parameters extracted from MODIS are cloud optical thickness, droplet effective radius and cloud water path. GOES data include visible reflectance (0.65 μm), albedo (3.9 μm), and brightness temperature (10.7 μm). A regression approach was implemented to determine the rain/no rain pixels during the daytime. NEXRAD values are used as rain/no indicator and the predictors are the brightness temperature, albedo, and visible reflectance. The threshold for discriminating rain/no-rain was selected such that the Heidke Skill Score (HSS) is maximized.