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## Evaluation of Satellite Precipitation from Google Earth Engine (GEE) in Tonle Sap Basin

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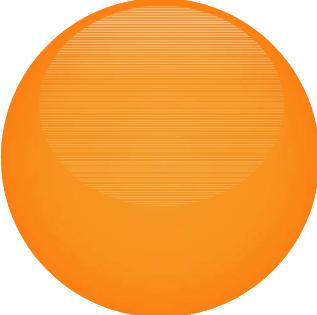
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## OUTLINE

- Introduction
  - Rainfall
  - Google Earth Engine (GEE)
- Study Area
  - Tonle Sap Lake (TLS)
- Material and Method
  - GIS, GEE, Thiessen Polygon Method
- Result and Discussion
- Conclusion and Recommendation

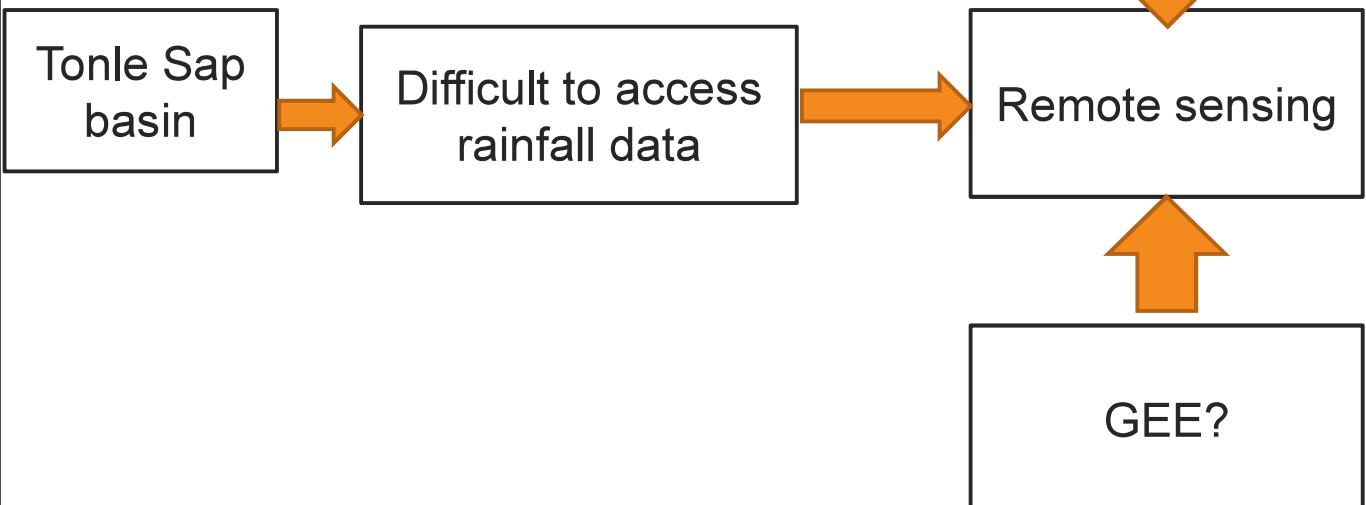


## INTRODUCTION

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- Rainfall:
  - critical variable in the global hydrologic cycle
  - influences our daily lives

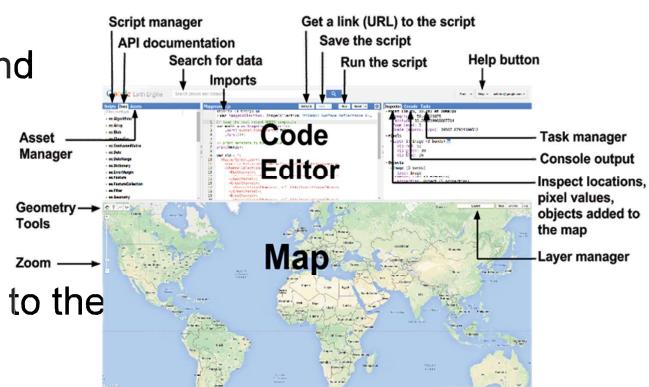


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## ➤ GEE:

