



**NILE BASIN INITIATIVE**  
INITIATIVE DU BASSIN DU NIL



# GEOGloWS Flood Forecasting and Basin Monitoring Tools for the Nile Basin

Dr. Riley Hales

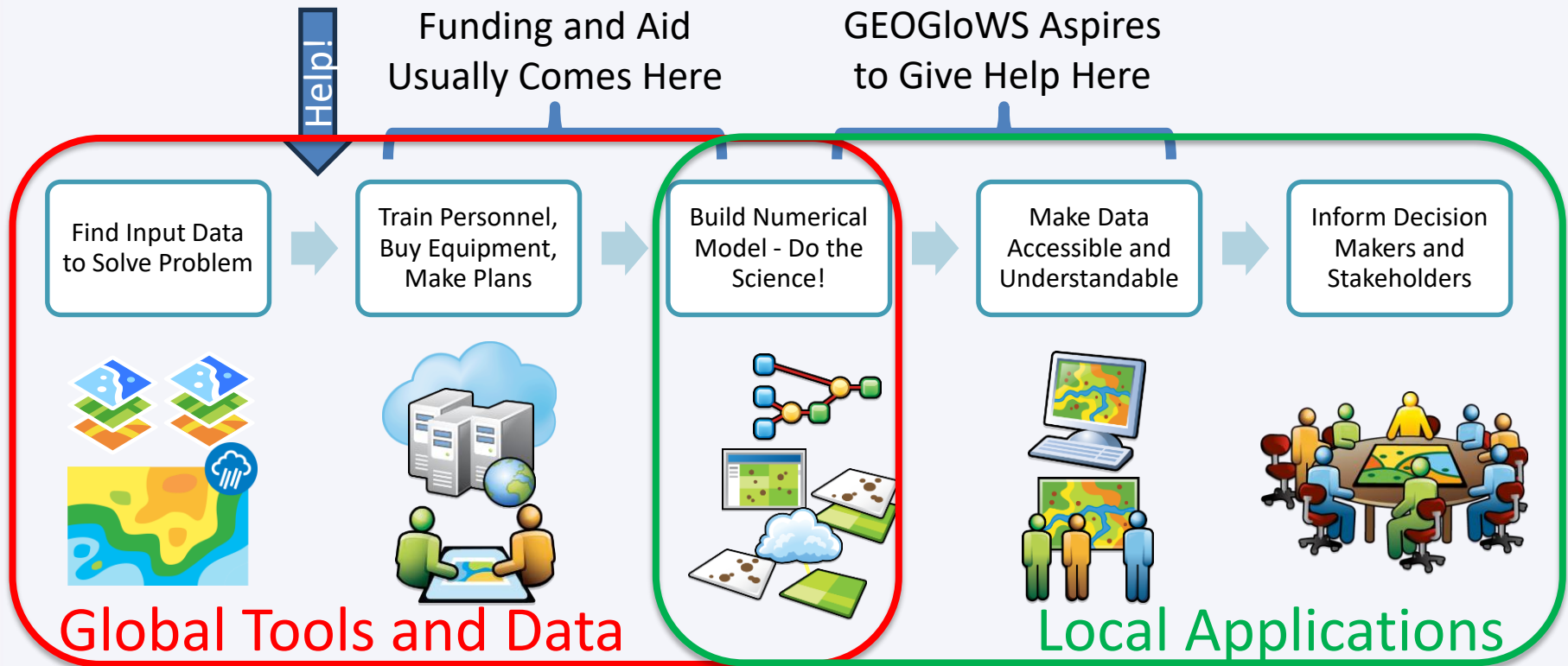
# The GEOGloWS Program



- Group on **E**arth **O**bservations  
**G**lobal **W**ater **S**ustainability
- Partners with ECMWF for met data
- Globally, 16k+ requests for data every day
  
- Global hydrologic model -> River Discharge
- Essential water variable monitoring dashboard

