

Hydrological Modeling by Using Application of the China Meteorological Assimilation Driving Datasets for the SWAT Model (CMADS) in the Chi-Mun Basin, Thailand.

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Water Management in Thailand

Floods



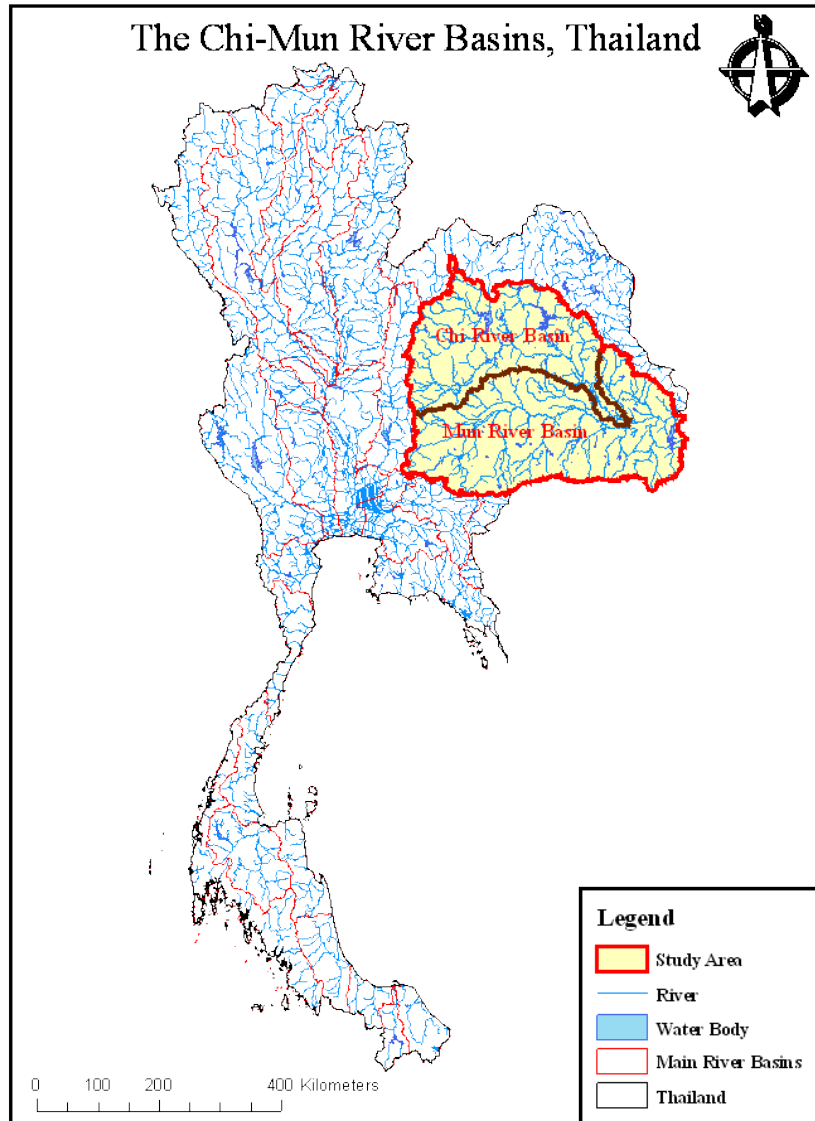
Droughts



<https://apicms.thestar.com.my/uploads/images/2019/09/15/272008.jpg>

<https://thethaiger.com/wp-content/uploads/2019/07/Screen-Shot-2019-07-24-at-16.04.45.jpg>

Chi-Mun Basin (CMB)



Chi-Mun Basin (CMB)

- Part of the Lower Mekong Basin
- 119,180 km²
- annual precipitation are 1,275 mm and 1,181 mm for the Mun and Chi Basin respectively.
- Hub of Jasmine Rice

Challenges in water management

- Recurring floods and droughts
- Lack of long weather data record



Choices of weather data for SWAT <https://swat.tamu.edu/data/>

Weather Data

[Global Weather Data](#)


Climate Forecast System Reanalysis (CFSR) data from 1979-2014

[NOAA Climate Data for the US 1950-2009](#)

Hosted by USDA-ARS, formatted for SWAT

[SWAT+ Global Weather Generator Database](#)

[ArcSWAT 2012 Global Weather Database](#)

Contains monthly weather data covering the entire globe that can be used with ArcSWAT. Please read the [import instructions](#)  and [watch a short video](#) before installing. [More information](#) about CFSR data.

