

Data Sources

Evapotranspiration (ET)

- **Model:** OpenET Ensemble
- **Units:** mm/month
- **Satellites:** Landsat 5, 7, 8, 9
- **Resolution:** 30 m
- **Source:**
 - <https://etdata.org/methodologies>
 - https://developers.google.com/earth-engine/datasets/catalog/OpenET_ENSEMBLE_CONUS_GRIDMET_MONTHLY_v2_0
- **Data Availability:** 1985 - 2024
- **Description:** Monthly evapotranspiration is provided by OpenET. Monthly ET is calculated as the mean of multiple remote sensing models (ALEXI/DisALEXI, eeMETRIC, geeSEBAL, PT-JPL, SIMS, SSEBop), with outliers removed using the Median Absolute Deviation.
- **Caveats:** Earlier Landsat data, most notably in 1985, contains a greater amount of spatial holes due to a lack of redundant coverage from other satellites and isn't as gap-filled as the rest of the record.

Reference Evapotranspiration (ETo)

- **Dataset:** University of Idaho EPSCOR GRIDMET
- **Units:** mm/month
- **Resolution:** 4 km
- **Source:**
 - <https://www.climatologylab.org/gridmet.html>
 - https://developers.google.com/earth-engine/datasets/catalog/IDAHO_EPSCOR_GRIDMET
- **Data Availability:** 1985 - 2024
- **Description:** Daily ETo is calculated using the Penman-Monteith method and aggregated monthly (mm/month).
- **Caveats:** See “Updates” and “Known Issues” at <https://www.climatologylab.org/gridmet.html> for caveats with the data product. Data is infrequently downloaded and cached directly from Climatology Lab NetCDF source mirrors, so any recent error findings in the data product may not be automatically corrected in generated reports.

Precipitation (PPT)

- **Dataset:** Oregon State PRISM
- **Units:** mm/month
- **Resolution:** 4 km
- **Source:** <https://prism.oregonstate.edu>
- **Data Availability:** 1985 - 2024
- **Description:** Monthly mm/month precipitation data is provided by the Oregon State PRISM dataset.

Cloud Cover and Missing Data (*Computed*)

- **Dataset:** Landsat 5, 7, 8, 9
- **Units:** Percentage
- **Resolution:** Calculated per report area
- **Source:** <https://planetarycomputer.microsoft.com/dataset/landsat-c2-l2>
- **Description:** Cloud cover and missing data are calculated on the fly for each report using Landsat data in Microsoft Planetary Computer using the QA_PIXEL band provided by Landsat. This is done by determining the number of cloudy pixels and dividing by the number of total pixels for each pass and then averaging all passes in each given month.
 - Cloudy pixels are defined as either:
 - A QA_PIXEL cloud confidence level of 2 or 3 (medium or high)
 - The QA_PIXEL Cloud Shadow bit being set
 - Missing or NaN pixel data
- **Caveats:** Cloud cover and Missing Data is the only statistic that doesn't rely on pre-cached data. As a result, reported percentage can change for the same area if a different response is received from Microsoft Planetary Computer. The most likely cause of this would be if we failed to receive a response at all. If this happens, the algorithm is set to retry fetching data a total of 5 times with subsequently longer periods of waiting between each retry. If we still don't receive a response over those 5 retries, data will be reported as 100% missing for the respective month. In this case, it is suggested to try either re-running the full report or just re-running the affected year of the report to recalculate cloud coverage. Also note that the QA_PIXEL cloud confidence is based on the CFMask algorithm, which has been shown to perform poorly over bright surfaces and tends to overmask pixels as being part of a cloud shadow. As a result, cloud cover may appear higher than expected in a given month.