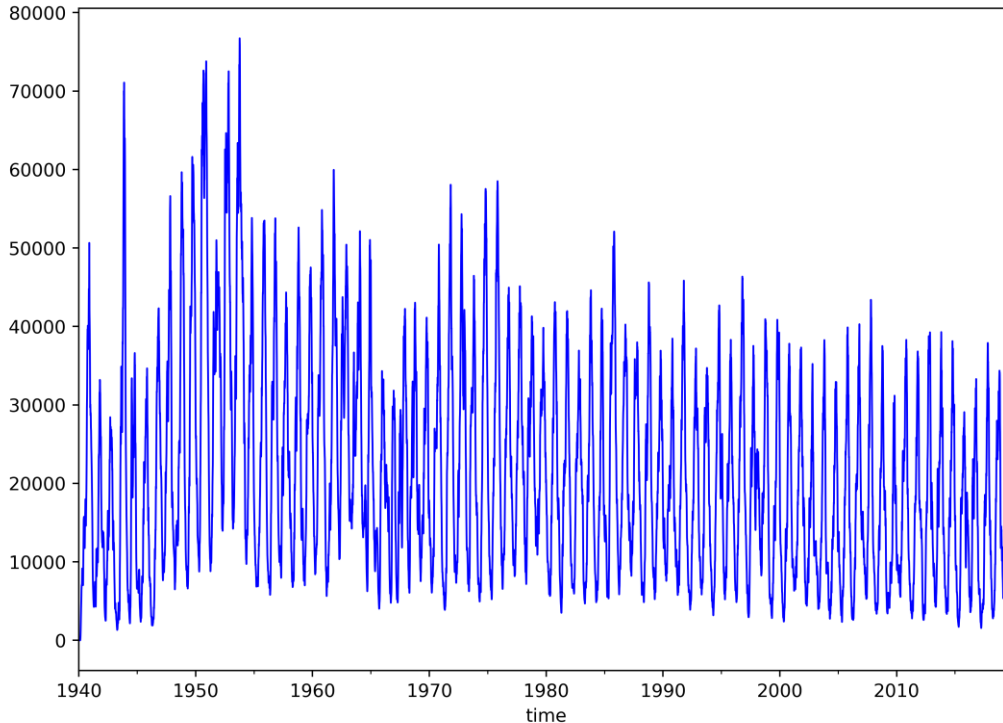


# The GEOGloWS Program



# GEOGloWS = Data + Tools

Raw GEOGloWS Nile Outlet Hindcast



- 1) Hindcast discharge 1940-Present
- 2) Daily 15-day ensemble forecasts
- 3) GIS Datasets – Rivers and Basins (166k in the Nile Basin)
- 4) Many discharge derived datasets
  - 1) Return Periods
  - 2) Temporal averages
  - 3) Volumes/water balance
- 5) Locally adaptable web app suite

# Local Adaptation in Malawi



**GEOGloWS Hydroviewer**

Map Controls

Map Animation

Tue Sep 12 2023 18:00:00 GMT-0600 (Mountain Daylight Time)

Find A Reach ID

Zoom to Lat/Lon Coordinates

Remove Map Marker

Switch to HydroShare Map

Stream Gauge Networks

Choose A Gauge Network

Legend:

- ESRI Topographic
- ESRI Terrain
- ESRI Grey
- Stream Network
- Gauge Network
- VIIRS Imagery

**Global Tool**

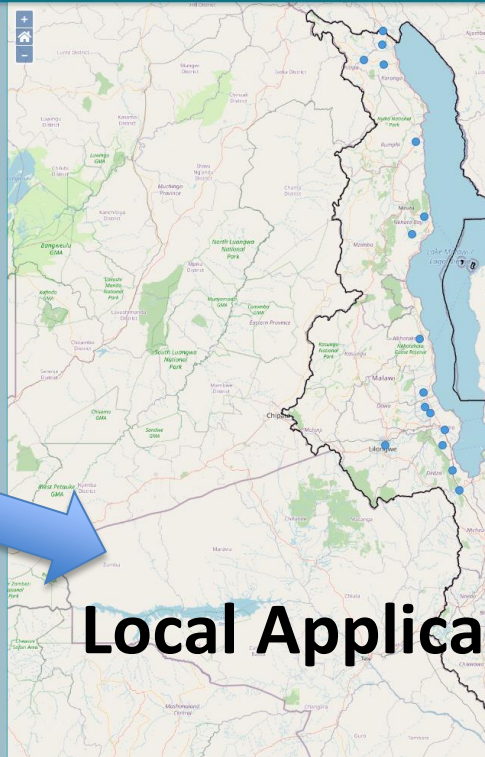
## Community Based Flood Early Warning System for Malawi

