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Evaluation of Rainfall Estimation Retrievals in Brazil

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In the last decades several rainfall estimations retrievals were developed to continuous monitor the precipitation on real time and on a daily/monthly basis. Besides this improvement, the algorithms still lack on regional adjustments since the retrievals are dependent on the precipitation physics, i.e., drops size distribution (DSD), type of precipitating system and its stage development for example. Based on this idea this study aims to present the major findings on the evaluation of rainfall retrieval over the continental area of Brazil. On the analyses of the diurnal cycle, the TRMM-3B42 3-hourly rainfall estimates were compared with a consolidated climatological weather station in São Paulo for the period of 5 year. The mean seasonal diurnal cycle shows that during the summer period, 3B42 is similar to the observations but the maximum rainfall peak lags 3 hours after of the observation, while in the other season it does not present consistent diurnal cycle. On the inspection of precipitation system dependence, a new microwave probabilistic algorithm (USProb) has been developed to capture the main precipitation characteristics observed in Brazil. This new algorithm is tested against 2A12, GSCAT and NESDIS algorithms by intercomparison with TRMM-2A25 and SPOL rainfall estimates during the TRMM/LBA-1999 field campaign. On rain area and rain volume USProb presented the lowest bias and low mean errors with high correlation, while 2A12 and NESDIS present highest errors. On the rainfall distribution measured by the PR-2A25 and the SPOL, USProb presented the best distribution, while 2A12 still presents the bi-modal distribution. Finally the DSD is tested on a microwave radiative transfer (Eddington model) model for the frequencies of 10 and 19 GHz. The commonly used Marshall and Palmer DSD is compared to 3 tropical DSD parameterizations (Brazil, Africa and Israel), and revealed that for the same rainfall rate and liquid water content a maximum of 4-8 K brightness temperature difference can occur. Based on this finding it is important to strength the importance of the differ-

ent precipitation characteristics observed in each region of the globe, especially if we are looking for real-time rainfall monitoring and the advent of the Global Precipitation Measuring (GPM) program.