Tav_Amp

Purpose

Calculate values of annual average ambient temperature (TAV) and annual amplitude in mean monthly temperature (AMP) for an APSIM climate (met) file and insert these values with keywords into the file.

Introduction

Apsim-SoilN2 (SoilN2) model uses the TAV and AMP to calculate the daily soil temperature for a site. These two variables are read by SoilN2 from its site parameter file and are used as default values for the site. If SoilN2 is unable to obtain these values from another APSIM module, such as the Met or Manager modules, it will use these default values. Tav_Amp has been constructed to calculate and insert the TAV and AMP values into the keyword portion of an APSIM climate file so that the Met module can provide these values on request by SoilN2. Tav_Amp is a Lahey Fortran90 program compiled and linked to for 32 bit operation.

Description

Amp is obtained by averaging the mean daily temperature of each month over the entire data period resulting in twelve mean temperatures, and then subtracting the minimum of these values from the maximum. Tav is obtained by averaging the twelve mean monthly temperatures.

Tav_Amp reads a nominated met file, calculates the values for TAV and AMP and writes a new met file with the calculated values inserted after the TAV and AMP keywords, which are placed immediately before the column headers. A comment is inserted before these new lines which specifies the date and time of insertion and the start and end of the period over which the data is calculated. Any existing TAV and AMP keyword and comment lines are removed. Ambient temperature is calculated by averaging the maximum and minimum temperatures of the day. Before reading the temperature data columns, the column headers are identified by the text strings, year, maxt and mint which are not within a comment.
Tav_Amp is run from a DOS prompt or the Windows Run command and requires the input and output file names to be specified after 'Tav_Amp'.

Requirements

Tav_Amp is a MSDOS based program written in Fortran 90, linked as a 32 bit windows executable. It is currently compiled to use a maths co-processor. It requires the input file to have at least 4 data columns, headed with the text names of year, day, maxt and mint. A units line is expected to immediately follow this header line. There are no requirements for the lines preceding the header line. There must be at least one data line following the units line. All comments are ignored. The column headers and data values must be separated by at least one blank.

Use

Syntax:

```
Tav_Amp [drive:][path]input_filename [drive:][path]output_filename
```

where:

`[drive:][path]input_filename` -
the name of the input file and optionally its path, up to 255 characters including the path.

`[drive:][path]output_filename` -
the name of the output file and optionally its path, up to 255 characters including the path.

Eg.

```
Tav_Amp dalby.met dalby.me1
```

The DOS ERRORLEVEL flag is not used.

While Tav_Amp is running, it reports its progress as it analyses the input file by displaying information about its actions in a window.

Eg.

```
Reading data from dalby.met

Column header record found
Reading record : site year   day  radn   maxt   mint   rain    evap

Reading temperature data
Starting record: DALB 1988     1 20.74   33.0   17.4    0.2    7.41
Ending record  : DALB 1990   120 17.39   25.0    6.6    0.0    3.83
Number of records =         857

Calculating TAV and AMP
 TAV =     19.4890     AMP =     12.7583

 Writing data to file
 AMP and TAV variables inserted into weather file: dalby.me1


 Pause... Press Enter to exit
```

Output file description:

The output file is a copy of the input file with all previous Tav and Amp lines removed and three new lines inserted above the column header line.

Eg.

```
!Title = Dalby 1988-1990

[weather.met.weather]
Latitude=-27.11
 ! TAV and AMP inserted by "tav_amp" on 27/10/1999 at 22:31 for period from   1/1988 to 120/1990 (ddd/yyyy)
 tav =  19.49 (oC)     ! annual average ambient temperature
 amp =  12.76 (oC)     ! annual amplitude in mean monthly temperature
site year   day  radn   maxt   mint   rain    evap
  ()   ()    () (MJ/m2) (oC)   (oC)   (mm)    (mm)
DALB 1988     1 20.74   33.0   17.4    0.2    7.41
DALB 1988     2 23.43   33.8   23.0    0.0    7.41
DALB 1988     3 23.79   32.5   21.0    0.0    7.41
…
```

Limits

Maximum length of file names with paths is 255 characters.
Maximum source file line length is 200 characters.
Maximum number of data columns is 20.
Year range is 1850 to 2020 inclusive.

Configuration Details

Title: Tav_Amp documentation
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