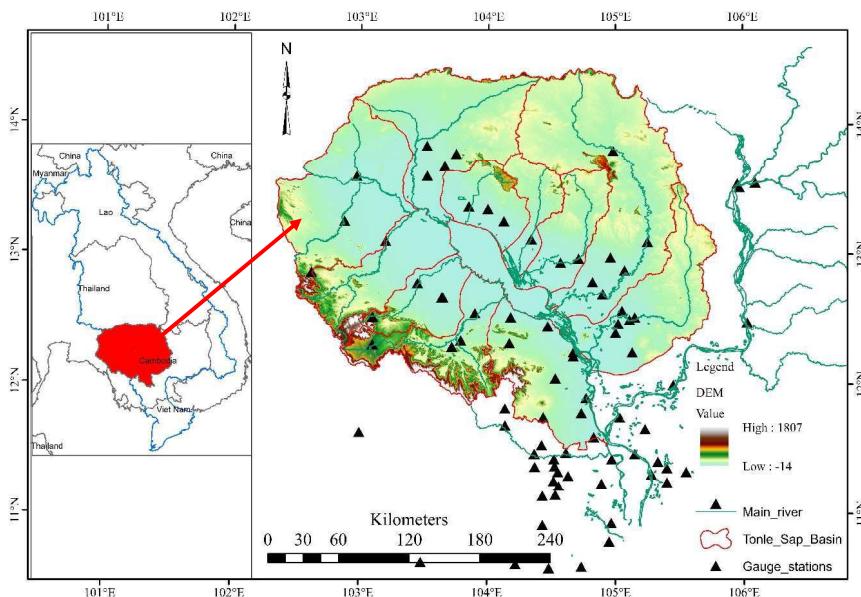
- A cloud-based platform
- Datasets: publicly available
  - remotely sensed imagery and
  - other data.
- Compute power:
  - Google's computational.
  - JavaScript and
  - Python for making requests to the Earth Engine servers.
- Code Editor:
  - An online for rapid prototyping and
  - visualization of complex spatial analyses.



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## ■ Study Area

Tonle Sap is the largest lake and wetland ecosystem in the Mekong River Basin.



- Tonle Sap Basin (11% Mekong Basin)
  - Drainage area 85,796 km<sup>2</sup>
  - 95% in Cambodia and 5% in Thailand
- 11 Sub-basins
- Climate: monsoon
- Aver. annual rainfall: between 1200-1900 mm

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# Objectives

- To collect the monthly rainfall (3B43V7)
  - manually download
  - GEE platform
- To compare a selected rainfall of whole TLS basin in 2010
  - GIS analysis functions
  - JavaScript on a GEE platform.
- To compare
  - GIS and GEE with the gauges.

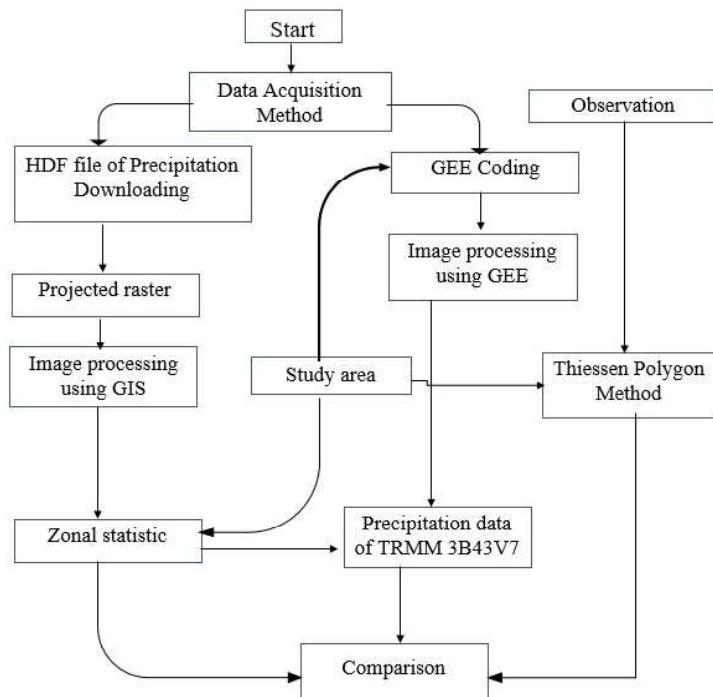
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## METHODOLOGY



