

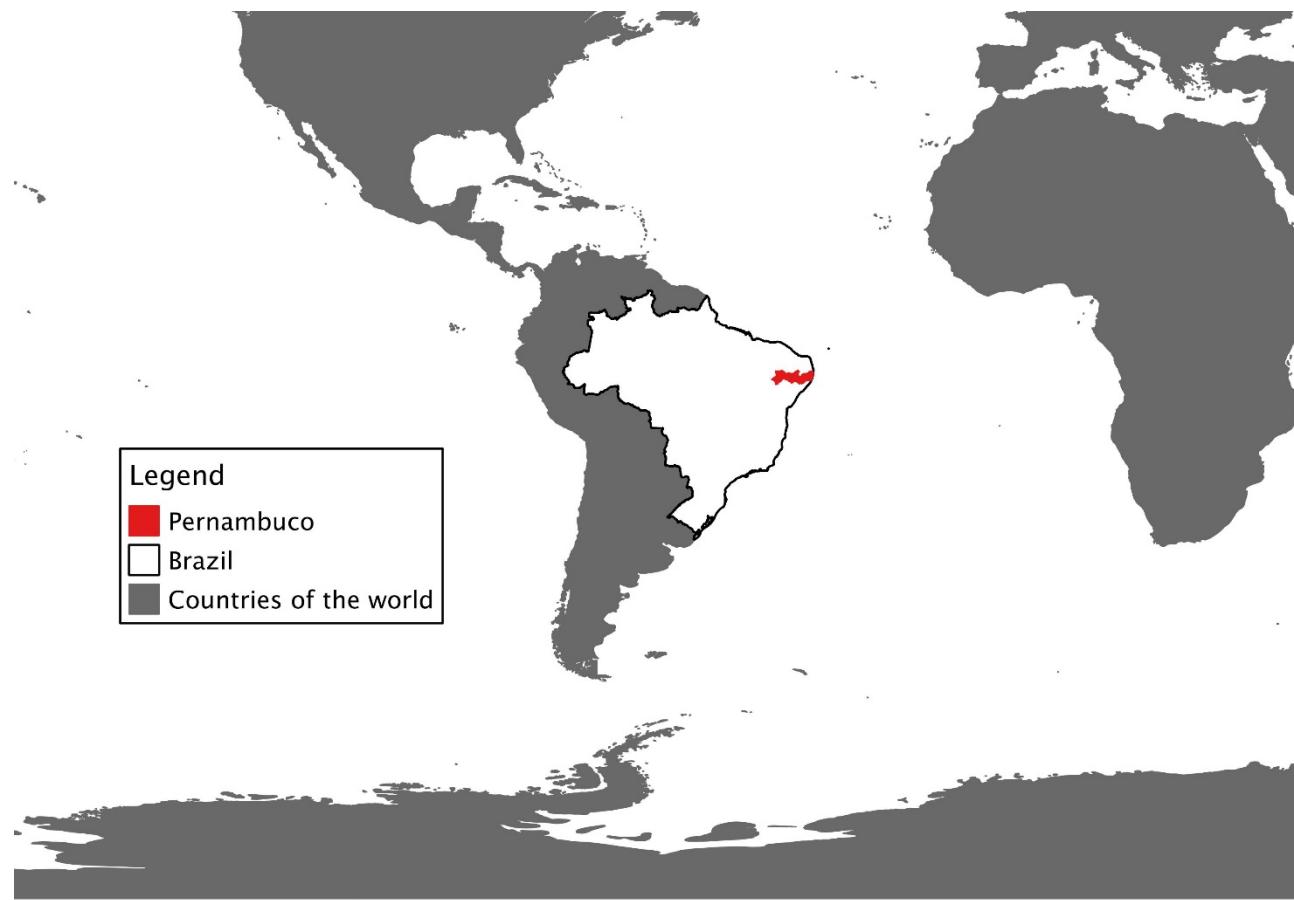
Calibration of three basins located in different climatic regions in the state of Pernambuco, Brazil

Rodrigo de Queiroga Miranda, Josiclêda Domiciano Galvâncio, et al.