[China Meteorological Assimilation Driving Datasets](#)

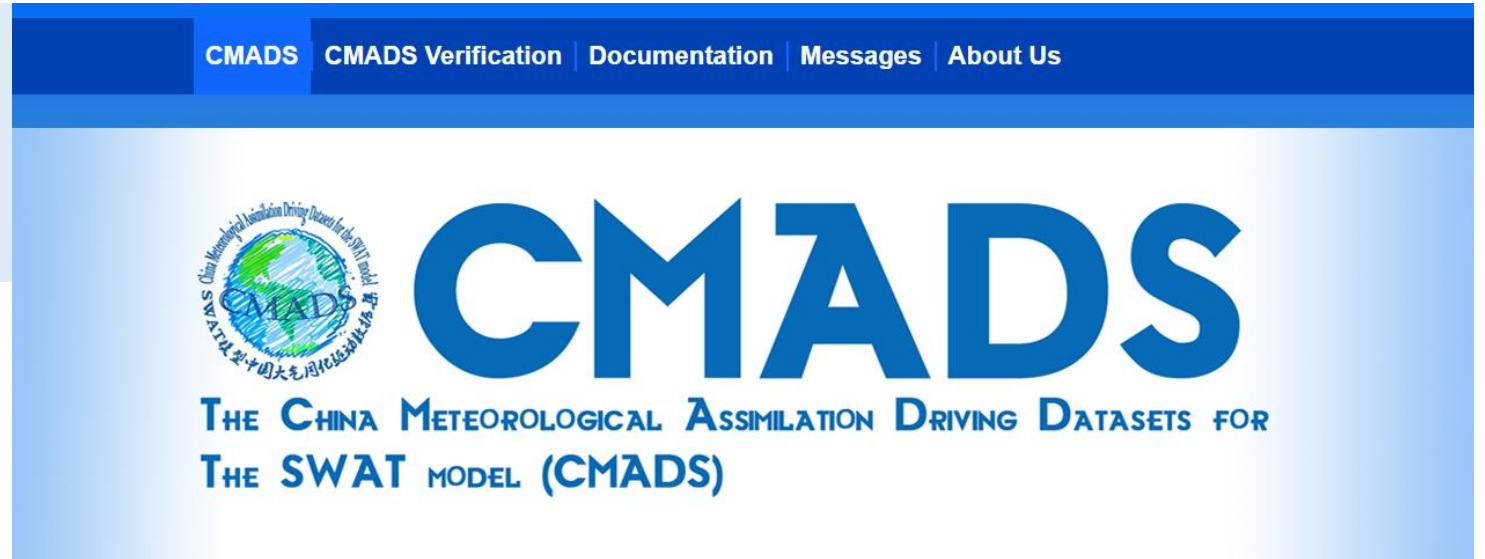
Public datasets for the SWAT model

Additional Data

[India Datasets for SWAT2012](#)



CMADS



- Daily data of temperature, precipitation, relative humidity, solar radiation, wind, air pressure, including soil temperature and moisture.
- The CMADS has been *calibrated and validated* in various basin across East Asia.
- **How about in SE Asia? Or even in Thailand?**