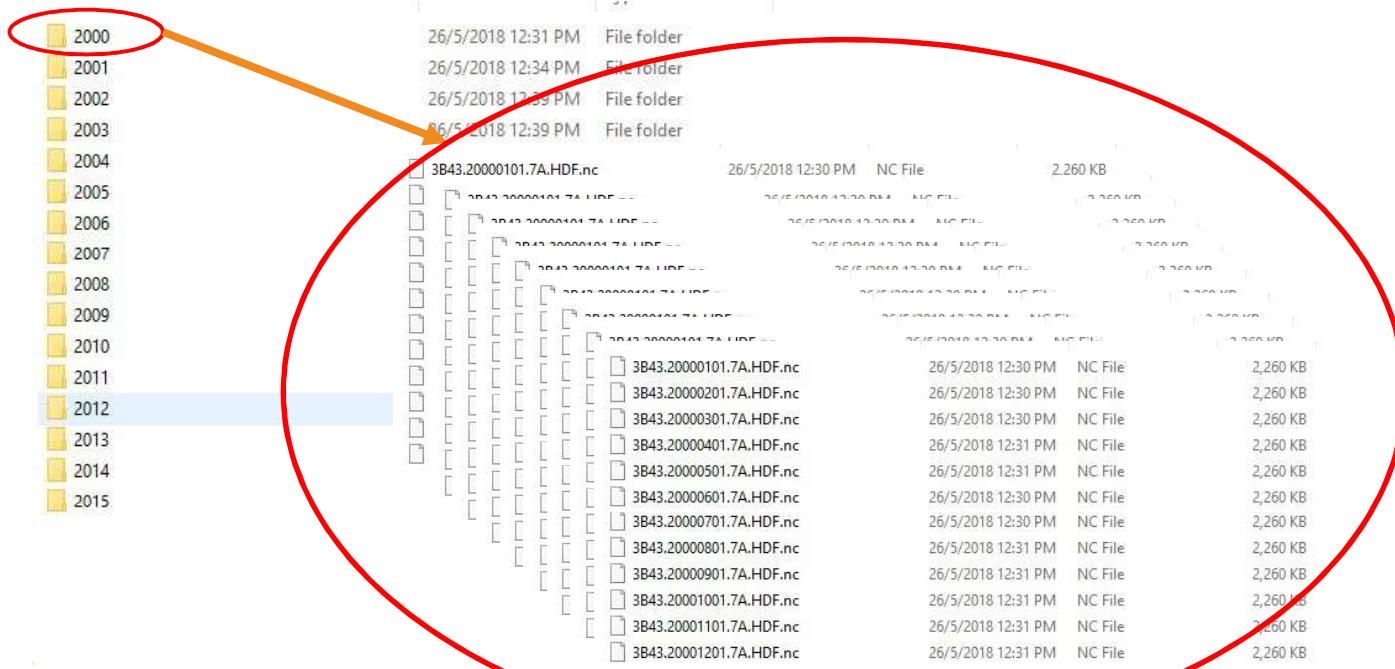
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# Framework



