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Seasonality in extreme precipitation as depicted in the TMPA and GPCP 1DD

George Huffman[†]; Robert Adler; David Bolvin; Eric Nelkin
[†] SSAI and NASA/GSFC, USA
Leading author: george.j.huffman@nasa.gov

Two data sets routinely computed by the authors are now long enough, each in excess of 10 years, that it is reasonable to examine the behavior of global extreme precipitation. The TRMM Multi-satellite Precipitation Analysis (TMPA) provides 0.25°x0.25° 3-hourly estimates of precipitation in the latitude band 50°N-50°S for the years 1998-present, while the GEWEX/Global Precipitation Climatology Project (GPCP) One-Degree Daily (1DD) precipitation product provides 1ox1o daily global estimates of precipitation for 1997-present. The TMPA incorporates many (intercalibrated) microwave estimates of precipitation, augmented by microwave-calibrated infrared (IR) estimates, while the 1DD consists of microwave-calibrated IR estimates in the band 40oN-40oS and TOVS (or AIRS) sounding-based estimates at higher latitudes. Both datasets incorporate monthly raingauge analyses, but it should be emphasized that the day-to-day occurrence of precipitation is entirely based on the satellite data. The analysis presented here focuses on basic parameters that are stable and well-suited to comparison with station data or model estimates. These include means, frequency of precipitation, 95th percentile values, and the longest spans of consecutive dry and wet days in each season or year (depending on the time period being examined). Overall, there is fair consistency between the 1DD and TMPA datasets. One result of the comparison is that the longest span of consecutive dry days is sensitive to the details of the retrieval algorithms. Another is confirmation that several of the parameters, including frequency of precipitation and 95th percentile values are sensitive to the spatial scale. In addition to enhancing our confidence in the results previously reported, this comparison allows us to examine contrasts in behavior for the same region across the seasonal cycle. For example, the TMPA tends to have drier estimates than the 1DD at higher latitudes, ~40-50°, particularly in the winter hemisphere, where the microwave algorithms currently lack sensitivity to the reduced precipitation signals. The high-latitude results could be important for helping assess the conditions that the joint NASA/JAXA Global Precipitation Measurement (GPM) mission will observe.