

# Processed Catchment-Averaged Meteorological Forcings from Daymet for Streamflow Monitored Catchments in British Columbia and Transboundary Basins

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## Dataset Metadata

### Description

This dataset provides catchment-averaged daily meteorological time series for selected watersheds in British Columbia and adjacent regions. Selection is based on minimum 5 (complete) years overlap with Daymet (1980-2023), where complete years have a minimum 20 observations in all 12 months. Meteorological variables are derived from the Daymet gridded climate dataset (Version 4 R1) at a 1-km spatial resolution and include the parameters in the table below:

Variable	Long Name	Units	Methods
dayl	Daylength	s	area: mean
prcp	Daily total precipitation	mm/day	area: mean time: sum
srad	Daylight average incident shortwave radiation	W/m <sup>2</sup>	area: mean time: mean
swe	Snow water equivalent	kg/m <sup>2</sup>	area: mean time: mean
tmax	Daily maximum temperature	degrees C	area: mean time: maximum
tmin	Daily minimum temperature	degrees C	area: mean time: minimum
vp	Daily average vapor pressure	Pa	area: mean time: mean
pet	Potential evapotranspiration <sup>1</sup>	mm/day	area: mean time: sum
streamflow	daily Average Streamflow <sup>2</sup>	m <sup>3</sup> /s	area: n/a time: mean

Catchment boundaries were used to clip and average Daymet tiles (provided in `Catchment_polygons.geojson`). The NetCDF files in this directory contain time series representing catchment average meteorological forcings. The files are provided in the format required for ingesting into the NeuralHydrology Python Package for research in applying neural networks to hydrological prediction.

The data were generated using the scripts provided in the `process_metforcings` Python repository available at: [https://github.com/dankovacek/process\\_metforcings](https://github.com/dankovacek/process_metforcings)

### Files

- meteorological forcings following the format `<Official_ID>_daymet.nc` (compressed in the archive file `BC_Monitored_catchment_mean_met_forcings_20250320.zip`)
  - Contains daily time series of the meteorological variables listed above, averaged over the catchment polygon defined in `Catchment_polygons.geojson`.
- `Catchment_polygons.geojson`
  - Contains the catchment polygons used for clipping and averaging Daymet tiles. Each polygon is associated with an `Official_ID` that matches the naming convention of the output NetCDF files.

<sup>1</sup>Potential evapotranspiration was computed by the Penman-Monteith method via the PyDaymet Python package

<sup>2</sup>Daily average streamflow is from USGS and Environment and Climate Change Canada (ECCC) monitoring stations, as provided in the HYSETS dataset. The streamflow data is not derived from Daymet but is included for hydrological modelling inputs.

**NOTE:**

The netCDF (.nc) files are not formatted for display in GIS software. It is recommended to use the xarray python package to work with these files. For working with netCDF files in R, see this tutorial.

**Subject**

- Hydrology
- Climate Forcings
- Environmental Science
- GIS
- Meteorology

**Keywords**

Daymet, catchment, meteorological forcings, potential evapotranspiration, precipitation, temperature

**Resource Type**

Dataset

**Related Publications**

Thornton, M. M., Shrestha, R., Wei, Y., Thornton, P. E., Kao, S., & Wilson, B. E.

Daymet: Monthly Climate Summaries on a 1-km Grid for North America, Version 4 R1.

ORNL DAAC, Oak Ridge, Tennessee, USA. (2022). <https://doi.org/10.3334/ORNLDAAAC/2129>

Arsenault, R., Brissette, F., Martel, J.L. et al. A comprehensive, multisource database for hydrometeorological modeling of 14,425 North American watersheds. *Sci Data* 7, 243 (2020). <https://doi.org/10.1038/s41597-020-00583-2>

**Rights**

This derived dataset inherits the usage conditions of the Daymet data product and is distributed under the CC-BY 4.0 License, unless otherwise stated.

Please cite both the original Daymet dataset and this processing workflow when using this data.

**Language**

English

**Funding**

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**Version**

v1.0 (2025-03-20)

**File Format**

NetCDF (.nc), GeoJSON (.geojson)

## Repository

GitHub repository for processing workflow:

[https://github.com/dankovacek/process\\_metforcings](https://github.com/dankovacek/process_metforcings)

## Spatial Coverage

- Region: British Columbia, Canada and adjacent hydrologic regions (Yukon, Northwest Territories, Alaska, Alberta, Montana, Idaho, Washington)
- CRS:
  - The Daymet projection is Lambert Conformal Conic (+proj=lcc +lat\_1=25 +lat\_2=60 +lat\_0=42.5 +lon\_0=-100 +x\_0=0 +y\_0=0 +ellps=WGS84 +units=m +no\_defs)
  - Catchment polygons are provided in BC Albers (EPSG 3005)

## Temporal Coverage

- daily, 1980–2023 (inclusive)

## Methods

Meteorological variables were processed by identifying Daymet tiles that spatially intersect each catchment polygon, downloading the relevant data, clipping and reprojecting to match each catchment's geometry, and computing area-weighted means for each day. For potential evapotranspiration, PyDaymet's implementation of the Penman-Monteith method was used.

The full processing workflow is documented and implemented in the accompanying Python scripts and shell commands within the GitHub repository.

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