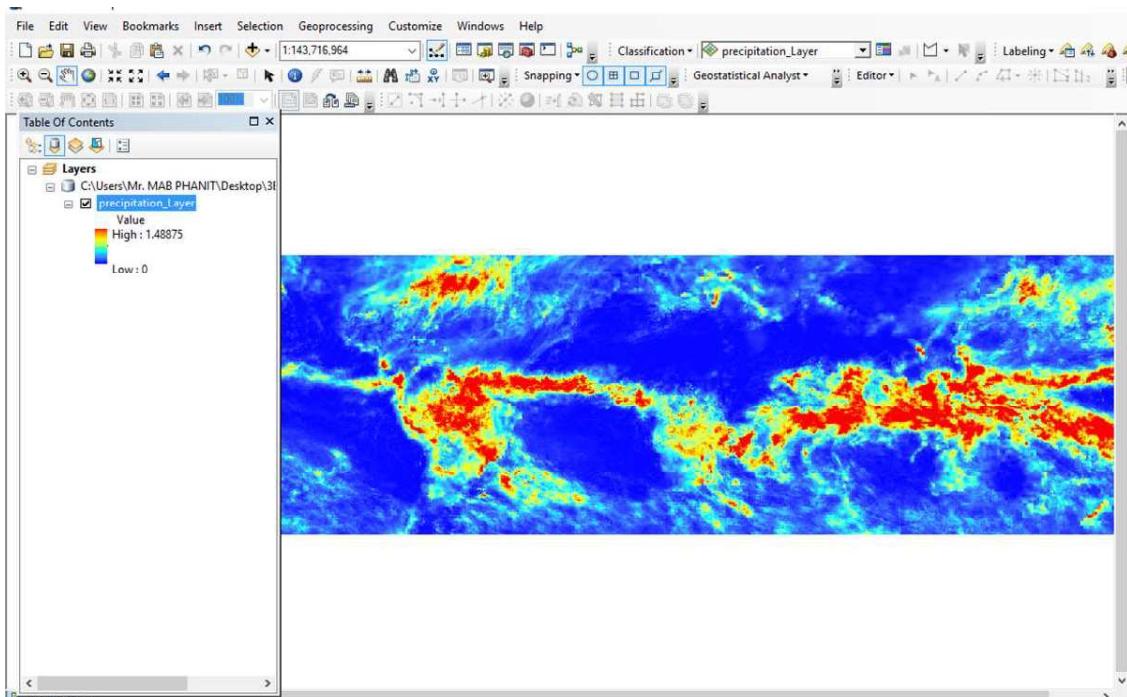
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# Manual Download



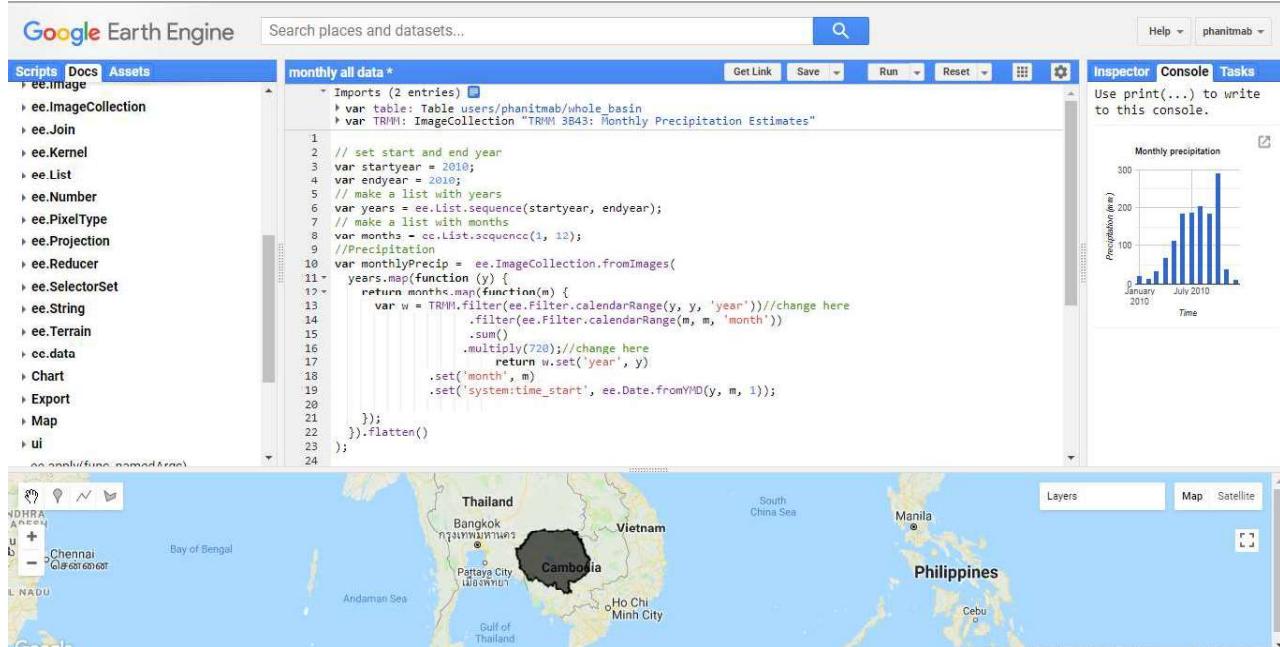
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## HDF Rainfall file using other applications