CMADS in CMB

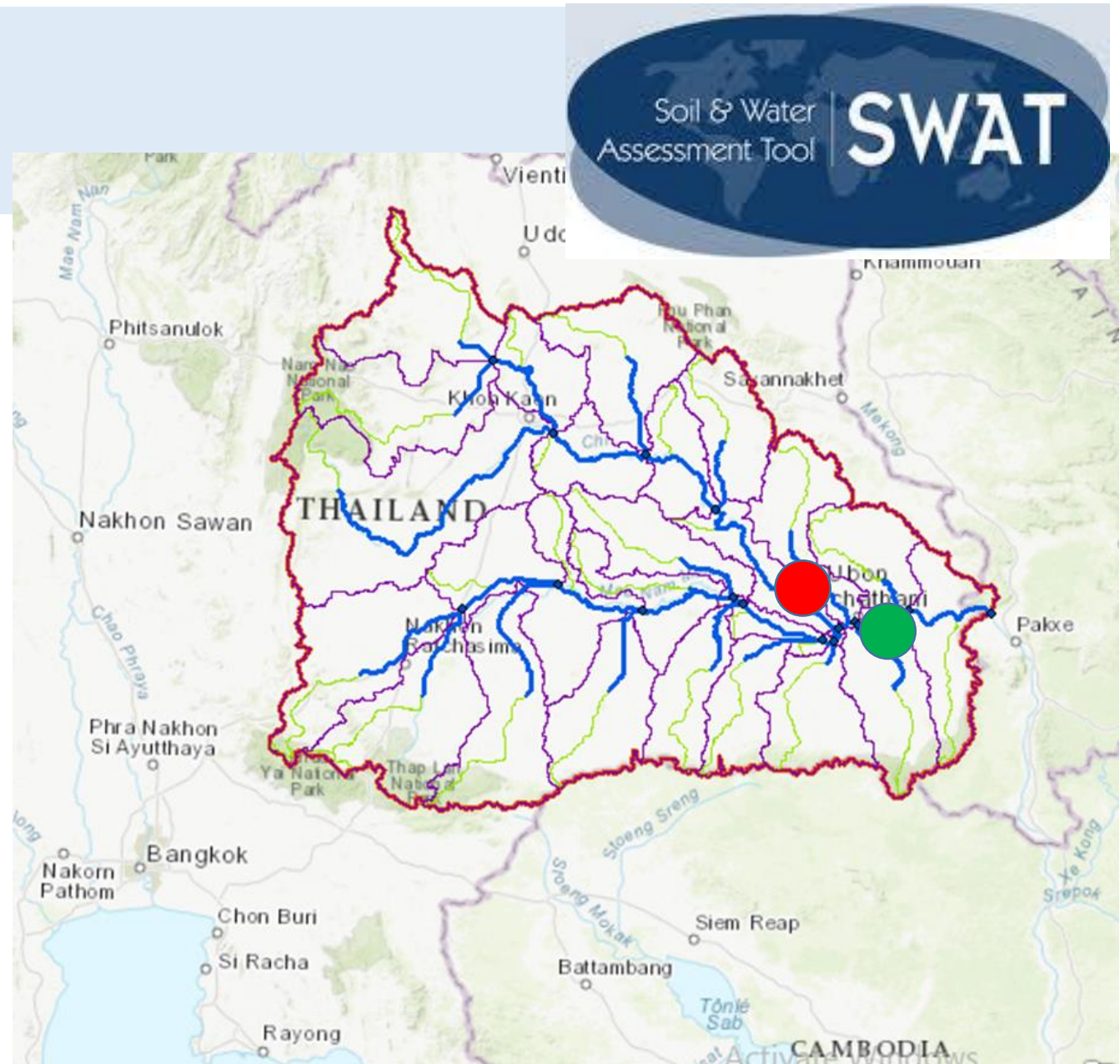


- **Input Data**

Input	Data Sources
Digital Elevation Model (DEM) 50 m resolution	Mekong River Commission (MRC)
Land cover 0.5 km resolution MODIS-based 2001-2010 (overlaid)	The USGS Land Cover Institute
Soil map Base on UN FAO classification digital soil map of the world V3.6 (www.fao.org/geonetwork)	Greater Mekong Subregion-Environment Operations Center (www.gms-eoc.org)
Weather data 1/3-degree resolution CMADS V1.0 2008-2016	The China Meteorological Assimilation Driving Datasets for the SWAT Model (CMADS), China Meteorological Administration

SWAT scenario

- Monthly Streamflow Simulation
- Calibrated (2010-2011) and validated (2015-2016) at **E20A** and **M5** Stations