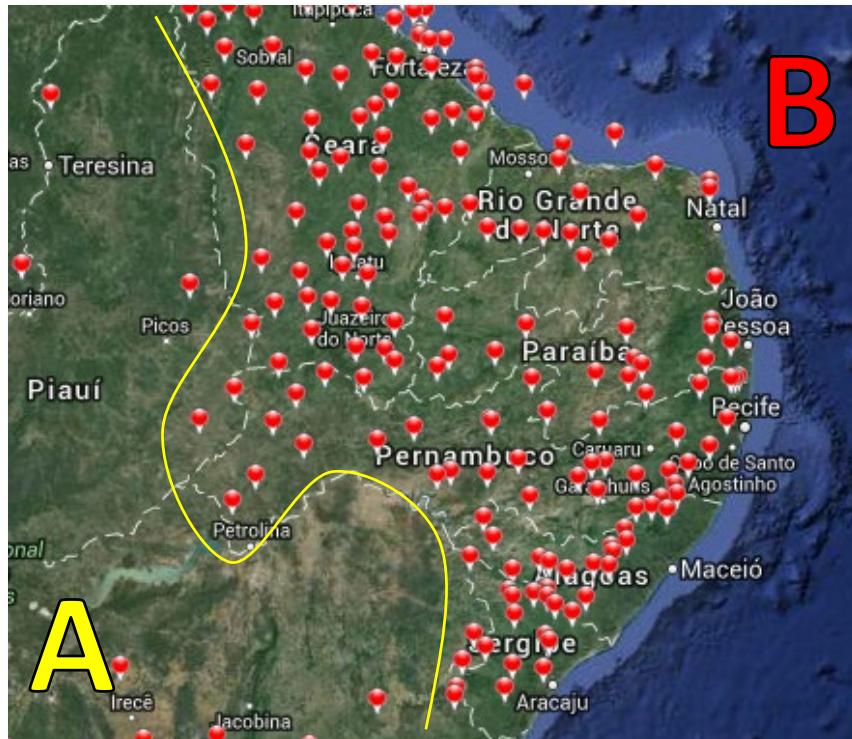


Where is Pernambuco?





