Calibration of a Brazillian watershed using MODIS evapotranspiration data

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SWAT applications

SWAT
Soil & Water Assessment Tool

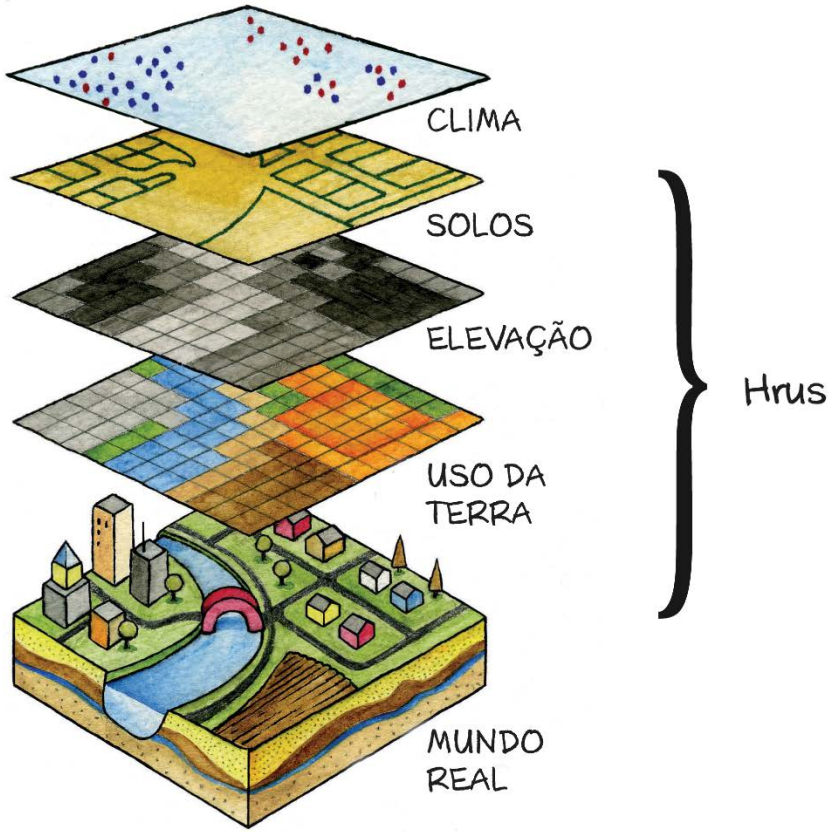
Africa

Europe

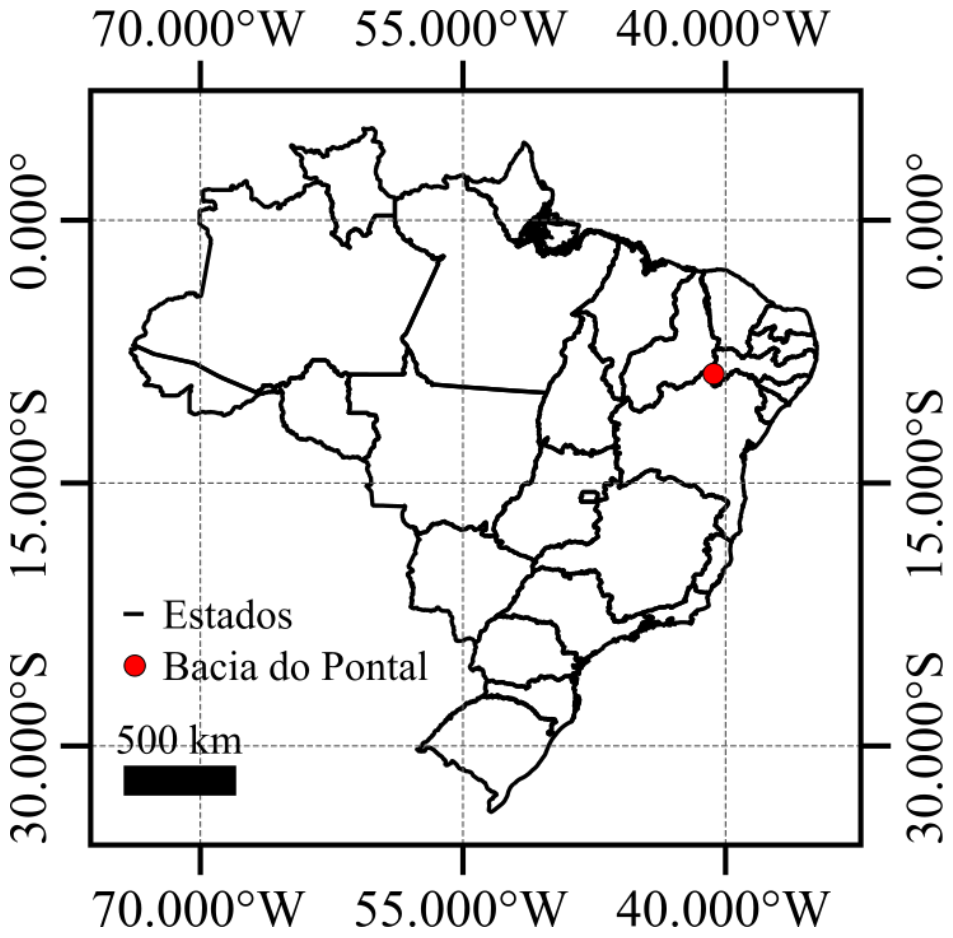
United States

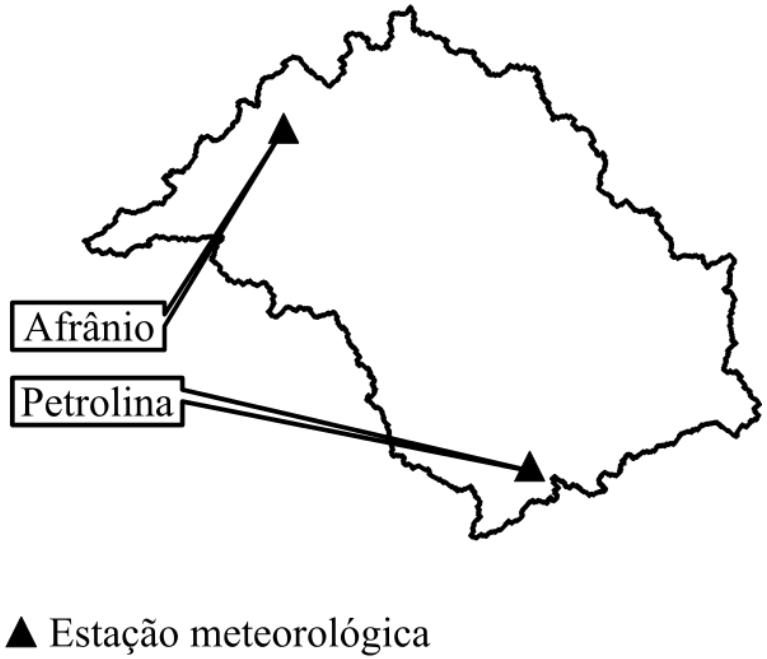
Brazil

Input data



Stations used in this work





Climate

Data of air temperature, relative air humidity, global radiation, wind speed and precipitation from the stations of the National Institute of Meteorology and Pernambuco Agency of Water and Climate for the period from 2005 to 2010

