Tropical Rainfall Measuring Mission (TRMM) precipitation data for CTFS-ForestGEO Sites.

Last updated: October 22, 2015

Data set description:

Standardized precipitation data is presented for 63 CTFS-ForestGEO tropical, subtropical, and temperate sites. The Tropical Rainfall Measuring Mission (TRMM) by NASA was launched in 1997 and carried 5 instruments: a 3-sensor rainfall suite (PR, TMI, VIRS) and 2 related instruments (LIS and CERES). Specific information on sensors and data generation can be accessed here http://trmm.gsfc.nasa.gov. For a summary of TRMM data products and services, see Liu *et al.* (2012).

We present data from the "Algorithm 3B43" which generate the best-estimate precipitation rate and root-mean-square (RMS) precipitation-error estimates from TRMM. The gridded estimates are on a calendar month temporal resolution and a 0.25° by 0.25° spatial resolution. Spatial coverage extends from 50 degrees south to 50 degrees north latitude, therefore some CTFS-ForestGEO sites have no data. Algorithm 3B43 is executed once per calendar month to produce the single, best-estimate precipitation rate and RMS precipitation-error estimate field (3B43) by combining the 3-hourly merged high-quality/IR estimates with the monthly accumulated Global Precipitation Climatology Centre (GPCC) rain gauge analysis.

Monthly precipitation data were downloaded on October 21, 2015. Data was retrieve from the Mirador interface (http://mirador.gsfc.nasa.gov) from NASA Goddard Earth Sciences Data and Information Services Center (GES DISC). Version 7 was downloaded as recommended. Units were converted from mm hr^{-1} to mm mo^{-1} by multiplying by the number of hours in each month, and annual precipitation was computed by summing months.

Notes:

A variety of precipitation data are available for CTFS-ForestGEO sites (www.forestgeo.si.edu/group/Ecosystems+and+Climate/Data+Resources; Anderson-Teixeira *et al.*, 2015). When reliable precipitation data are available from a local weather station, those data should be considered the most accurate. In terms of precipitation estimates from global databases, the TRMM 3B43 data have higher spatial resolution for monthly or annual precipitation estimates than other data products that had been made available for all CTFS-ForestGEO sites as of October 2015. Other precipitation estimates downloaded from global databases for all CTFS-ForestGEO sites included data from the CRU-

TS v3.10.01 Historic Climate Database (Harris *et al.*, 2014), which has lower spatial resolution, and from WorldClim (Hijmans *et al.*, 2005), which presents only climatic averages.

Comparison of TRMM data to local weather station data for CTFS-ForestGEO sites (Table 2 in Anderson-Teixeira *et al.*, 2015) showed that TRMM data tended to systematically underestimate MAP at sites with high MAP, particularly those receiving >3000 mm yr^{-1}. Thus, TRMM precipitation values for high precipitation sites should be considered probable underestimates.

Temporal coverage: 1998-01 to 2014-12

Temporal resolution: Monthly and annual

Data files:

- CTFS-ForestGEO_TRMM.3B43_monthly.csv.
- CTFS-ForestGEO_TRMM.3B43_annual.csv.

Data file contents:

CTFS-ForestGEO_TRMM.3B43_monthly.csv

Column	Description	Units
ID	Site ID number. Numbers 1 to 59 are as in Anderson-Teixeira *et al.* (2015); numbers 60+ joined the network after this publication.	-
Site	Site name	-
modlat	Latitude	Decimal degrees
modlon	Longitude	Decimal degrees
[YYYYMMDD]	Satellite/gauge precipitation estimates for month YYYYMM.	mm mo-1

CTFS-ForestGEO_TRMM.3B43_annual.csv

Column	Description	Units
ID	Site ID number. Numbers 1 to 59 are as in Anderson-Teixeira *et al.* (2015); numbers 60+ joined the network after this publication.	-
Site	Site name	-
modlat	Latitude	Decimal degrees
modlon	Longitude	Decimal degrees
MAP.1998.2014	Mean annual precipitation (satellite/gauge estimates) for 1998-2014.	mm yr-1
[YYYY]	Satellite/gauge precipitation estimates for year YYYY	mm yr-1

Data use:

Researchers who wish to use this data product are responsible to understand and evaluate its appropriateness for their research purposes. Information on the TRMM data product is summarized in (Liu *et al.*, 2012) and at http://trmm.gsfc.nasa.gov.

These data are freely available for scientific research purposes, as a service of the CTFS-ForestGEO Ecosystems & Climate Initiative. Publications using these data should cite Liu *et al.* (2012) and provide the url for this CTFS-ForestGEO data product (www.forestgeo.si.edu/group/Ecosystems+and+Climate/Data+Resources). Co-authorship is not required.

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References:

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