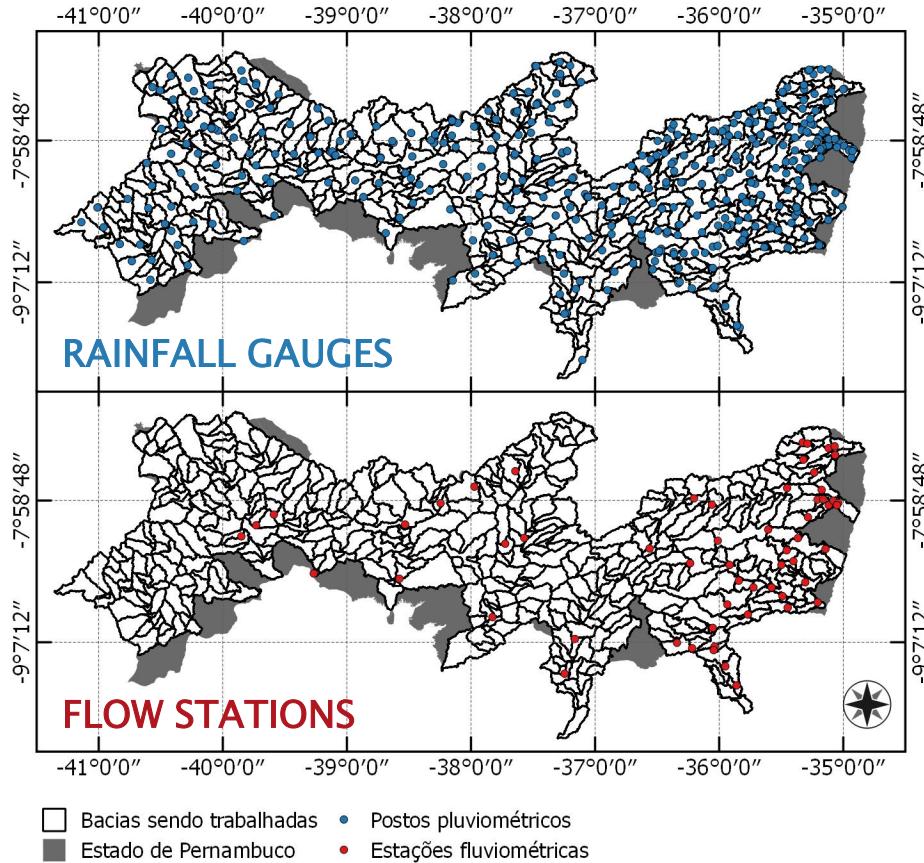
Research motivation



Spatial distribution of complete stations from IBGE (2016).

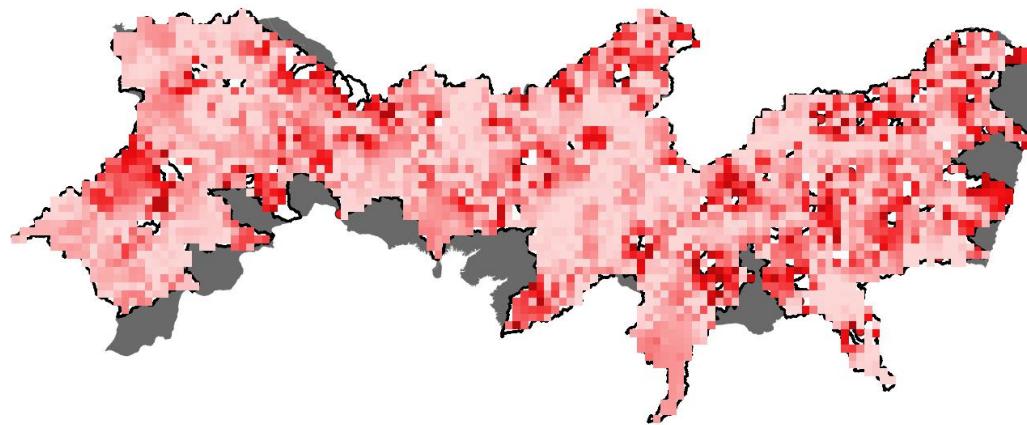
Source: IBGE (2016)

Distribution of the monitoring stations





Percentage of errors in rainfall datasets



Falhas (%):

| | | | | |
|-----------|-----------|-----------|-----------|-----------|
| 15.259000 | 31.234089 | 47.209178 | 63.184267 | 79.159356 |
| 23.246544 | 39.221633 | 55.196722 | 71.171811 | 87.146900 |



Impacts on society



Floods in Palmares (PE) in 2010; Destroyed soybean plantation in Mato Grosso do Sul in 2017, Effects of drought in the Brazilian Northeast, and the Tragedy of Mariana (MG).

Source: Google Images

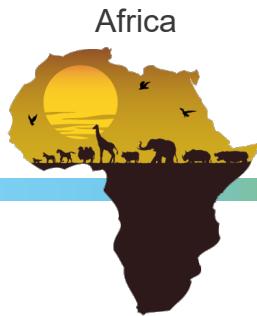


Questions

- What can be done in the face of this scenario?
- How can we fill those gaps temporarily or sometimes permanently?



The SWAT model



Africa



Europe



United States



Brazil



In partnership...





