Deriving precipitation features in the Southeastern United States from long-term remotely sensed data

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The precipitation climatology of the Southeastern United States spans a very broad spectrum of precipitation regimes. A warm season that is characterized by isolated thunderstorms, mesoscale convective systems, and tropical cyclones, and a winter season characterized by widespread frontal rain, ice, and snowfall. Each of these types of precipitation systems impact regional hydrology in very different ways, and are associated with a large variety of natural hazards.

In order to assess precipitation patterns and hydro-climatic extremes, we use long-term records of remotely sensed data to derive yearly, seasonal, and diurnal characteristic of rainfall at fine scales. We use thirteen years (1998-2010) of TRMM precipitation products: TRMM PR 2A25 (0.05-deg/daily) and TRMM Multi-satellite Precipitation Analysis (TMPA) 3B42V6 (0.25-deg/three-hourly). In addition to yearly, seasonal and daily trends, the other aspect of the study focuses on extreme events such as tropical storms. Results show that tropical cyclones for the overall period of observation account for about 8-12% of the seasonal precipitation budget of the southeastern United States and up to 15-20% for areas located near the coasts.

In addition to satellite products, the ongoing work proposes to include ground based precipitation estimates derived from the National Mosaic and Multi-Sensor Quantitative precipitation Estimates (NMQ/Q2). Preliminary results of inter-comparison of satellite and ground based precipitation estimates will be provided for selected precipitation events. In that regard, this work represents a first step toward a longer-term approach that proposes to derive trends in the evolution of precipitation patterns and assessment of climate change effects on precipitation.