Precipitation (DP1.00006.001)

Measurement

Precipitation in millimeters

Collection methodology

Primary - weighing gauge housed within a small double fence intercomparison reference, which is generally located within 0.5 km of the tower infrastructure. Secondary - tipping bucket located on the top of the tower infrastructure. Throughfall - tipping buckets at 4 or 5 soil array locations (absent at short-stature ecosystems). On flat ground the throughfall collection area is between 37.5 and 50 cm aboveground. Bulk precipitation is determined at five- and thirty-minute intervals for primary precipitation and at one- and thirty-minute intervals for secondary and throughfall precipitation.

For information about disturbances, land management activities, and other incidents that may impact data at NEON sites, see the Site management and event reporting (DP1.10111.001) data product.

Maintenance and calibration

Preventative maintenance is performed every 2 weeks. Sensors are calibrated annually.

Data package contents

THRPRE_30min: Throughfall pooled over 30 minutes
THRPRE_1min: Throughfall pooled over 1 minute
SECPRE_30min: Secondary Precipitation pooled over 30 minutes
SECPRE_1min: Secondary Precipitation pooled over 1 minute
PRIPRE_30min: Primary Precipitation pooled over 30 minutes
PRIPRE_5min: Primary Precipitation pooled over 5 minutes
variables: Description and units for each column of data in data tables
readme: Data product description, issue log, and other metadata about the data product
sensor_positions: Geospatial locations of individual sensors

Data quality

Each measurement is accompanied by a final quality flag (priPrecipFinalQF, secPrecipRangeQF, secPrecipSciRvwQF, TFPrecipRangeQF, and TFPrecipSciRvwQF). NEON recommends only using data where the corresponding final quality flag is 0. Data with a final quality flag of 1 are potentially inaccurate and should only be used with caution. The final quality flag is based on automated QA/QC tests, as well as a manually set science review flag if applicable. Each measurement is accompanied by an estimate of

measurement uncertainty, expressed at the 95% confidence level (priPrecipExpUncert, secPrecipExpUncert, and TFPrecipExpUncert), which comprises known and quantifiable uncertainties.

Standard calculations

For wrapper functions to download data from the API, and functions to merge tabular data files across sites and months, see the neonUtilities R package.

Data are populated with 0 for time periods with no precipitation. Time periods when xxxPrecipBulk is blank or NA indicate either the sensor was not functioning or the data were redacted by data quality algorithms.

The latitude, longitude (referenceLatitude, referenceLongitude; °), and elevation (m) of the tower reference corner, soil plot reference corner, or primary precipitation collector base are in the sensor positions file (...sensor_positions...csv). Use the HOR.VER component of the time series file name (horizontalPosition and verticalPosition if stacked using neonUtilities) to link to the corresponding row in the HOR.VER column of the sensor positions file. HOR indices 000, 001-005, and 900 correspond to the tower, soil plots 1-5, and the primary precipitation collector, respectively, and VER indices correspond to the tower measurement level for secondary precipitation. Sensor height (zOffset; m) relative to the tower reference corner is reported for secondary precipitation.

Documentation

NEON Sensor Command, Control and Configuration (C3) Document: Secondary Precipitation – Tipping Bucket
NEON.DOC.000367vB | 221 KiB | PDF

NEON Algorithm Theoretical Basis Document (ATBD) – Time Series Automatic Despiking for TIS Level 1 Data Products – QA/QC
NEON.DOC.000783vB | 374.8 KiB | PDF

NEON Algorithm Theoretical Basis Document (ATBD): Secondary Precipitation and Throughfall (Tipping Bucket)
NEON.DOC.000816vC | 763.9 KiB | PDF

NEON Sensor Command, Control and Configuration (C3) Document: Primary Precipitation
NEON.DOC.000897vC | 412.9 KiB | PDF

NEON Algorithm Theoretical Basis Document (ATBD) – Primary Precipitation (DFIR)
NEON.DOC.000898vB | 498.7 KiB | PDF

NEON Algorithm Theoretical Basis Document (ATBD) –Quality Flags and Quality Metrics for TIS Data Products
NEON.DOC.001113vC | 1.1 MiB | PDF

NEON Sensor Command, Control and Configuration (C3) Document: Soil Throughfall
NEON.DOC.001300vC | 253.1 KiB | PDF

NEON Preventive Maintenance Procedure: Primary Precipitation Gauge and Double Fence Intercomparison Reference (DFIR)
NEON.DOC.003342vB | 7.6 MiB | PDF

NEON Preventive Maintenance Procedure: Soil Throughfall Collector
NEON.DOC.003656vE | 3.2 MiB | PDF

NEON Preventive Maintenance Procedure: TIS & AIS Secondary Precipitation Gauge
NEON.DOC.004849vB | 2.2 MiB | PDF

NEON Algorithm Theoretical Basis Document (ATBD) – QA/QC Plausibility Testing
NEON.DOC.011081vD | 476.8 KiB | PDF

For more information on data product documentation, see:
https://data.neonscience.org/data-products/DP1.00006.001

Citation

To cite data from Precipitation (DP1.00006.001), see citation here:
https://data.neonscience.org/data-products/DP1.00006.001
For general guidance in citing NEON data and documentation, see the citation guidelines page:
https://www.neonscience.org/data-samples/guidelines-policies/citing