The system SUPer

SUPer | Sistema de Unidades de resposta hidrológica para Pernambuco

Sistema de Unidades de resposta hidrológica para Pernambuco
Uma ferramenta de avaliação hidrológica e de qualidade de água

Select Language | Log off

Projects Portal

Teste

Climate_change

Create a new project

Account settings

Help

Log off

Scenarios

| Name | Last Modified | Start | End | Skip | Print |
|----------------|--------------------|----------|------------|------|---------|
| Climate_change | 3/17/2018 7:51 PM | 1/1/2005 | 12/31/2009 | 2 | Monthly |
| Teste | 10/30/2017 3:05 PM | 1/1/2005 | 1/31/2009 | 2 | Daily |

Create a scenario

Project Files

Create a zip of all your project files and download them to your computer for offline use. We recommend waiting until you are done running all scenarios for this project before creating this file. It may take several hours if you have multiple scenarios and your project is large (>10,000 HRUs).

Create zip of project files Receive an email when complete?

Project Documents

Watershed - Subbasin Head to 56

Project area: 6,033.00 km²

Number of subbasins: 59

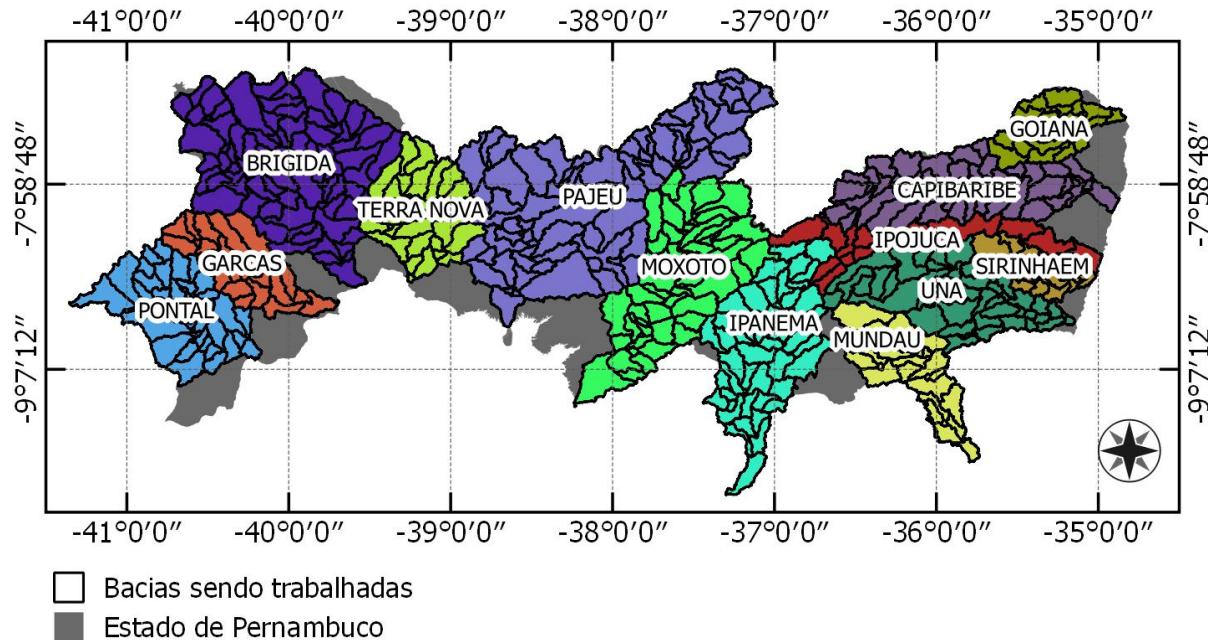
Number of HRUs: 285

Download SWAT to Sub Mapping

Download

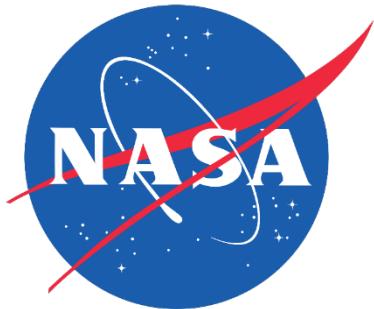
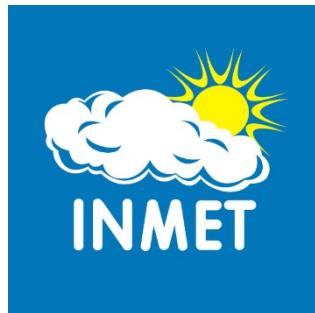


