Read the Docs Template Documentation

Release 1.0

Read the Docs

Apr 05, 2023

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WHAT IS ECO3D?

ECO3D is a three-dimensional land surface model.

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INSTALLATION

2.1 Overview

This document provides the instruction to install the ECO3D model.

2.2 Requirements

You need the following environment to build the ECO3D model.

- *gnu C++11 compiler*
- *cmake*
- *make*

2.3 Instruction

Navigate into the build folder and modify the *CMakeLists.txt* file based on your system.

```
cmake CMakeLists.txt
```

After that, run the following command:

```
make install
```

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HISTORY

- 2015-05-12: Design
- 2017-04-12: Publish

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SUPPORT

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CONTRIBUTION

ECO3D was developed and maintained by

- Chang Liao (Pacific Northwest National Laboratory)

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REFERENCES

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AUTHORS

- Chang Liao <changliao.climate@gmail.com>

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API REFERENCE

8.1 Atmosphere

class **atmosphere**

Public Functions

int **run_atmosphere_model**(int iDay_doy, int iMonth_ymd, double dAspect_in, double dLatitude_in, double dPrecipitation_in, double dSlope_in, double dTemperature_basin_max_in, double dTemperature_dewpoint_in, double dTemperature_max_in, double dTemperature_min_in)

<atmospheric components>

Parameters

- **iDay_doy** – day of the year
- **iMonth_ymd** – month of the year
- **dAspect_in** – degree
- **dLatitude_in** – degree
- **dPrecipitation_in** – meter
- **dSlope_in** – degree
- **dTemperature_basin_max_in** – kelvin
- **dTemperature_dewpoint_in** – kelvin
- **dTemperature_max_in** – kelvin
- **dTemperature_min_in** – kelvin

Returns

<ReturnValue>

class **groundwater**

class **evapotranspiration**

Public Functions

int **calculate_vaporization_latent_heat**(double dTemperature_mean_in)

<calculate the latent heat of evaporation>

Parameters

dTemperature_mean_in – the mean temperature, unit: kelvin

Returns

<dLambda, unit: joule per gram>

int **calculate_potential_evapotranspiration_jh**(int iMonth, double dElevation_in, double dShortwave_in, double dTemperature_mean_in, double dVapor_pressure_deficit_in)

<ET using jh methodn>

Parameters

- **iMonth** – month od the year
- **dShortwave_radiation_in** – units: joulie per square meter per day
- **dTemperature_mean_in** – mean temperature unit kelvin

Returns

<ReturnValue>

int **calculate_potential_evapotranspiration_pt**(int iMonth, double dElevation_in, double dShortwave_radiation_in, double dTemperature_mean_in, double dTemperature_mean_yesterday_in)

<ET using Priestley-tayor equation>

Parameters

- **iMonth** – month of the year
- **dElevation_in** – elevation of the grid, unit meter
- **dShortwave_radiation_in** – the daily actual shortwave radiation, units: joule per square meter per day
- **dTemperature_mean_in** – mean temperature, unit kelvin
- **dTemperature_mean_yesterday_in** – mean temperature from yesterday, unit kelvin

Returns

<ReturnValue>

int **run_evapotranspiration_model**(int iMonth, double dElevation_in, double dShortwave_radiation_actual_in, double dTemperature_mean_in, double dVapor_pressure_deficit_in)

<long-description>

Parameters

- **iMonth** – month of the year
- **dShortwave_in** – the daily actual shortwave radiation, units: joule per square meter per day
- **dTemperature_mean_in** – mean temperature unti kelvin

Returns

<ReturnValue>

CHAPTER

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ADDENDUM

9.1 Glossary

DEM
Digital elevation model.

Spatial discretization
Subdivision of the computational domain in a finite number of control volumes or elements (i.e., the generation of the numerical grid).

Stream order
The stream order or waterbody order is a positive whole number used in geomorphology and hydrology to indicate the level of branching in a river system.

Watershed
A drainage basin is any area of land where precipitation collects and drains off into a common outlet, such as into a river.

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