**Data Watch**

As of: 2023-SEP-13, 18:46

Activate Siren on browser

Bua River at Bua Lodge	N/A	N/A
Kyungu River at Chisi, Karonga	N/A	N/A
Levulezi River at MS Bridge, Dedza	N/A	N/A
Lifidzi River at Chimoga, Salima	N/A	N/A
Likangala River at MS Road Bridge, Salima	N/A	N/A
Limphasa River at Timbiri, Nkhatabay	N/A	N/A
Lingadzi River at Mwanza, Salima	N/A	N/A
Linthipe River at MS Road Bridge, Salima	N/A	0 mm



**THE NATION**  
TUESDAY, 24 MAY 2022

### Floods warning gadgets save lives in Karonga

**ANDREW MKONDA**  
MALAWI NEWS AGENCY

People around Songwe River in Traditional Authority Mwakaboko in Karonga District have said early warning gadgets saved their lives and livestock from floods this year.

Speaking on Saturday when Malawi Red Cross Society officials appreciated the impact of the gadgets in the area, Mwakaboko Village Civil Protection Committee chairperson Mofira Mwaseya said previously, people were caught unaware by floods, thereby losing lives.

He said: "But this year, no single life has been lost as people were able to escape to the upland on time following alerts from the gadgets. Without the gadgets, we would have lost many lives because Songwe River flooded beyond expectation."

One of the flood survivors, Dickson Ngonya, whose house collapsed during the disaster, said his family fled to safety after hearing an alarm showing that the river had flooded.

He said: "We were fast asleep when the alarm rang. We quickly woke up and left the house surrounded by water. No sooner had we left, than the house collapsed."

Malawi Red Cross Society disaster preparedness and mitigation specialist Cecilia Banda said it was interesting to learn that community members were following warnings using modern equipment.

She said: "We are impressed with how people are using the gadgets. It shows that Modernised Climate Information and Early Warning System Project we are implementing is bearing fruits."

Community-based early warning system gadgets were installed in four rivers in the district with financial support from UNDP: The rivers are Kyungu, North Rukuru, Lufilya and Songwe.

Karonga is one of the disaster-prone districts in the country and this year, over 6,000 households were affected by floods in the district.

