Applications of Satellite Precipitation Data in Asia

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Satellite precipitation estimates have a variety of applications in weather and climate monitoring and prediction. The Precipitation Radar (PR) of Tropical Rainfall Measuring Mission (TRMM) provides direct measurement of precipitation and its vertical distribution. TRMM data is being used as a global reference against which precipitation data of microwave sensors of different satellites inclining KALPANA-1 Quantitative Precipitation Estimate (QPE) can be validated. Validation studies over sub-regional levels in India have shown promise in some of the regions whereas the algorithms need further fine-tuning for some other regions. On real time basis satellite precipitation estimates provide reliable rainfall information, particularly over the data sparse land regions and over the oceans. Satellite precipitation estimates over the oceans have provided new insights into the phenomenon like El-Nino/ Southern Oscillation (ENSO) and Madden Julian Oscillation (MJO) which have significant influence on the interannual variations of weather and climate of the globe. Indian summer monsoon is particularly impacted by these phenomena. The real -time satellite rainfall over the Indian and Pacific Oceans provides useful information on the status of ENSO and MJO. In day to day operational weather forecasting, the satellite rainfall is used to determine the rainfall distribution associated with intense weather systems like tropical cyclones and thunderstorms and to delineate the areas of heavy precipitation, particularly over the data sparse regions. Satellite precipitation data have enabled to have a reliable climatology of rainfall over the oceanic regions. The quantitative documentation of precipitation patterns using TRMM data with other precipitation estimates would be very useful in the study of interactive relationships between rainfall, sea surface temperature, synoptic systems like tropical cyclones, and climatic events like ENSO and MJO.