

# A 15-Year TRMM Composite Climatology of Tropical Rainfall

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## 1. TRMM Composite Climatology (TCC)

The TCC is meant to provide a "TRMM-best" estimate of monthly climatological surface rainfall for use in water budget and other studies. The TCC consists of the mean of quality-controlled, TRMM rainfall V7 products from 36°N to 36°S at 0.5° resolution using 15 years of data. No gauge information is used in this new version of the TCC.

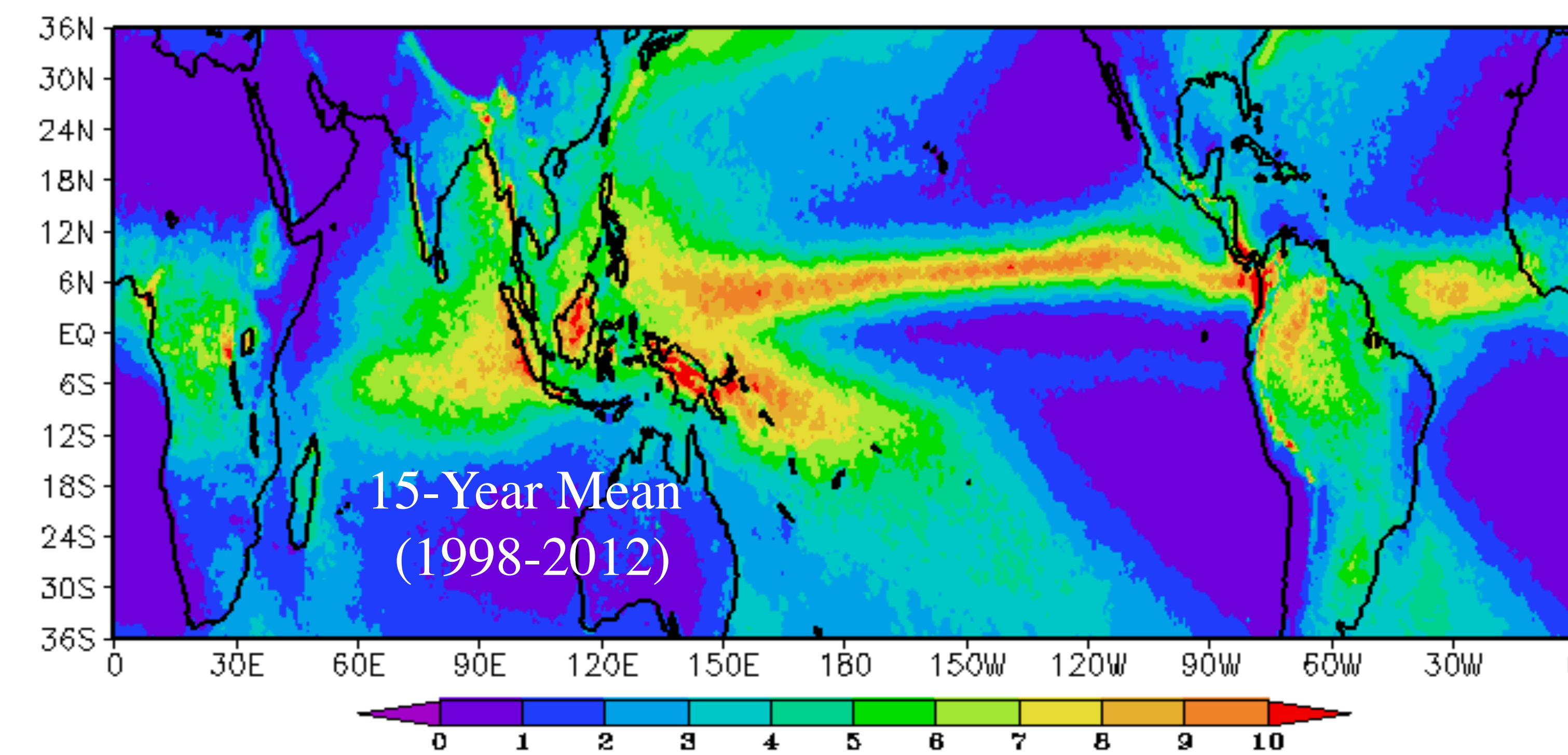
**Input Rain Products for TCC:**

- 1) TMI (2A12)
- 2) Radar (2A25 Near Surface) [Adjusted +5.4% for boost]
- 3) Combined (2B31)