**Mwaseya (R) explains how the warning system works**

PHOTOGRAPH BY ANDREW MKONDA, MALAWI NEWS AGENCY

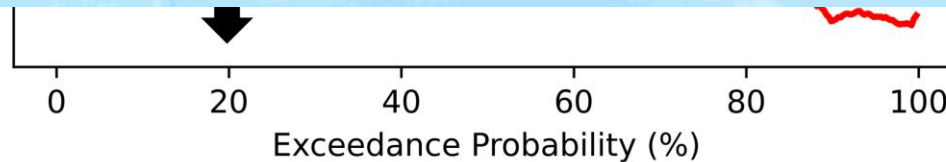
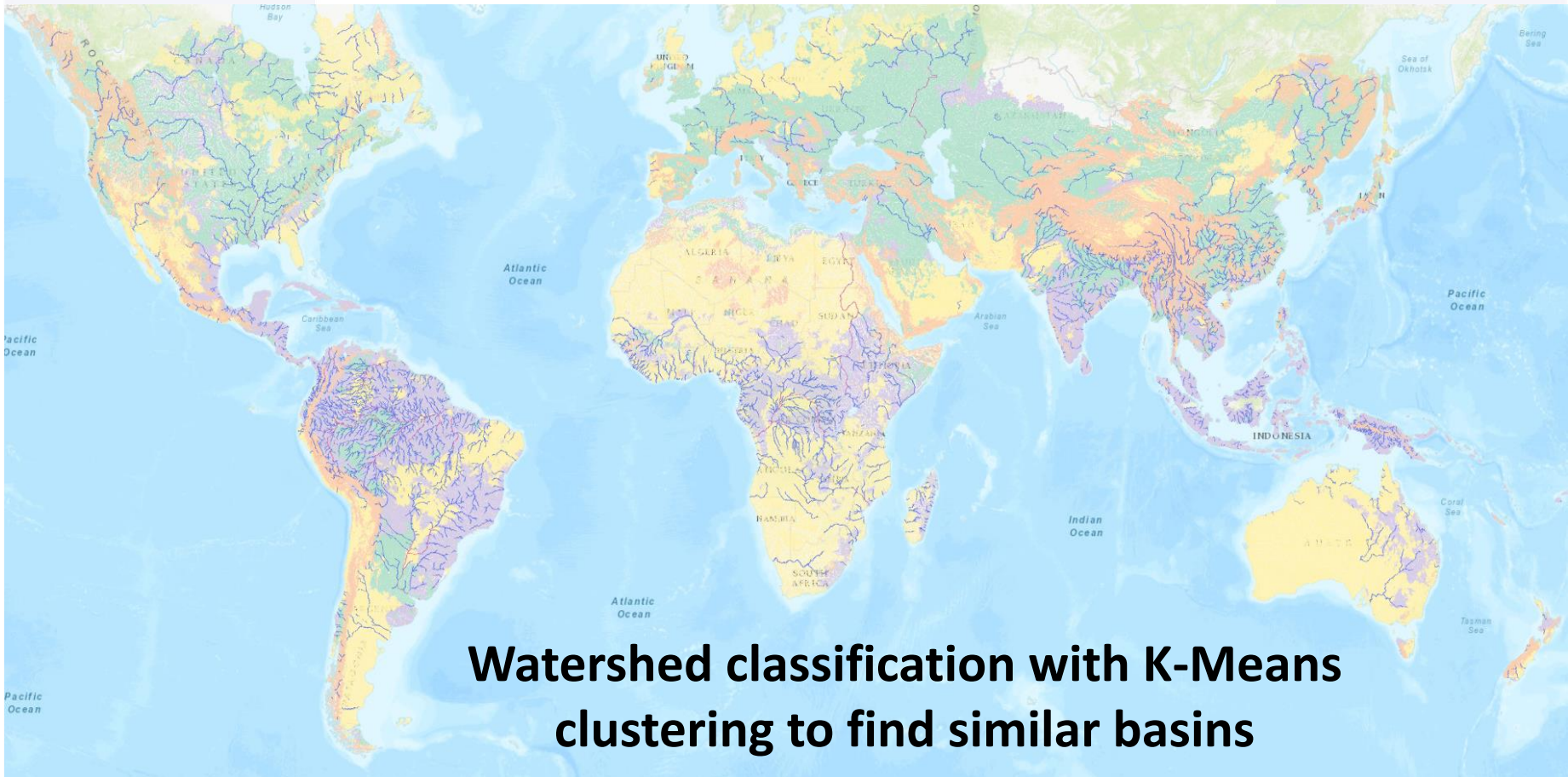
## Local Application