13 watersheds of the State of Pernambuco





Source of input data





First evaluation for SUPer

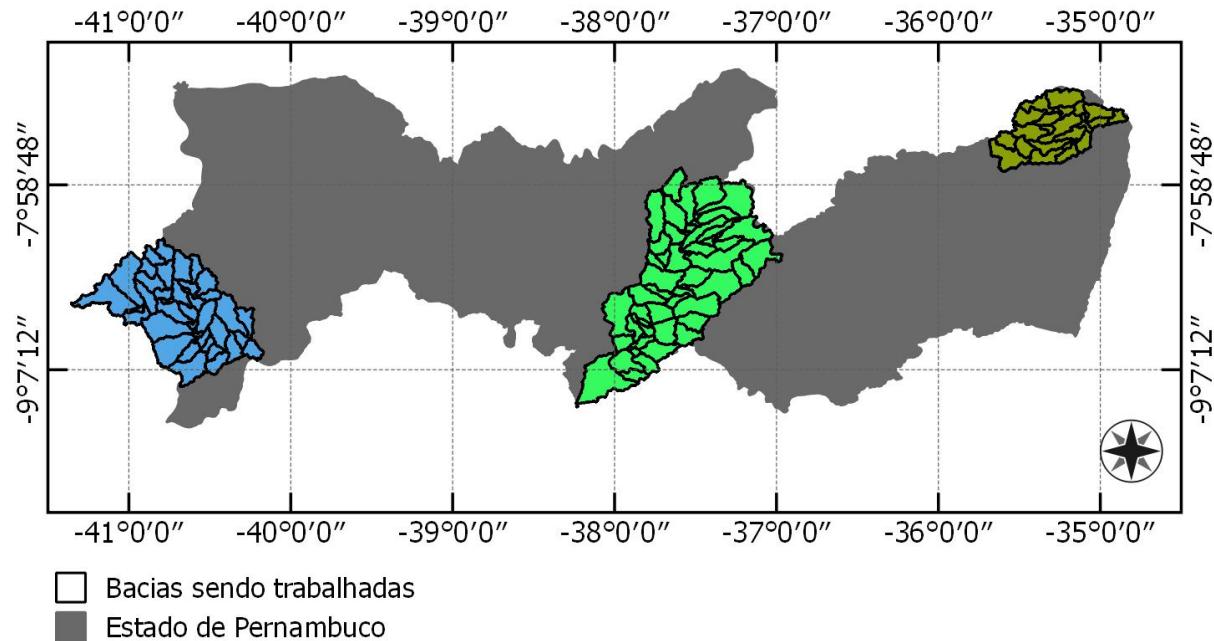
Tabela 2. Resumo das variáveis do balanço hídrico das 13 bacias do Estado de Pernambuco, Brasil. Todos os valores estão em mm.

| Bacia | PET | ET | R | Q_s | Q_l | P_s | P_d | BF | Revap |
|------------|--------|-------|--------|--------|--------|--------|-------|--------|-------|
| Terra Nova | 2680,6 | 344,3 | 503,9 | 14,84 | 124,28 | 20,37 | 1,02 | 7,01 | 14,54 |
| Brígida | 2229 | 427,8 | 556,2 | 20,04 | 69,34 | 47,99 | 2,4 | 28,69 | 19,14 |
| Pajeú | 1958,9 | 509,2 | 724,3 | 42,24 | 152,99 | 20,49 | 1,02 | 10,13 | 11,24 |
| Capibaribe | 1839,4 | 499,5 | 748,2 | 80,99 | 85,65 | 81,51 | 4,08 | 59,91 | 18,88 |
| Garcas | 2468,4 | 409,3 | 496,9 | 24,48 | 35,7 | 27,23 | 1,36 | 12,33 | 15,02 |
| Goiana | 1549 | 711,1 | 1164,2 | 163,03 | 105,21 | 185,24 | 9,26 | 156,49 | 20,56 |
| Ipanema | 2019,4 | 495,8 | 624,8 | 4,37 | 63,77 | 60,77 | 3,04 | 31,36 | 28,01 |
| Ipojuca | 1769,6 | 526,2 | 894,7 | 161,01 | 153,28 | 54,12 | 2,71 | 3,65 | 18,82 |
| Moxotó | 1969,3 | 511,7 | 621,7 | 13,84 | 56,61 | 53,07 | 2,65 | 30,22 | 21,21 |
| Mundaú | 1625,3 | 741,4 | 1031,3 | 151,14 | 86,61 | 58,38 | 2,92 | 35,37 | 21,25 |
| Pontal | 2932,1 | 414,4 | 445,1 | 17,14 | 4,12 | 11,28 | 0,56 | 1,94 | 9,64 |
| Sirinhaém | 1823,4 | 763,5 | 1618,4 | 685,65 | 76,45 | 95,77 | 4,79 | 61,22 | 29,62 |

