Interannual Fluctuations in Satellite Precipitation Datasets

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One key issue for satellite precipitation datasets is the degree to which they consistently depict the time/space variation in global precipitation. Recent work shows that several modern datasets show notable consistency at the seasonal and interannual time scales for the tropical oceans, with some interesting differences in phasing and amplitude. Specifically, the Version 7 Real-Time TRMM Multi-satellite Precipitation Analysis (TMPA-RT) and Version 2.2 Global Precipitation Climatology Project monthly Satellite-Gauge (GPCP SG) are relatively similar to each other, while the Version 7 Production TMPA has a smaller interannual amplitude and tends to lead the other two by a few months. The phasing and amplitude for the Version 7 TRMM Combined Instrument (TCI) dataset is very similar to the TMPA, which is consistent with the TCI providing local, month-to-month calibration for the various sensor products contributing to the TMPA. In contrast, the TMPA-RT is driven by variations in the same sensor products with only climatological TCI calibration, implying that the dominant factor is a market basket of passive microwave (PMW) estimates. The GPCP SG is driven by local, month-to-month calibration by a single PMW estimator. As an additional comparison, an experimental version of the GPCP SG that is calibrated by the new 2010 version of the Goddard Profiling algorithm (GPROF2010) is examined and found to be more similar to the PMW-driven datasets than those calibrated by the TCI, despite the fact that GPROF2010 differs from the other PMW algorithms. The spatial patterns corresponding to these time series are examined to show the relative importance of regional time-mean differences.