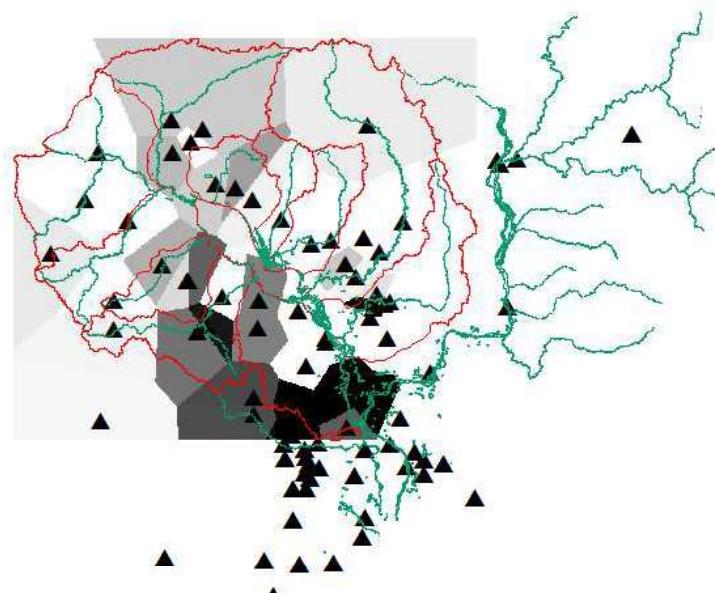
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## GEE platform



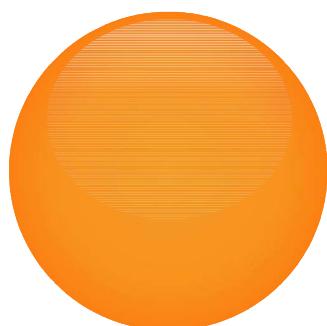
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## Thiessen Polygons Method with the gauges