Elevation and soils

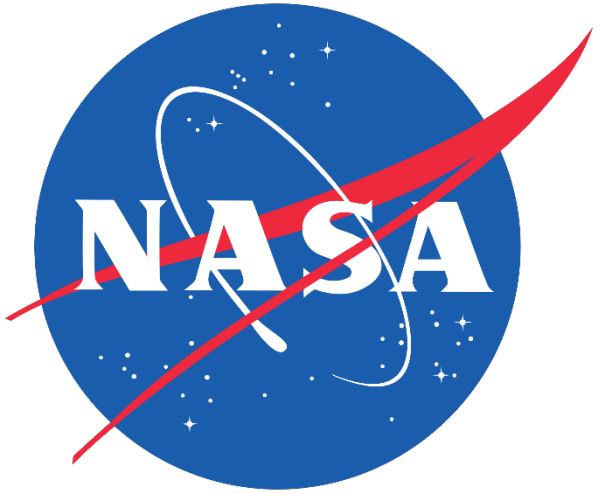
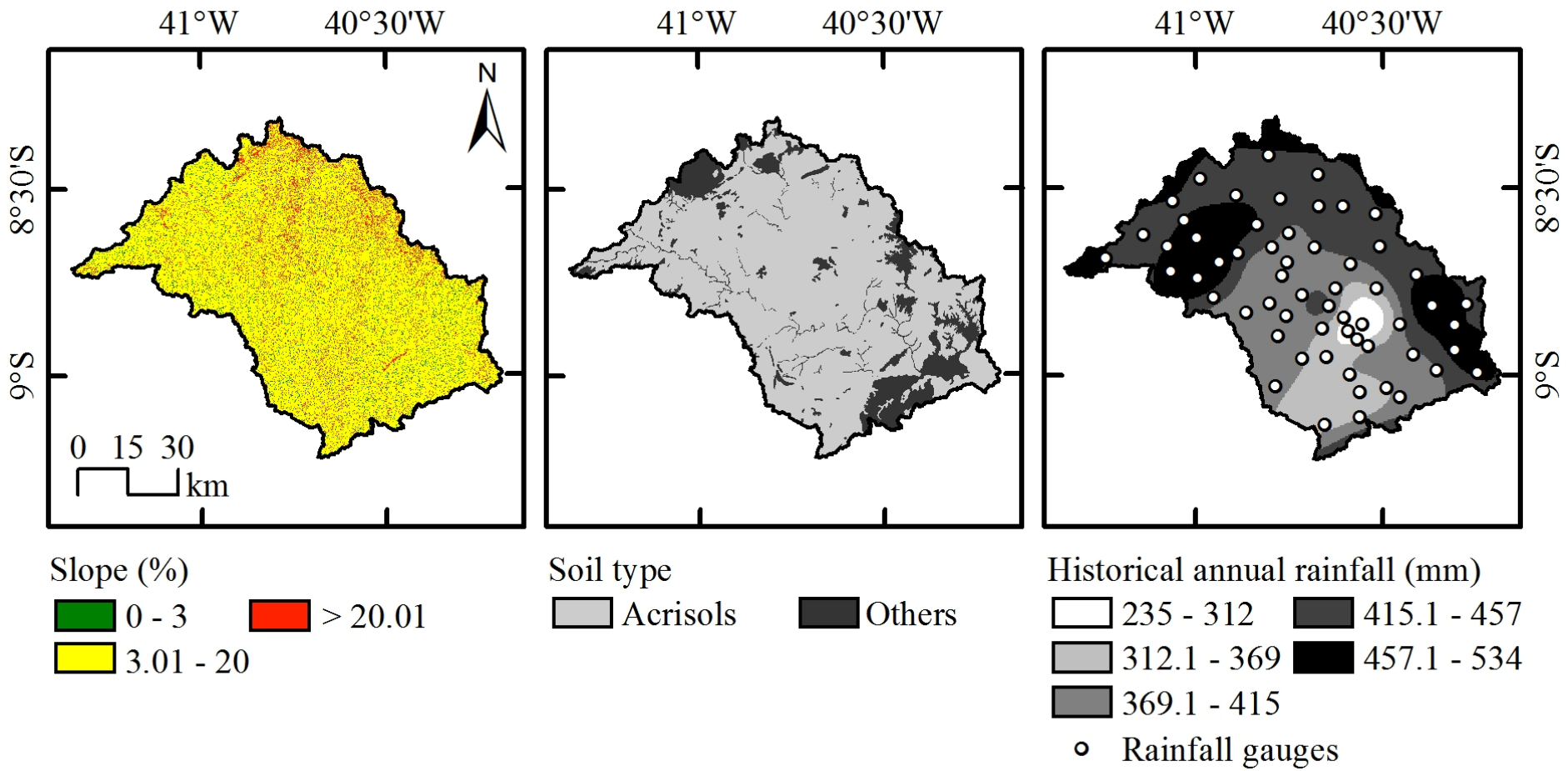
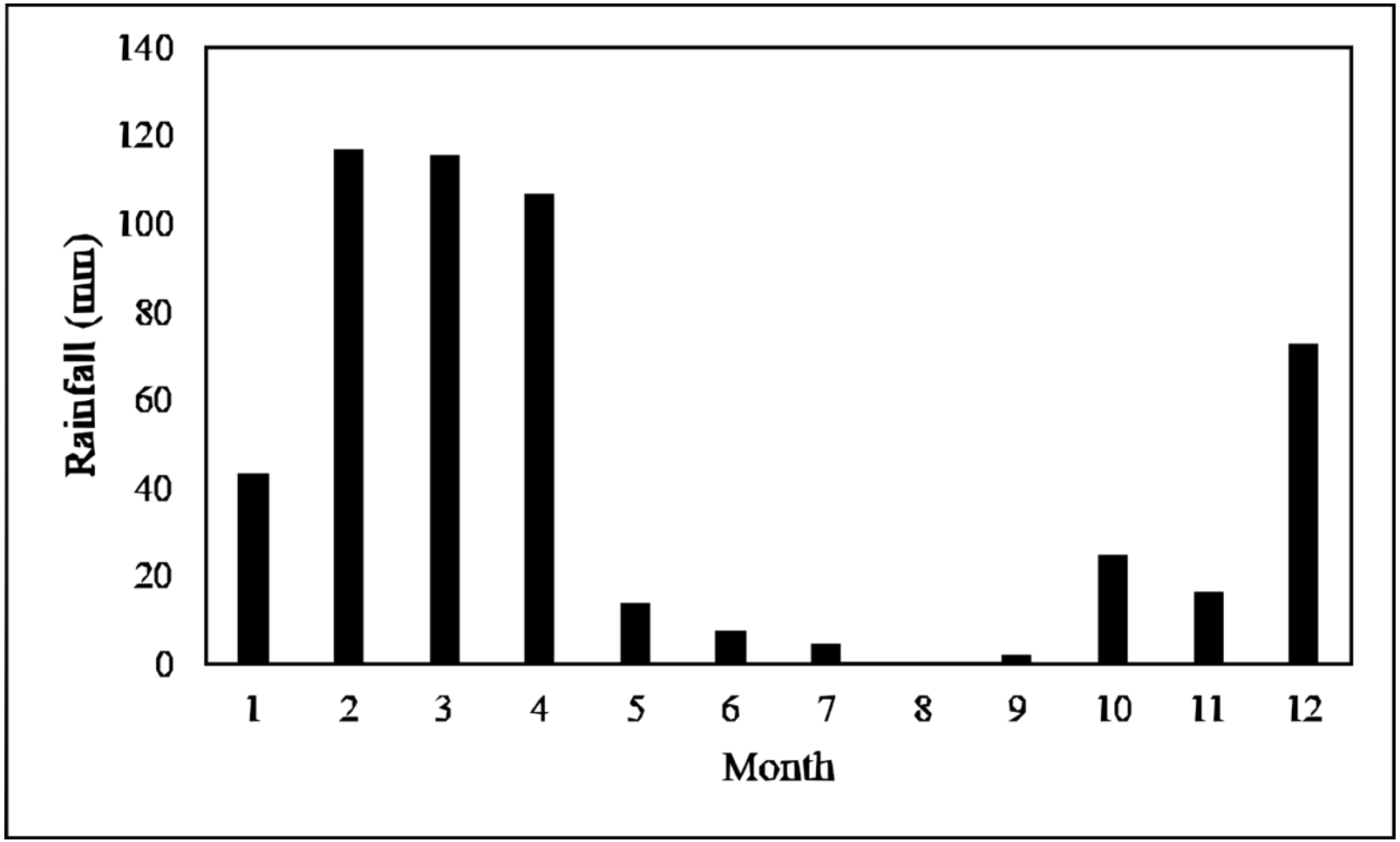