Results

- **Calibration**

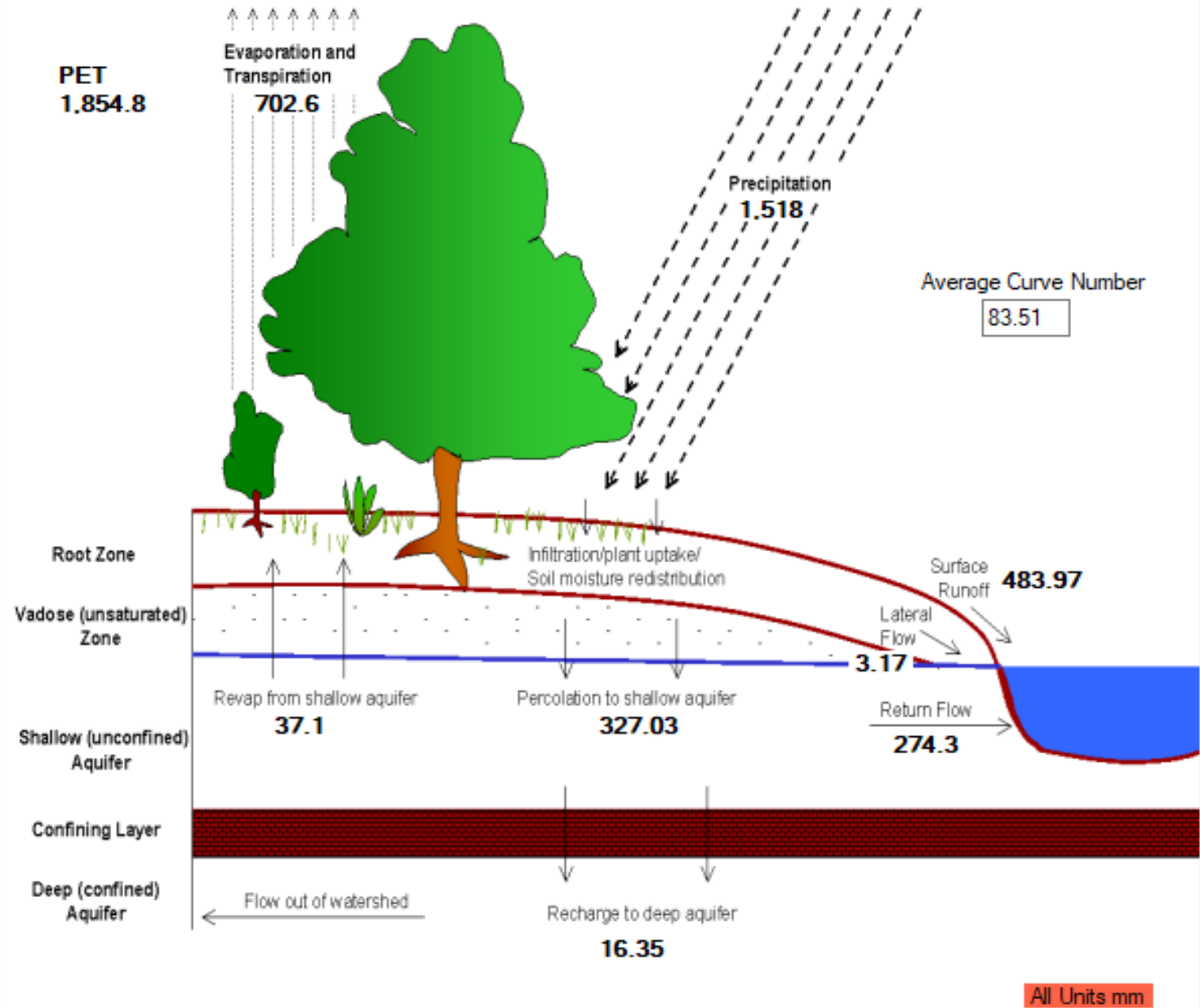
R^2 , NSE and PBIAS

E20A Station:

0.84, -1.24 and -150.3

M5 station:

0.61, 0.54, and 15.7



Conclusion

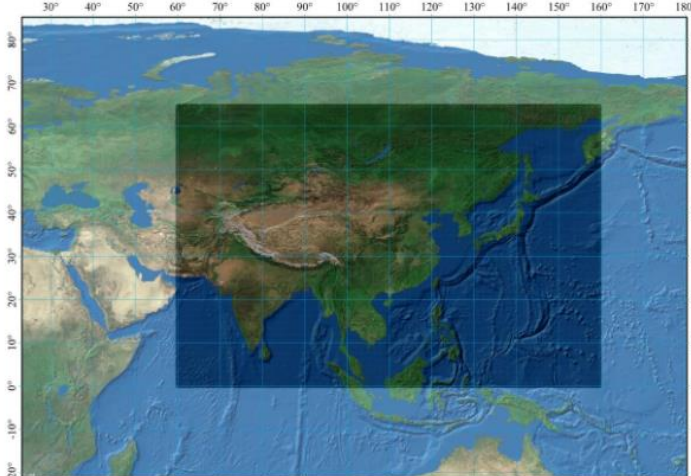
- The simulated monthly streamflow in Mun Basin shows **acceptable to good performances**.
- Thus, CMADS is **applicable** as a meteorological data for the SWAT model simulation **in the Mun Basin** appropriately.
- Besides, the SWAT modeling study in a larger basin scale is promoted due to the CMADS advantages of data acquisition and availability, particularly in the ungagged basin of East and Southeast Asia.

Way forward



- Longer time span
- Combination with various sources of input data
- Apply in various basins, and spatial scales

Download CMADS V1.0



The map shows East Asia, including China, Korea, and Japan, with a grid overlay. The grid covers a longitude range from 30°E to 180°E and a latitude range from 20°S to 80°N. A scale bar at the bottom indicates distances up to 6,000 kilometers.

CMADS V1.0
Total data: 50000MB
Occupied space: 50000MB
Time: From year 2008 to year 2017
Time resolution: Daily
Geographical scope description: East Asia
Longitude: 60°E
The most east longitude: 160°E
North latitude: 65°N
Most southern latitude: 0°N
Number of stations: 58500 stations
Spatial resolution: 1/3 * 1/3 * grid points

[Downlad CMADS V1.0 \(English\)](#)
[Downlad CMADS V1.0 \(Chinese\)](#)
[Downlad CMADS V1.0 \(BD-Cloud\)](#)

CMADS V1.0
China Meteorological Assimilation Datasets for the SWAT model (Version1.0)

THANK YOU