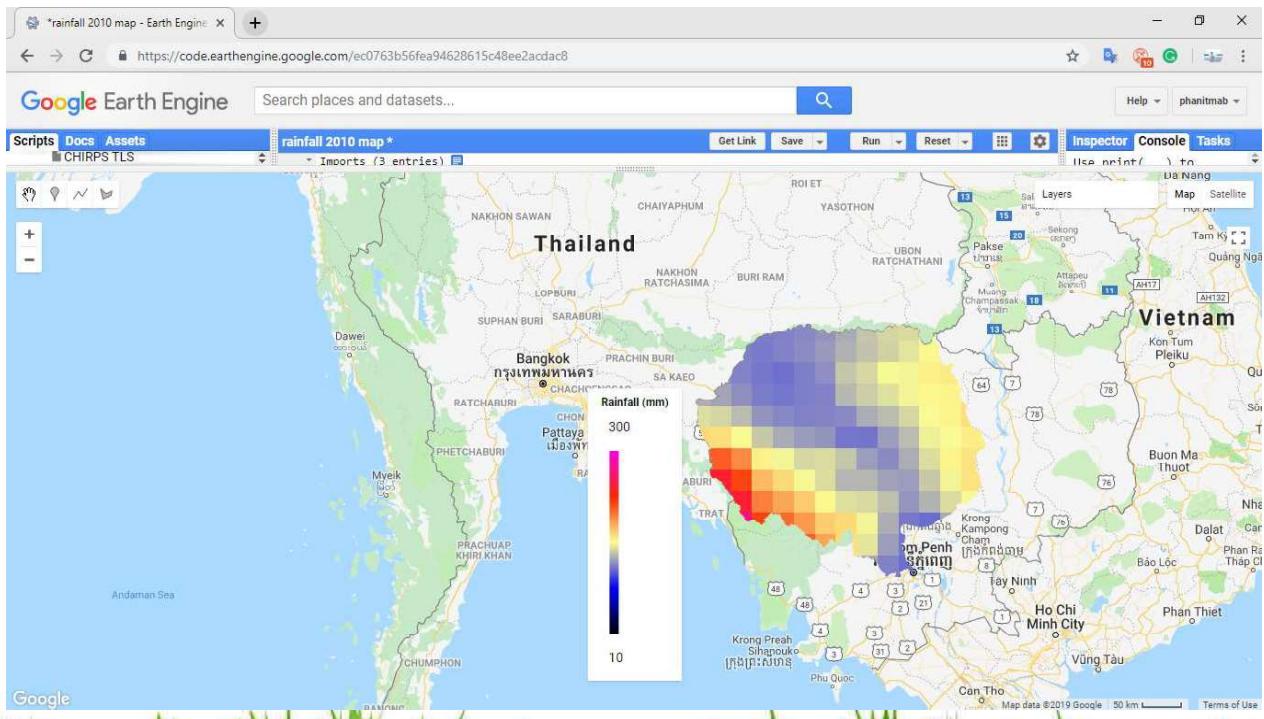
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## RESULT AND DISCUSSION