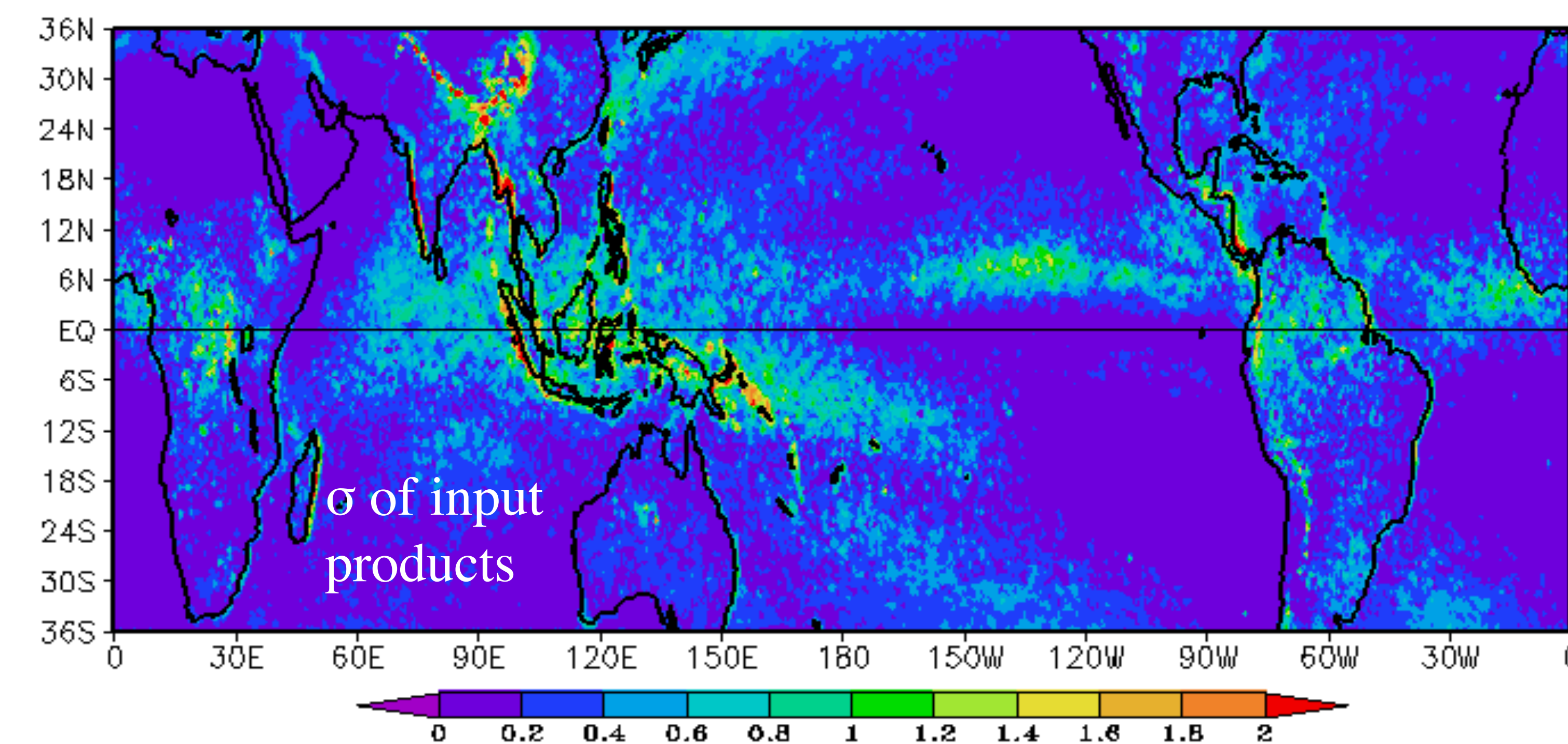
Special attention is paid to TMI estimates over land due to artifacts related to surface effects. These artifacts are excluded if one of criteria below are met:

- a.  $2A12 > 1.5 * \text{AVG}(2A25, 2B31, 3B43) \ \& \ 2A12 > 1 \text{ mm/day}$
- b.  $2A12 < 0.5 * \text{AVG}(2A25, 2B31, 3B43) \ \& \ \text{AVG}(2A25, 2B31, 3B43) > 1 \text{ mm/day}$