PET: evapotranspiração potencial; ET: evapotranspiração; R: precipitação; Q_s : escoamento superficial; Q_l : escoamento lateral; P_s : percolação pro aquífero raso; P_d : percolação pro aquífero profundo; BF: fluxo de base; Revap: água que retorna da zona saturada para a não-saturada.



The three selected river basins

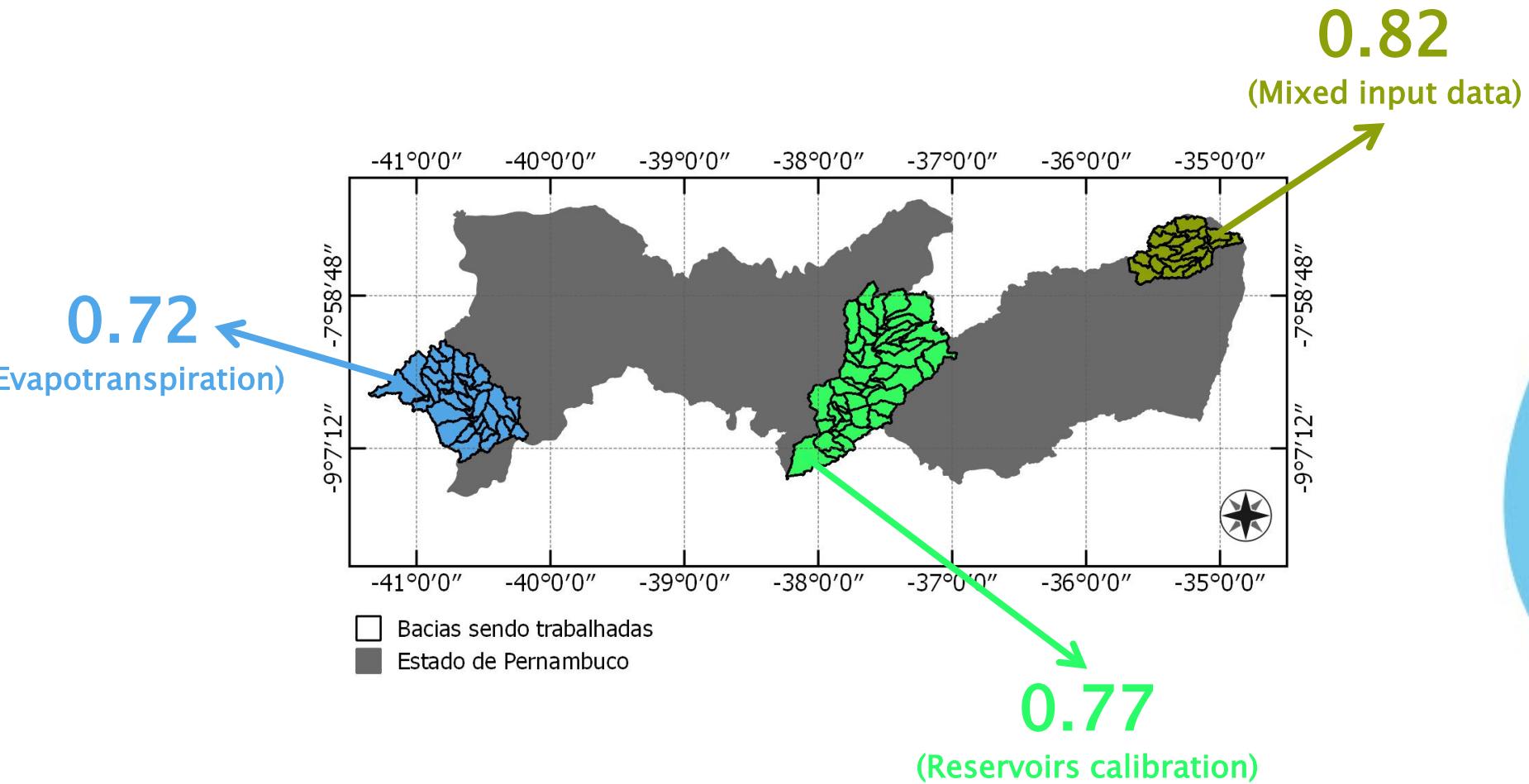




