Potential Evapotranspiration (PET) datasets

This document will help you understand and use the Environment Agency Potential Evapotranspiration datasets.

What is Potential Evapotranspiration?

Potential evapotranspiration (PET) is the amount of evaporation which would occur if there was an unlimited supply of water. The datasets provided are for well-watered short grass.

Update frequency

The intention is to update this dataset monthly.

Related datasets

This dataset can be used in conjunction with gridded rainfall datasets from the Met Office or UKCEH.

The grid points of the PET datasets align with those the Met Office HadUK gridded datasets.

Common questions & known issues

What period of record do the datasets cover?

* Both the EA_PET and EA_PETI start on 1st January 1961, prior to 1961 currently the digital daily climate records are too sparse to calculate daily PET at 1km resolution.

What is the geographical extent of the datasets

* The EA_PET dataset covers England and Wales with no regional variations
* The EA_PETI dataset covers England and Wales, data from 2021 onwards in Welsh catchments which will don't drain into England will be of greater uncertainty due to the rainfall grids used.
* The implementation within EA_PETI is based upon a review of the CHESS (Robinson et al 2017) and MORECS (Hough et al 1997) methodologies (JBA 2020).

What are the differences between EA_PET and EA_PETI?

* PETI incorporates canopy interception into the calculation of PET.
* The implementation within EA_PETI is based upon a review of the CHESS and MORECS methodologies
* Assumption about the daily rainfall profile and duration remain the same as CHESS-PETI
* Summer multiple rainfall event will be implemented in a similar manner to MORECS to September
* Changes to update the maximum canopy capacity to the latest implementation model
* A time step of 30 seconds to accumulate canopy water during a rainfall event used in CHESS-PETI JBA (2020).

Should I use EA_PET or EA_PETI for my application?

- This is an end user decision and may depend on your application. The vast majority of users so far have chosen to use PET and to allow their downstream model to account for the interception element.
- The recommended default option would therefore be PET, however this may also depend upon the current product you are using. The Met Office MORECS 2.3 product (Hough et al 1997) does, by default, include an interception element within its PET formulation.

What is the format of the datasets?

- The datasets are provided in zip files each containing a full 5 years of data. Periods of less than 5 year will provided in annual zip files.
- The files within each zip file are in netCDF (Network Common Data Form) format. Each file contains one month of daily data for 1km grid points.
- The naming convention of he unzipped files are as follows:

  <variable>_<grid resolution>_<timestep>_<month>_<year>_<qcode>.nc where:

    o <variable> is either PET or PETI
    o <grid resolution> is 1km
    o <timestep> is daily
    o <month> is the numeric month of the data file
    o <year> is the numeric year of the data file
    o <qcode> is the quality code of the data in the file
        ▪ MASHQC - from homogenised data produced during Phase 1 of the project (JBA 2018)
        ▪ FullQC - from data which has undergone full Quality Control within the Met Office MIDAS system (Met Office Integrated Data Archive System)
        ▪ MinQC - from provisional climate data from MIDAS which is subject to high level range checks only.
- FullQC data will supersedes min QC data 4 months in arrears

The datasets contain negative values - are these errors?

Both PET datasets do contain negative values, these represent foggy/misty conditions and are plausible outcomes from the FAO56 methodology (Allen et al 1998). The decision as to whether to use this directly or set to zero (to avoid a potential small element of water balance double counting) has been left to the end user.

Do I need to recalibrate my model to use the new dataset?

Yes, all models will need to be recalibrated to use the new datasets.

Can I just append the new dataset to my current PET dataset?

No, this is not recommended as your model would have been calibrated using a current PET product. Any current PET product will be of a different magnitude to the new products as well as containing spatial and temporal discontinuities inherited from their input datasets. Using a time series containing different PET products within an existing model is likely to cause a step change in the resulting model outputs. The model outputs would therefore not be fit of purpose.

> Note: We do our best to avoid quality problems but this dataset reflects the data we hold. Our datasets may contain errors.

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Dataset content

Field name	Description
Projection x coordinate	Ordnance Survey national grid eastings (m)
Projection y coordinate	Ordnance Survey national grid eastings (m)
time	Water day 24 hours from 09:00 GMT
Variable	PET or PETI in mm

References

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