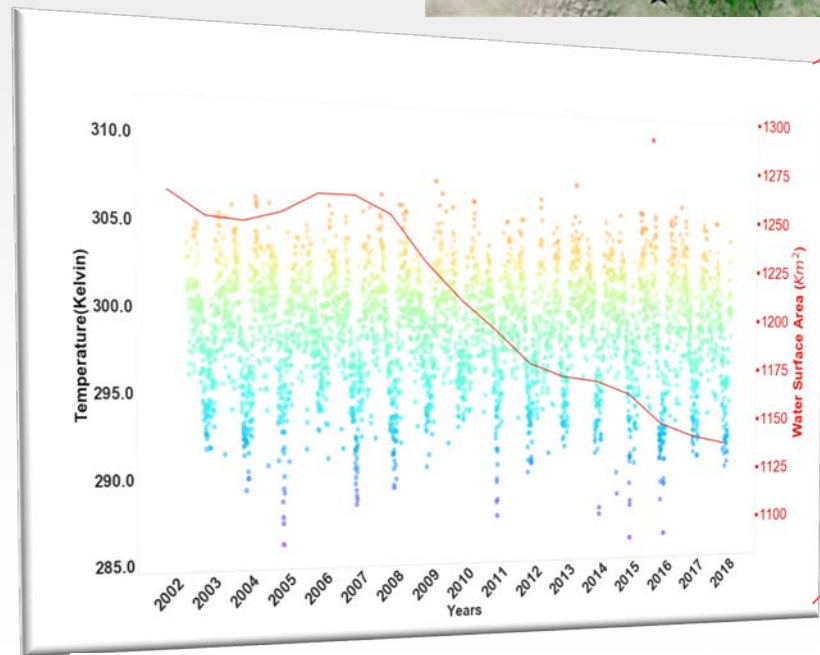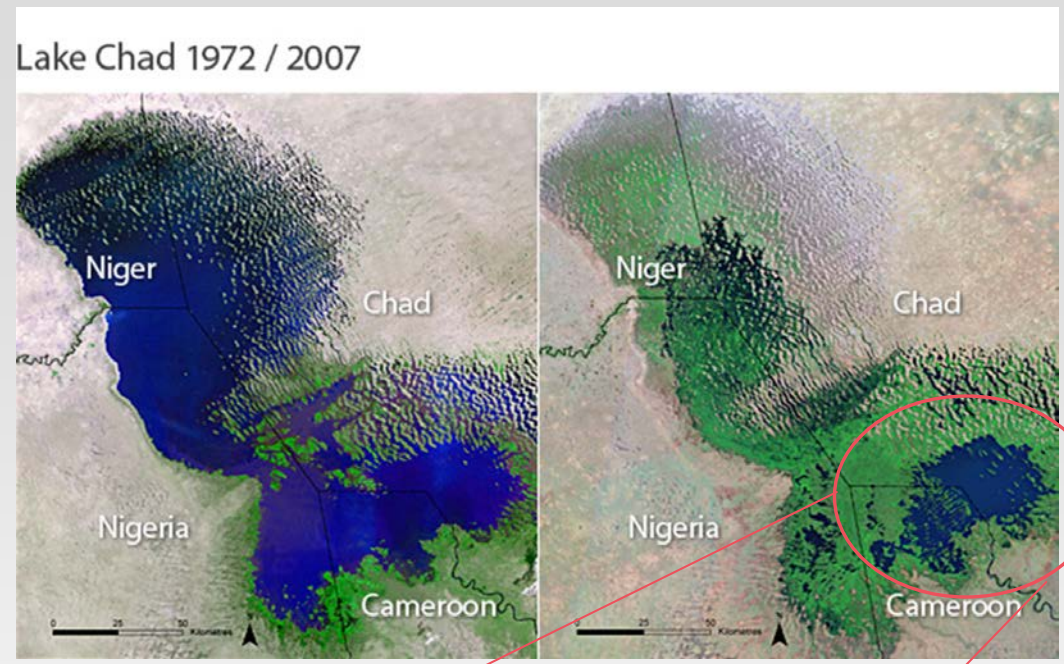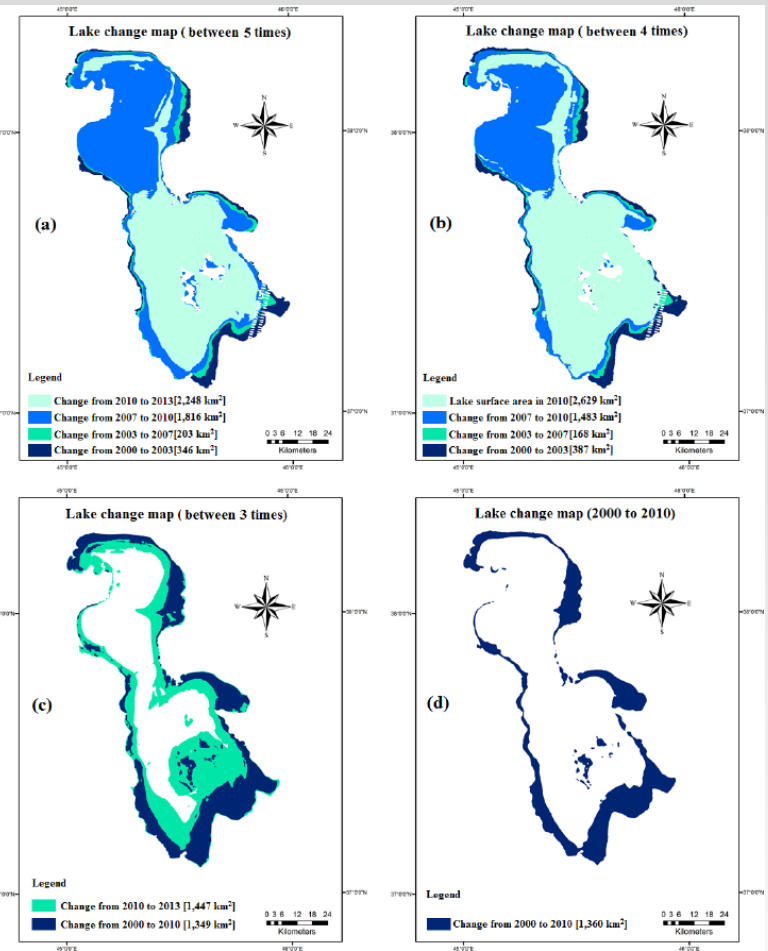# Studying Global Lake Surface Temperature Variabilities Using Remote Sensing Observations