They have different characteristics...

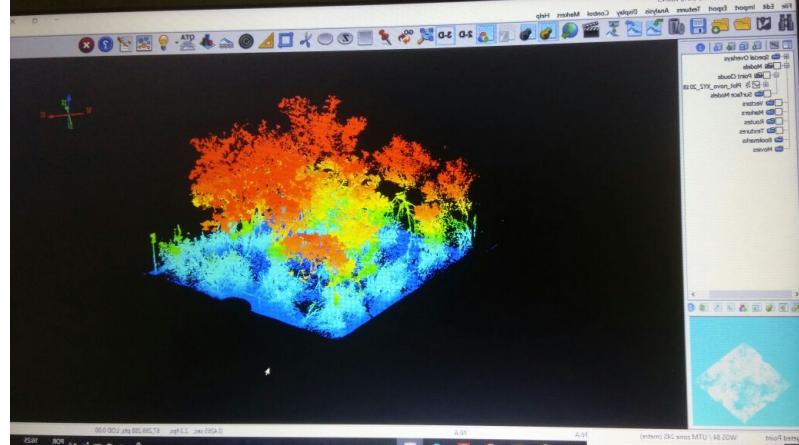
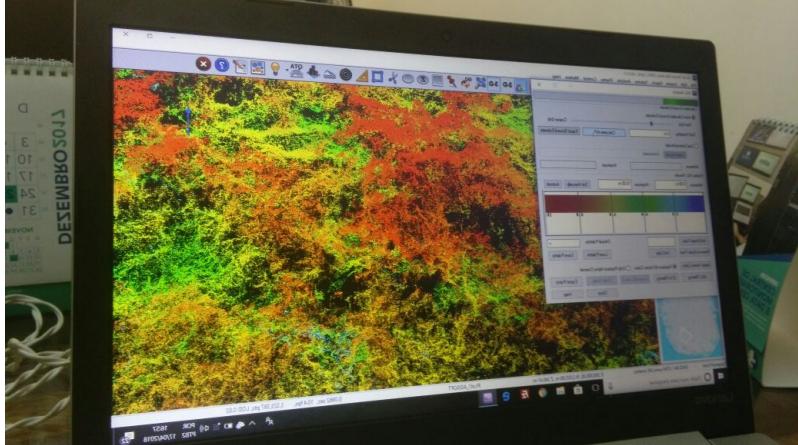
- In the semiarid (to west):
 - Pontal (average rainfall of 500 mm; 54% of missing data)
- In the *agreste* (this is a Brazilian transitional climate zone):
 - Moxotó (1000 mm; 52%)
- Near the coast (to east):
 - Goiana (2000 mm; 49%)

Preliminary results Calibration (NSE; SUFI2)