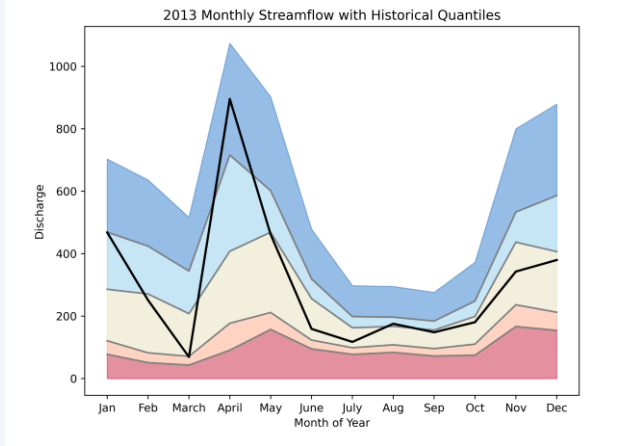
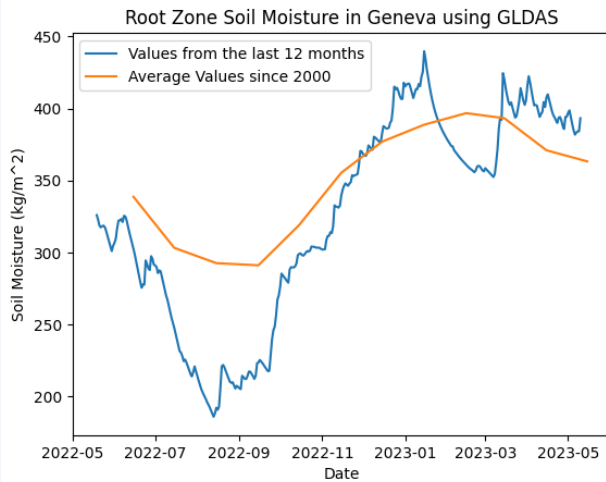
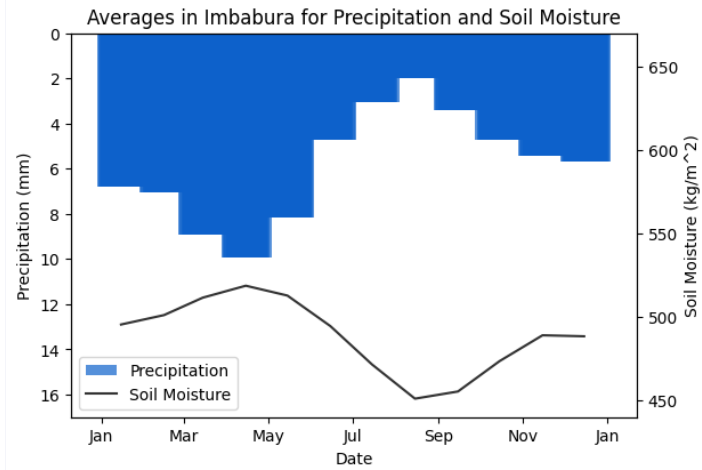
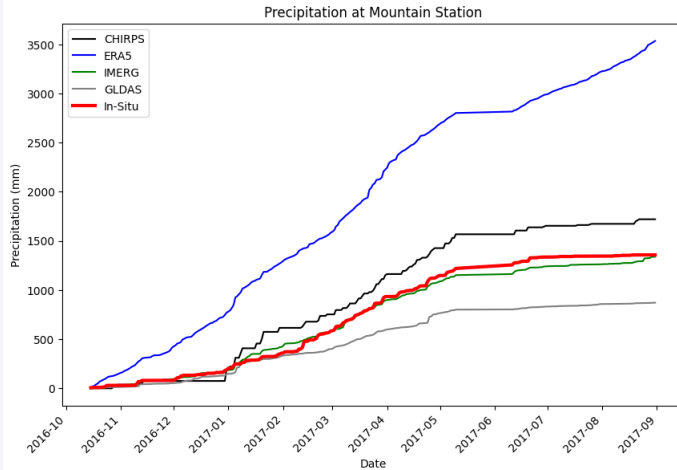
© OpenStreetMap contributors



# Bias Correction & Gauge Fitting



# Water Variable Monitor



**Datasets**  
 GEOGloWS  
 GLDAS  
 ERA5  
 CHIRPS  
 IMERG  
 SMAP  
 gauges  
 and more...

# Applications to Nile Basin

- *Correlating local in-situ river data with GEOGloWS discharge data can increase the utility of local data.*
- *Create dashboards to monitor essential water variables from remote sensing and modeled datasets to view historical and current conditions.*
- *Get connected with GEOGloWS resources*

<https://training.geoglows.org>

<https://data.geoglows.org>

<https://stories.geoglows.org>





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**THANK  
YOU!**