Image ASTER GDEM spatial resolution of 30 m and altitude values (m)

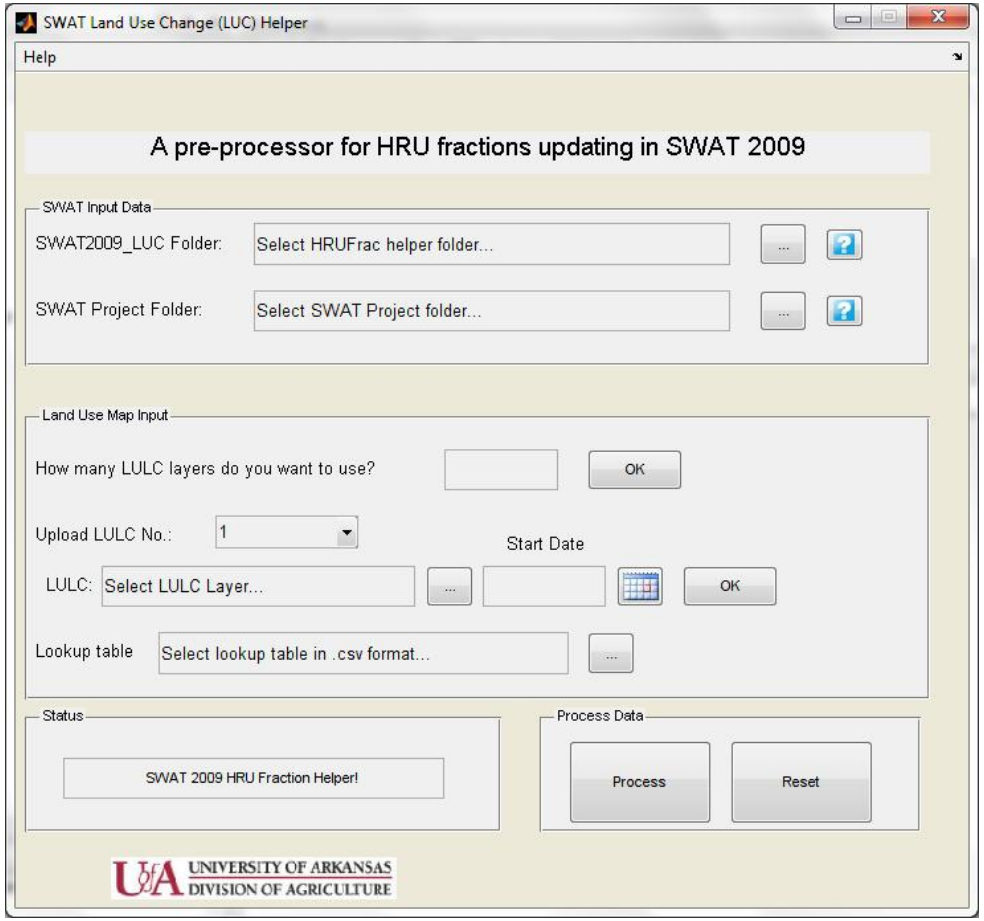
Agroecological Zoning of the State of Pernambuco (ZAPE) formed of map with 1: 250,000 scale