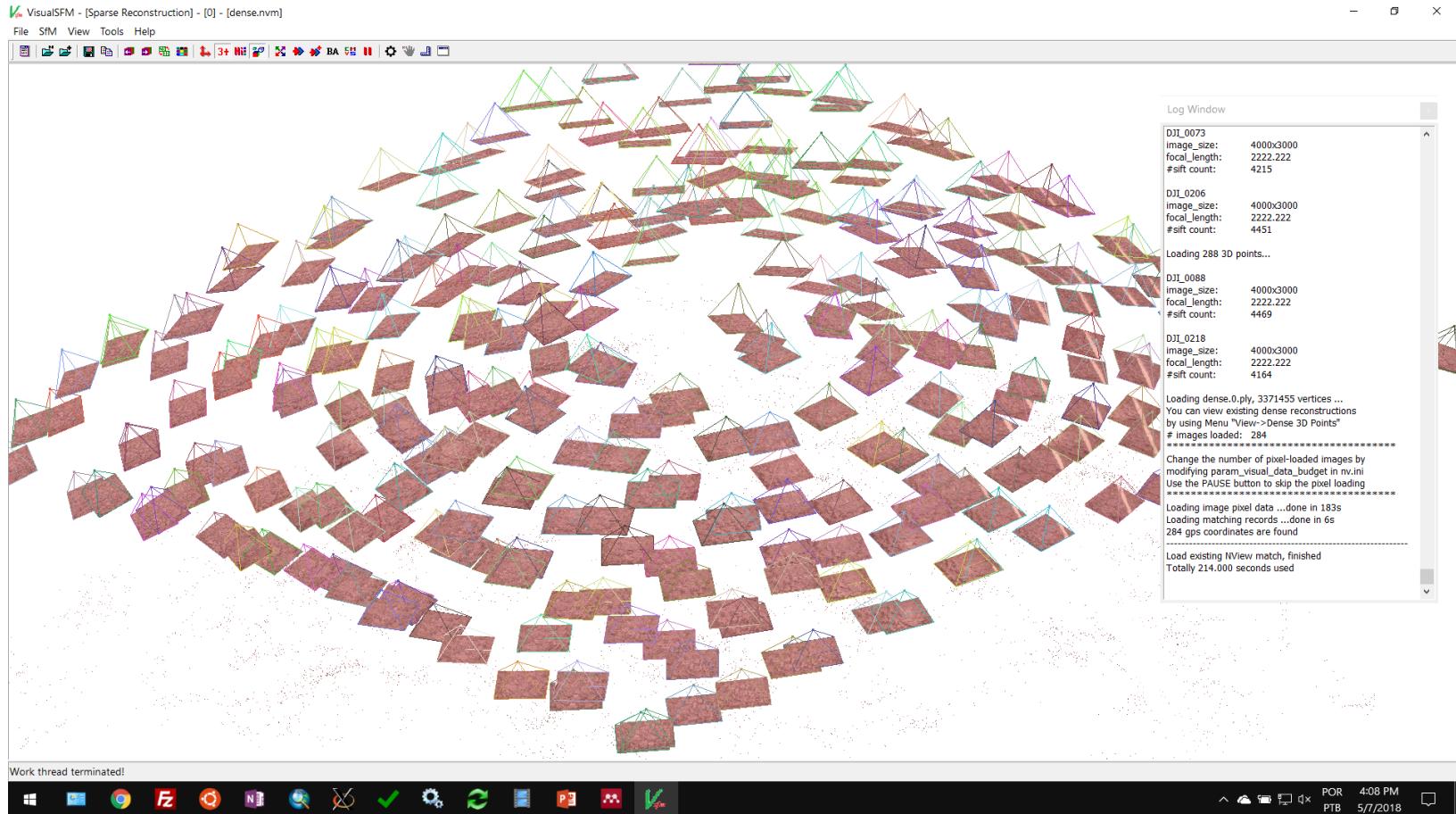


Different approaches





Drone e LiDAR



Thank you!