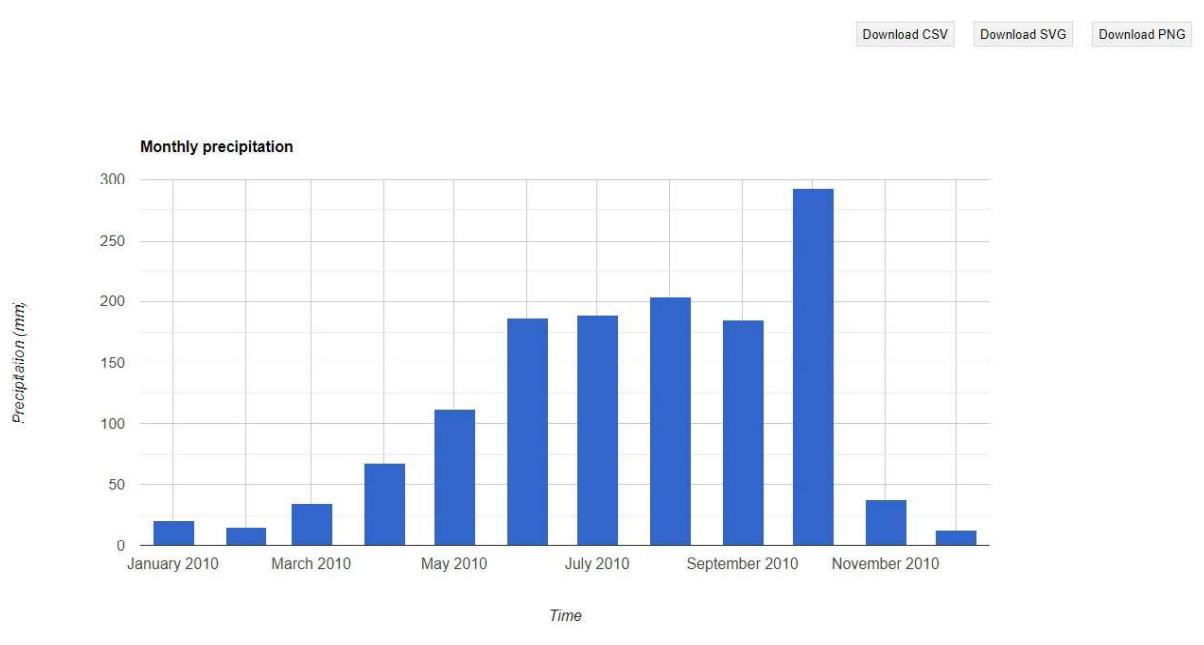


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## Spatial Distribution of Average Rainfall from TRMM

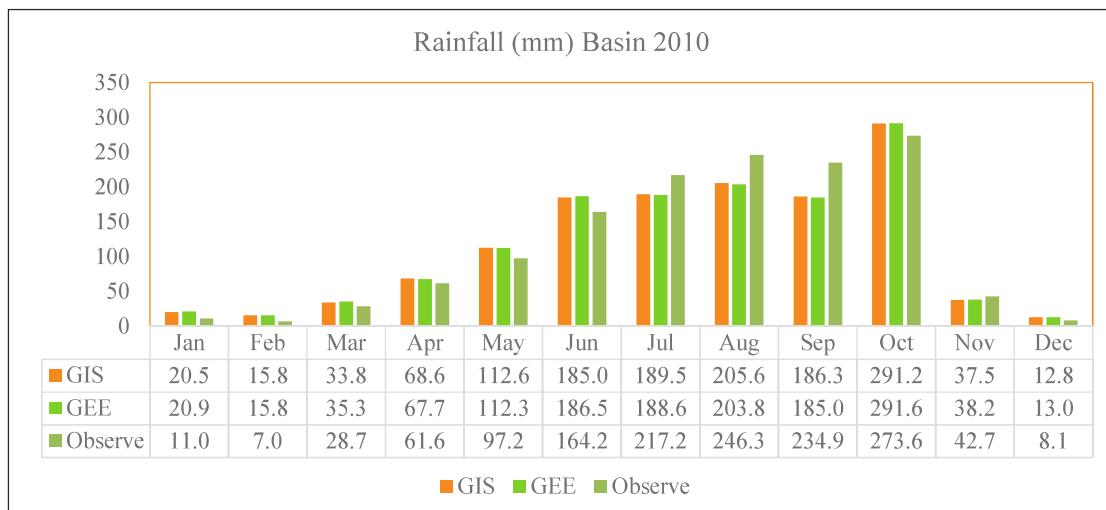


## GEE platform Result



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TRMM (Basin)	r	RMSE
GIS vs. GEE	0.999	0.70
GEE vs. observed	0.975	16.40
GIS vs. observed	0.977	15.88

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## CONCLUSION & RECOMMENDATION



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# Conclusion

- Rainfall from manually download and those from a GEE platform:
  - almost similar rainfall depth for,
    - the entire basin.
- Some error amount of rainfall:
  - uncertainty and
  - location of the gauges in basins.
- TRMM 3B43V7 dataset:
  - high correlation compared with the gauge stations.

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# Recommendations

- The GEE platform:
  - Quickly
  - Online
  - Free and
  - managing time-consuming tasks
- A new concept of remote sensing platform:
  - how to get satellite datasets
    - easily
    - quickly with results in reliable outputs.

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**THANKS FOR YOUR ATTENTION !**