Abdou Rachid Bah

Our Research

❑ 100 million lakes on Earth (excluding those that are covered with glaciers), covering roughly 4% of the land surface.

❑ Does the global rising temperature affect lakes?

❑ If yes, to what extent?

Credit: Anuar Ahmad

- From June 1995 to May 2009, lake Urmia decreased in depth by 6 m (Eimanifar and Mohebbi, 2007).

Lake Chad 1972 / 2007

- Lake Chad has decreased by more than 90 % in area over the last 40 years (Gao et al., 2011).

Research Questions

- What are the global and regional patterns of lake water temperature compared to their surrounding land surface temperature changes over the period 2002 -2018?

- What is the relationship between lake water temperature and geomorphic drivers ?
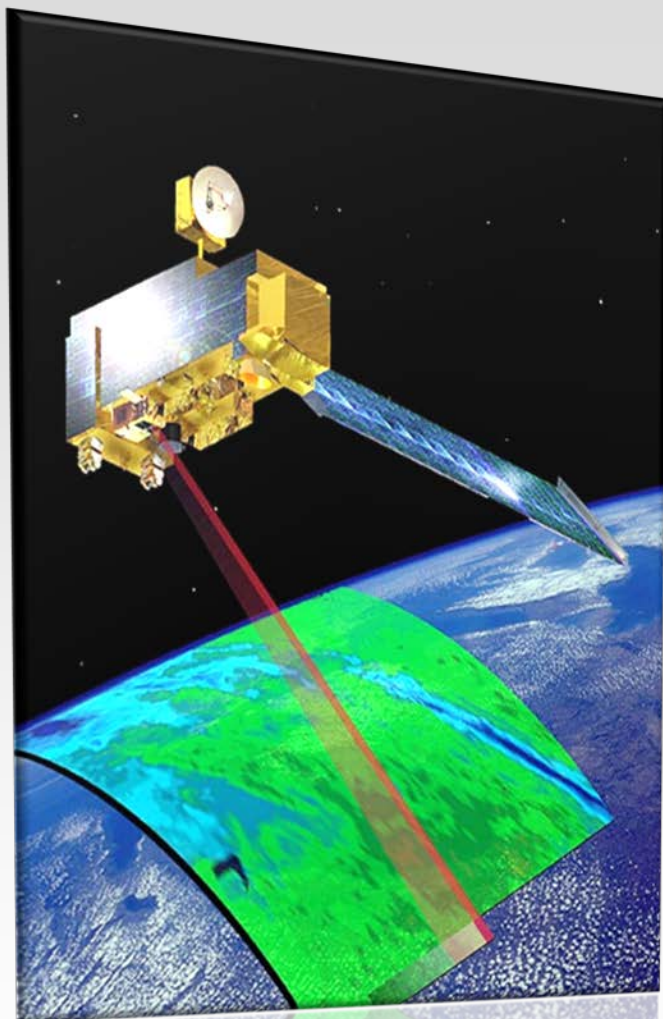
Data
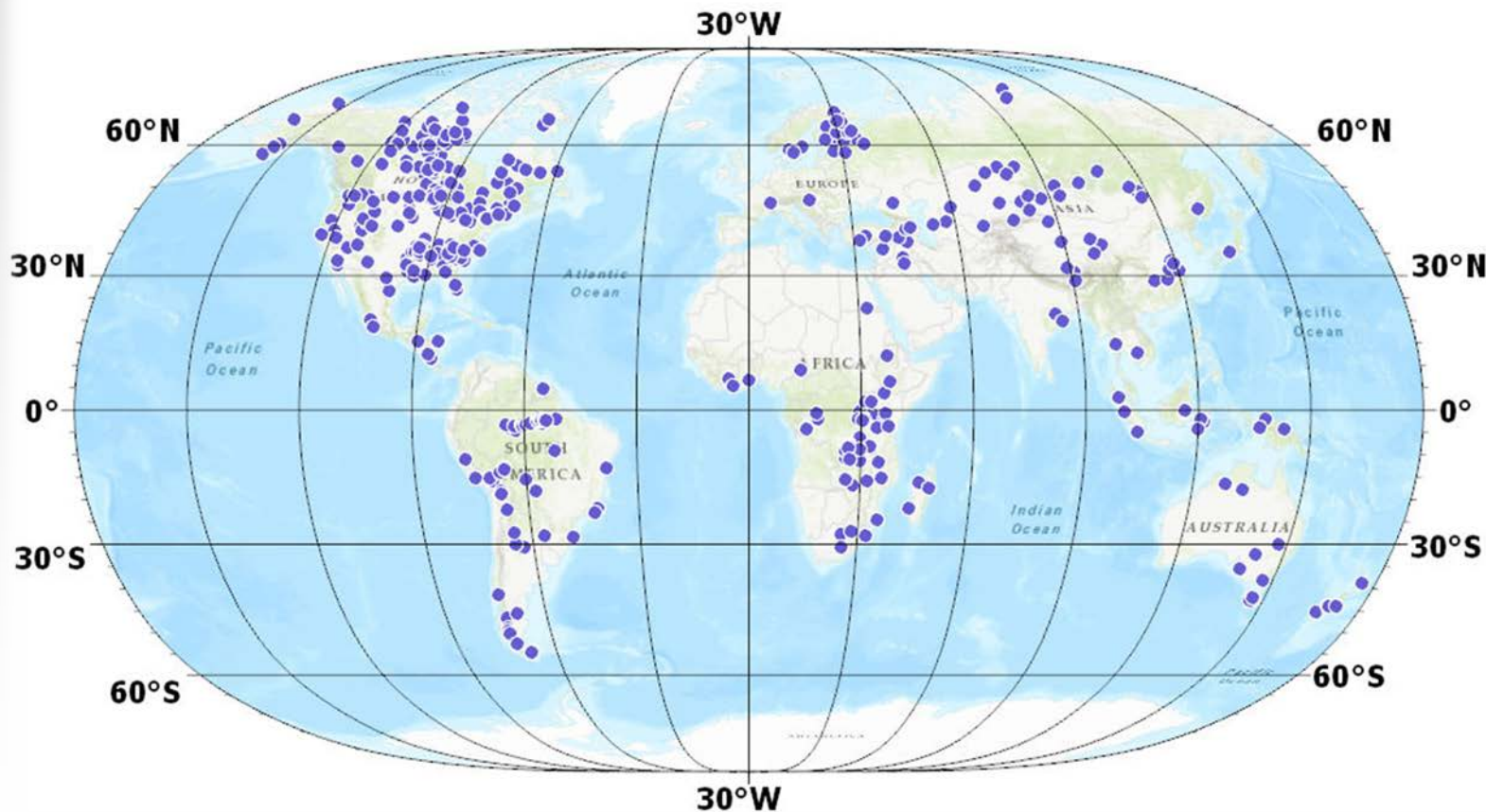
The study sample is 507 lakes which represent 0.0005% of world total lakes

Lakes with at least 1 m depth and a minimum surface area of 3 km2 were chosen.

Lake data were downloaded in decreasing order in terms of their surface area. The downloaded lakes represent the world's first 507 bigger lakes.

Unit of Analysis = Lake

Data

Land Surface Temperature (LST)
- ❑ 1 km resolution,
- ❑ Aqua MODIS LST Day
- ❑ 2002 – 2020

Land Cover (LC)
- ❑ 1 km resolution,
- ❑ MODIS Land Cover Type (MCD12Q1) Version 6 data
- ❑ 2002 – 2020

Platform	Aqua
Sensor	MODIS
Band	TIR
Spatial Resolution	1Km
Spectral Resolution	0.4 – 14 um
Orbit Type	Sun-Synchronous
Altitude	705 Km
Time	13:30

Credit: NASA

Data

Climatic Variables	Source	Geomorphic variables	Source
Slopes of Water Temperature/Decade	Extracted via linear regression from Aqua MODIS daily surface temperature	Length	HydroLAKES
Slopes of Water Temperature/Decade	Extracted via linear regression from Aqua MODIS daily surface temperature	Latitude	HydroLAKES
		Depth	HydroLAKES

Activities

1- Use Matlab to Process the time series of LSWT, and LST.

2- Use GIS and GeoDa to perform Geostatistics

3- Validation of Satellite data using in Situ data

4- Map the temperature and surface area changes using GIS

5- Design Research Posters

Thank you