QUASI-GLOBAL PRECIPITATION AS DEPICTED IN THE GPCP V2.2 AND TMPA V7

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ABSTRACT

After a lengthy incubation period, the year 2012 saw the release of the Global Precipitation Climatology Project (GPCP) Version 2.2 monthly dataset and the TRMM Multi-satellite Precipitation Analysis (TMPA) Version 7. One primary feature of the new data sets is that DMSP SSMIS data are now used, which entailed a great deal of development work to overcome calibration issues. In addition, the GPCP V2.2 included a slight upgrade to the gauge analysis input datasets, particularly over China, while the TMPA V7 saw more-substantial upgrades:

1) The gauge analysis record in Version 6 used the (older) GPCP monitoring product through April 2005 and the CAMS analysis thereafter, which introduced an inhomogeneity. Version 7 uses the Version 6 GPCC Full analysis, switching to the Version 4 Monitoring analysis thereafter.
2) The inhomogeneously processed AMSU record in Version 6 is uniformly processed in Version 7.
3) The TMI and SSMI input data have been upgraded to the GPROF2010 algorithm.

The global-change, water cycle, and other user communities are acutely interested in how these data sets compare, as consistency between differently processed, long-term, quasi-global data sets provides some assurance that the statistics computed from them provide a good representation of the atmosphere's behavior. Within resolution differences, the two data sets agree well over land as the gauge data (which tend to dominate the land results) are the same in both. Over ocean the results differ more because the satellite products used for calibration are based on very different algorithms and the dominant input data sets are different. The time series of tropical (30°N-S) ocean average precipitation shows that the TMPA V7 follows the TMI-PR Combined Product calibrator, although running ~5% higher on average. The GPCP and TMPA time series are fairly consistent, although the GPCP runs ~10% lower than the TMPA, and has a somewhat larger interannual variation. As well, the GPCP and TMPA interannual variations have an apparent phase shift, with GPCP running a few months later.

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1. INTRODUCTION TO THE POSTER

The poster presented at the meeting has fairly complete text covering all of the major points, so it seems unnecessary to reproduce those words here in detail. The poster summarizes the upgrades, with attention to the changes in input data. Comparisons to monthly Pacific atoll data are shown, as well as the time series of the tropical ocean alluded to in the Abstract, and comparisons of the climatologies.

It is still the case at the time of this writing that the excess of TMPA V7 over its calibrator is considered erroneous, but has not yet been resolved. As well, it was recently shown that the TMPA-RT V7 over land has an apparent upward trend, mostly related to data in east-central Asia and northwestern South America, again for unresolved reasons. Nonetheless, the new data sets are sufficiently improved over the V6 data sets that they are considered to supersede them.

Finally, shortly after IPWG6 it was discovered that the AMSU and MHS input data had been accidentally neglected in both the RT and production TMPA V7 computations. A second retrospective processing was done and all archives are now complete. A summary of this issue is provided in Huffman (2013).

2. REFERENCE

Huffman, G.J., 2013: Summary of Retrospective Processing for Production and Real-Time TRMM Multi-Satellite Precipitation Analysis (TMPA) Data Sets. TRMM Project, 2 pp. [*ftp://meso-a.gsfc.nasa.gov/pub/trmmdocs/rt/3B4XRT_notice_V7.pdf*]