**Overall, about 16% of 2A12 data over land are not used in TCC.**



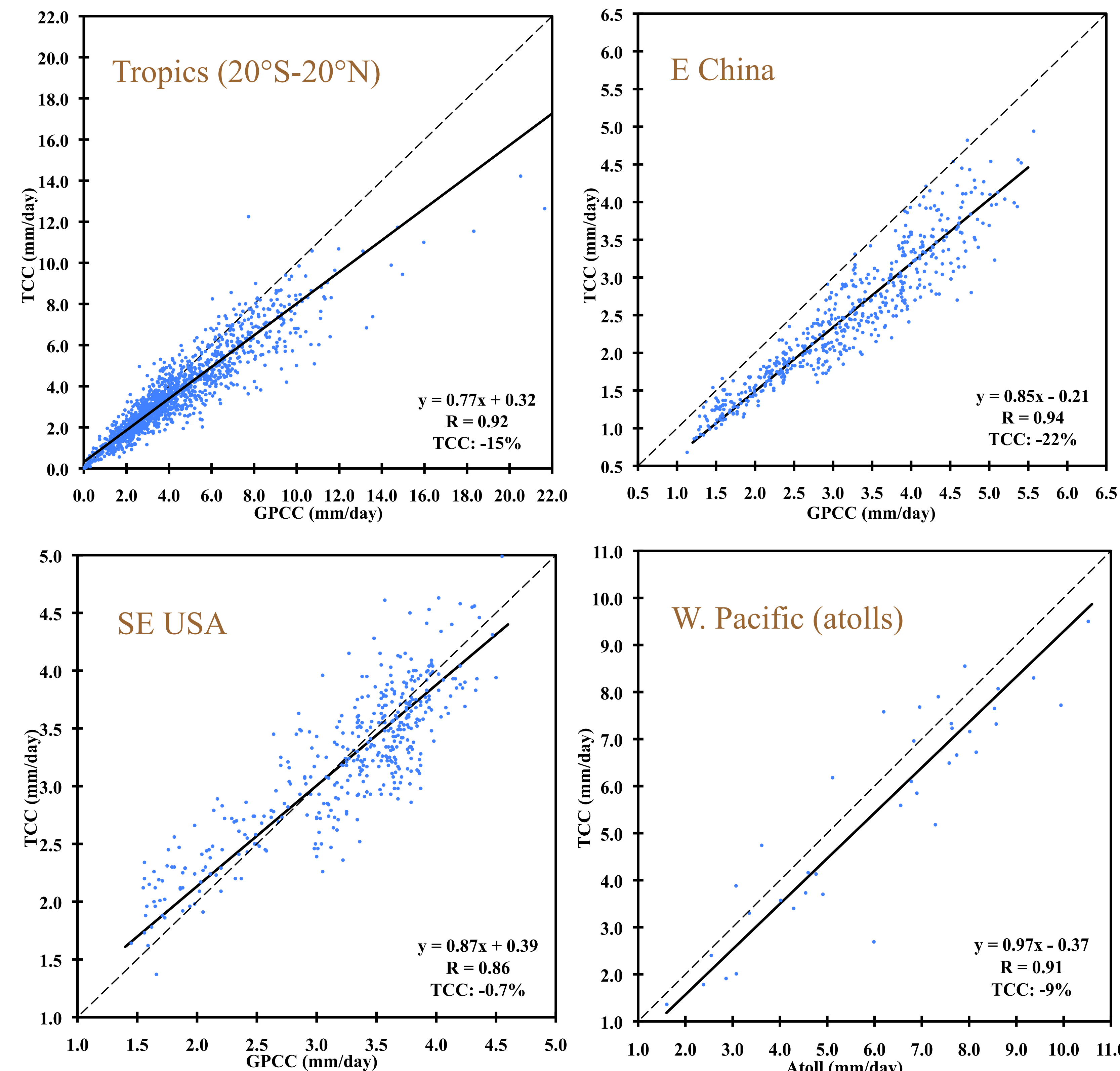
The standard deviation ( $\sigma$ ) among the three TRMM estimates serves as a measure of confidence or estimate of bias error.



## 2. Comparison of TCC with Raingauge Observations

TCC compared to independent gauge analyses (GPCC) at 0.5 degree resolution for 1998-2010

- Over land TCC is ~-15% relative to gauges in Tropics, ~-22% relative to gauges in eastern China and ~-1% relative to gauges in southeast U.S.
- Over western Pacific TCC is ~-9% relative to atoll gauges
- Additional analyses needed to arrive at "best" estimate of absolute value.



## 4. Summary and Future Work

The development of a new 15-year TRMM Composite Climatology rainfall using TRMM version 7 data is introduced. Comparing to the earlier TCC V6, which used gauge-calibrated TMPA (3B43) to replace 2A12 over land, this is a TRMM satellite only rainfall climatology. Over land there are seasonally-varying (not shown) significant differences with gauge information which need to be understood. Over ocean TCC estimates confirm other climatologies, but still require further study in light of global water and energy balance issues.

The TCC will be useful to TRMM investigators as "first look" and outside community as convenient, high quality TRMM estimates for global model validation, and water budget studies.

Through the quality control processes, obvious artifacts from 2A12 (over land) due to rainfall screening problems are removed. Nevertheless, more effort is needed to further improve the quality of 2A12 results. In addition, to provide the best possible climatological estimate, an additional TCC product will be produced by integrating gauge information from the TRMM period.

## 3. Validation of TCC Inputs against Raingauge