41°W
40°30'W
8°30'S
9°S
N
0 15 30
km
Slope (%)
0 - 3
3.01 - 20
> 20.01
Soil type
Acrisols
Others
Historical annual rainfall (mm)
235 - 312
312.1 - 369
369.1 - 415
415.1 - 457
457.1 - 534
Rainfall gauges


140
120
100
80
60
40
20
0
Rainfall (mm)
1
2
3
4
5
6
7
8
9
10
11
12
Month

Landuse cover

Dynamic maps. Different years. Why?



UofA

DIVISION OF AGRICULTURE

RESEARCH & EXTENSION

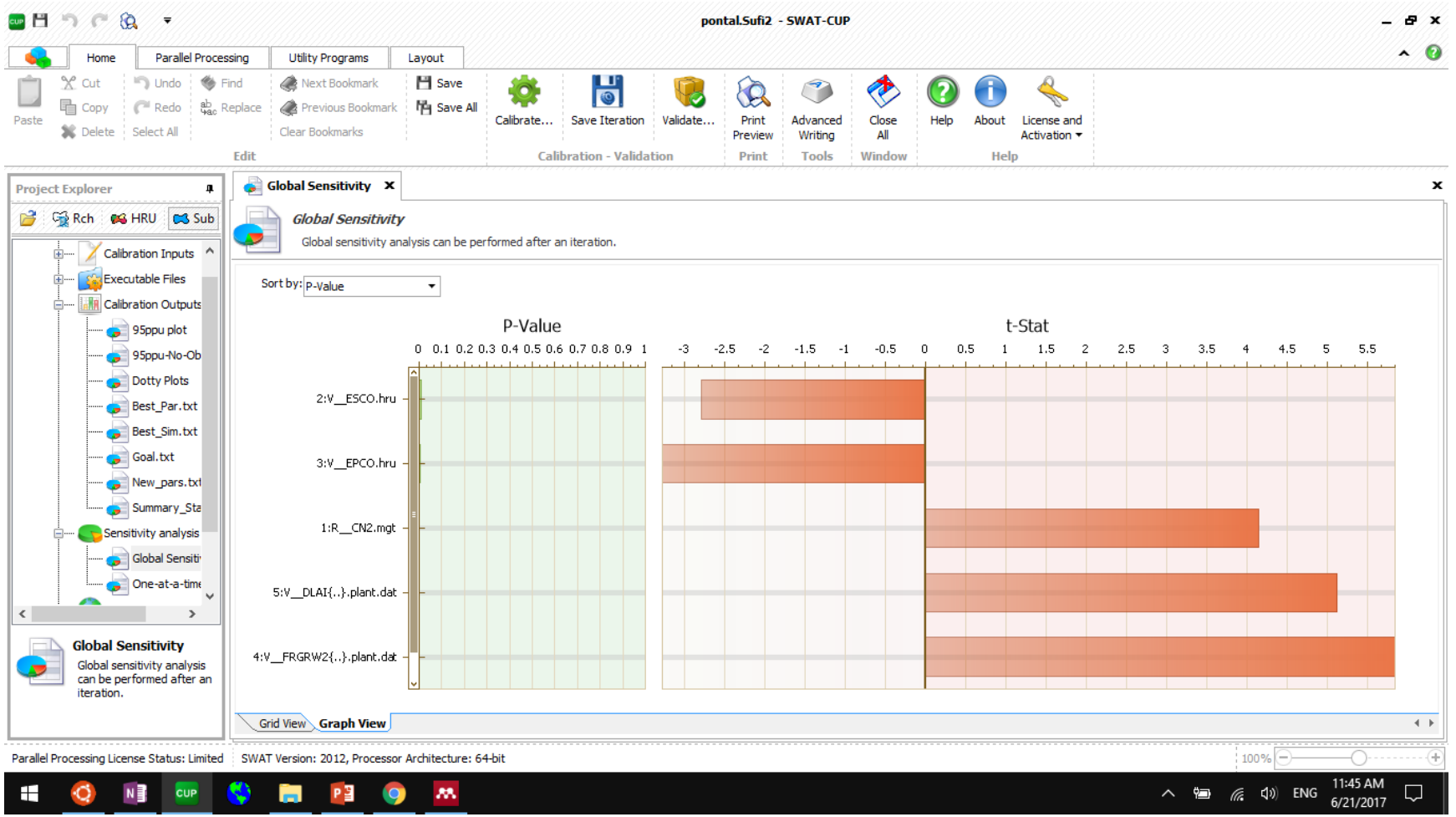
University of Arkansas System

Project configuration

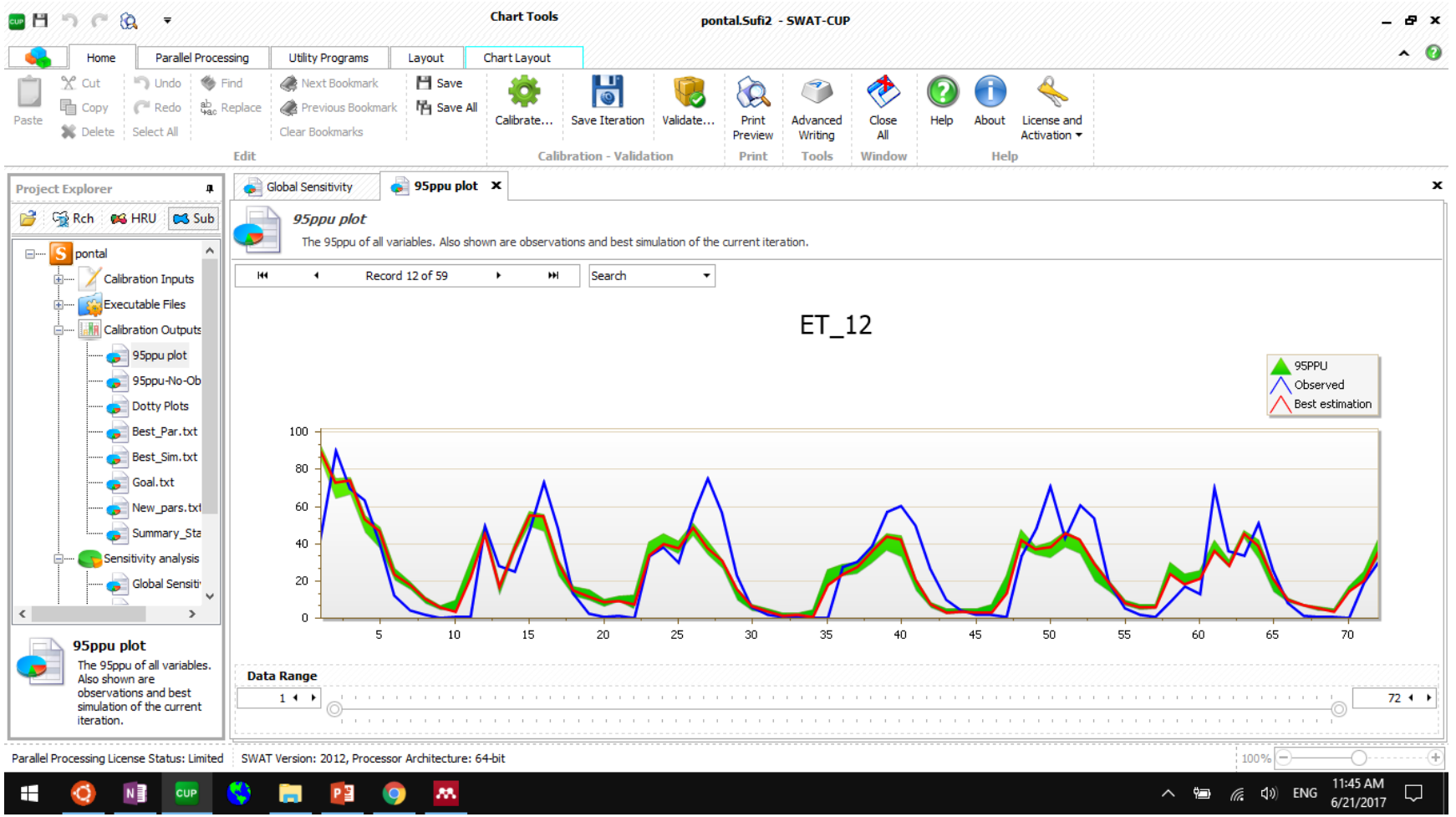
Yihun T. Dile, Prasad Daggupati, Chris George, Raghavan Srinivasan, Jeff Arnold, *Introducing a new open source GIS user interface for the SWAT model*, Environmental Modelling & Software, Vol. 85, n. Nov 2016, doi: 10.1016/j.envsoft.2016.08.004, **2016**

This options due free software.

Sensitivity analysis

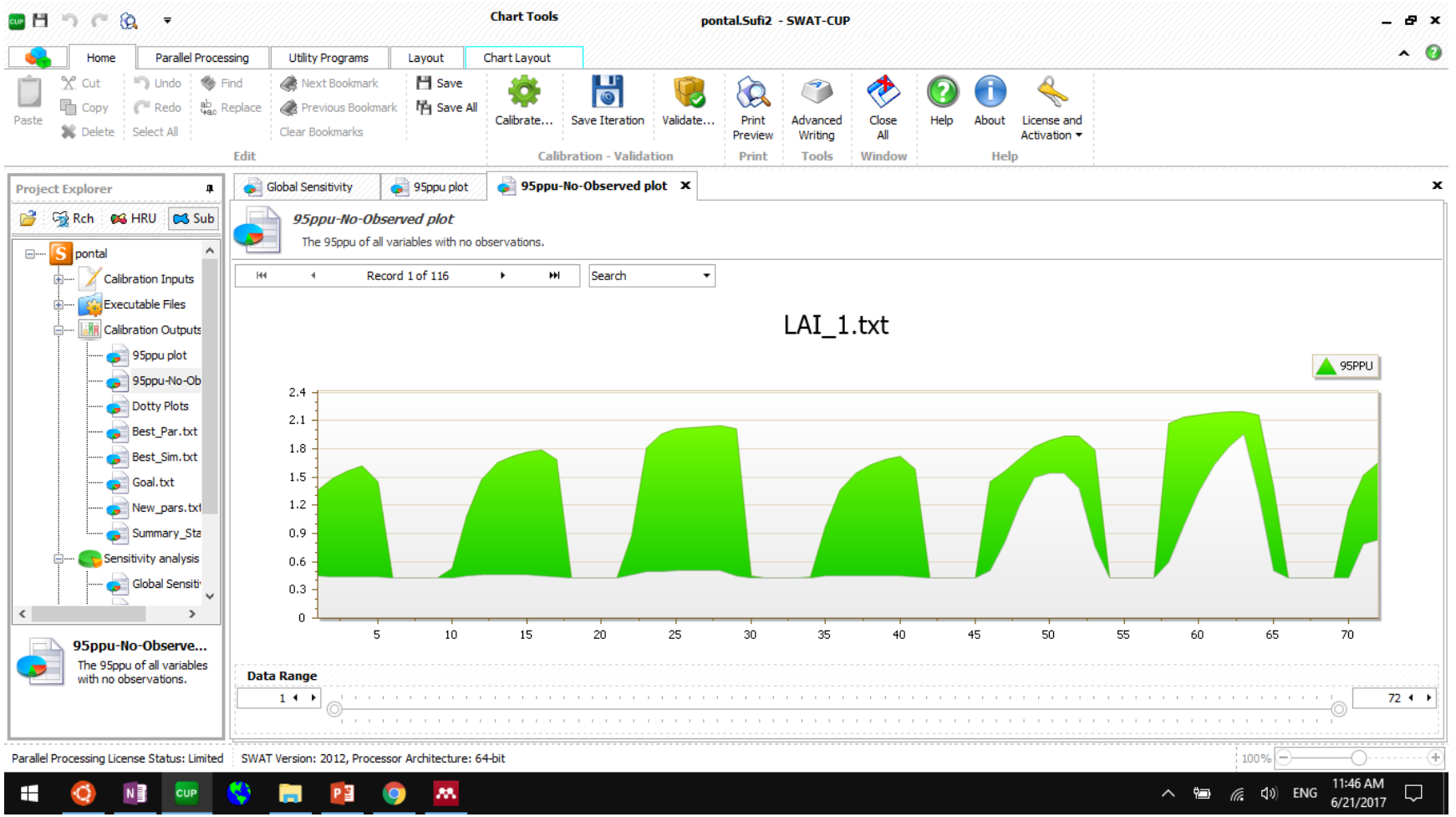


Calibration



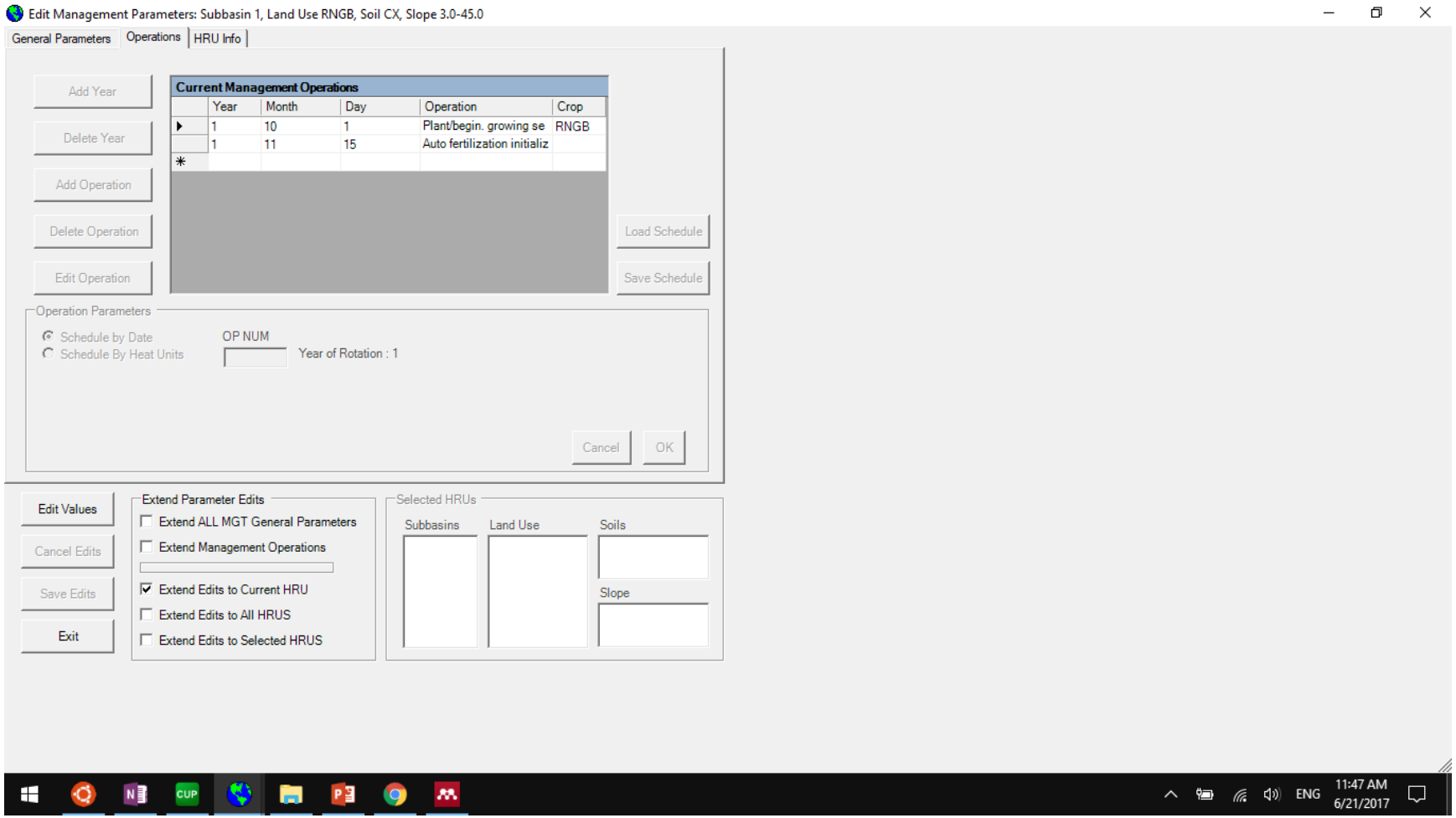
Its possible to calibrate with MODIS because MODIS is daily. Other advantage is possible to obtain image without clouds.

Leaf Area Index adjustment



Other problem was LAI because in Caatinga (Savanna) LAI is not zero, due this adjusted LAI as show above.

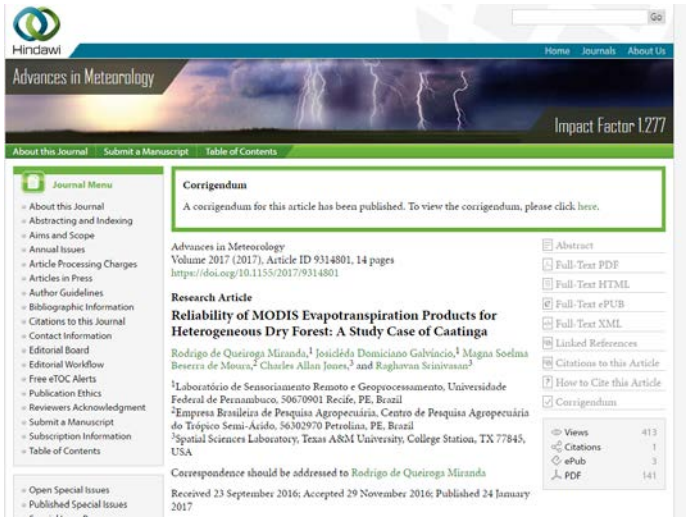
Management operations



In growing of the plant was adjusted or management operations.

Conclusions

- It is possible to calibrate the SWAT model with MODIS evapotranspiration for Savanna and obtain good results.
- In basins without runoff data we recommend to use remote sensing data to calibrate the SWAT model. This situations without data is common in watershed in Brazil.
- This results is part of the thesis of first author. Complete results you can see in Advances in Meteorology. https://www.hindawi.com/journals/amete/2017/9314801/



Thanks!

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