



UNIVERSITY OF BIRMINGHAM

Climate Change and Variability: The Impact on Climate-Sensitive Diseases up to 2050s for North-Western Nigeria

A.F. Abdussalam, G.C. Leckebusch, J. E. Thornes

School of Geography, Earth and Environmental Sciences, University of Birmingham, UK

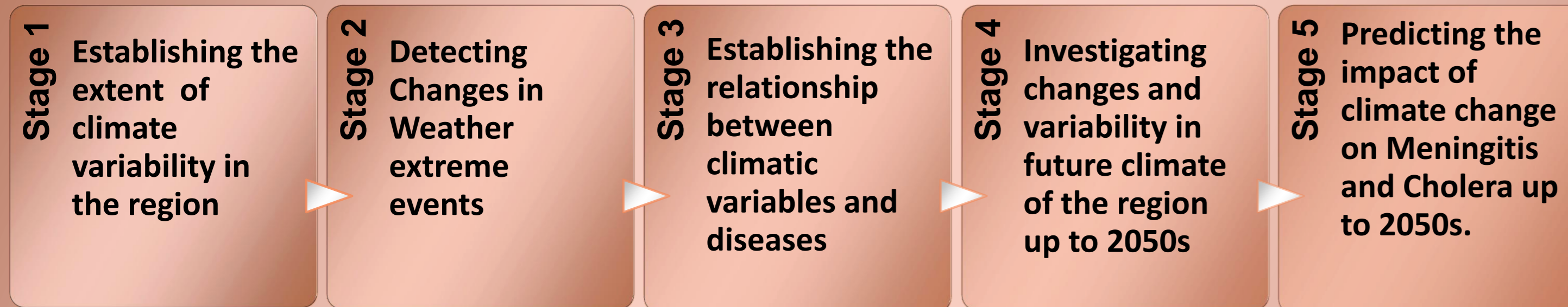
auwal1976@yahoo.com



BACKGROUND

This research was triggered following the citations in the human health chapters of the fourth Intergovernmental Panel on Climate Change (IPCC, 2007) assessment report, which specifies that significant attention should be given to health impact of global climate change, most especially in vulnerable countries.

General Methodology



Images From the Study Area



Drying Well



Shrinking Lake



Desert Encroachment

www.desdemonadespair.net



How Cholera Spreads

Courtesy: peakwater.org



African Meningitis Belt

Courtesy: International Research Institute for Climate and Society



Flooding

Courtesy: BNCCR, Nigeria

CONCLUSION

- The result shows statistically significant trends in temperature and precipitation indices, suggesting warmer and wetter trends in the region.
- Extreme events calculation reveals significant increase in the frequency of summer nights and days, but the daily temperature range has significantly decreased.
- Temperatures show a significant positive relationship with reported cases of meningitis, while precipitation doesn't. On the other hand precipitation shows a clear association with reported cases of cholera.

RESULTS

Data Information

Meteorological Station Data

Data	Span	City	ID	Lat	Lon
Tmax	40yrs	Kaduna	65019	10.6	7.45
Tmin	40yrs	Kano	65046	12.0	8.53
PRCP	40yrs	Sokoto	65015	12.9	5.20
Humidity	40yrs	Yelwa	65001	11.0	4.50
W/Speed	24yrs	Gusau	65015	12.1	6.77
S/Radiatio	35yrs	Katsina	65028	13.0	7.68

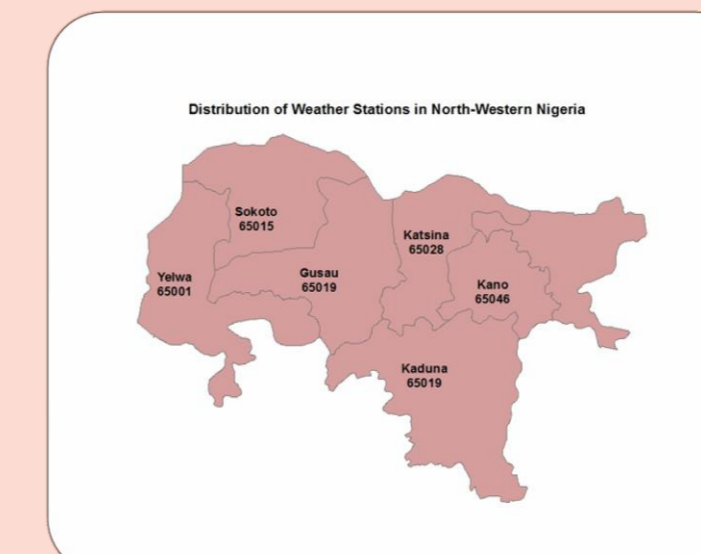
The climate data was subjected to Quality Control (QC) and Homogeneity tests, using the *RclimDex.r* (1.0) and *RHtestsV3.r* developed by Wang and Feng (2010).

Health Data

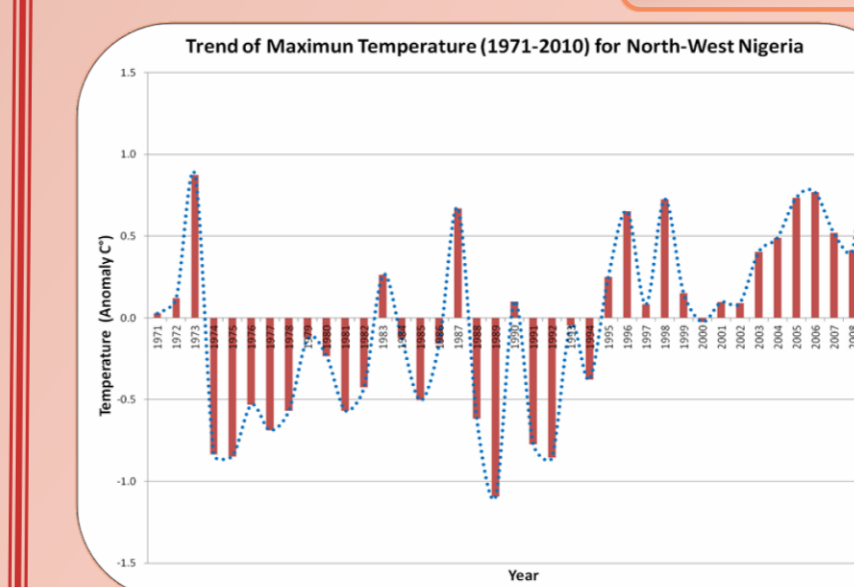
Data	Hospital	City	Span
Meningitis /Cholera	Barau Dikko Specialist Hospital	Kaduna	11yrs
Meningitis /Cholera	Infectious Disease Hospital/Murtala Specialist Hospital	Kano	11yrs
Meningitis	Sokoto State Specialist Hospital	Sokoto	11yrs

Meningitis and Cholera reported cases records were obtained from Specialist Hospitals sampled across the region. Quality of the data was also ensured.

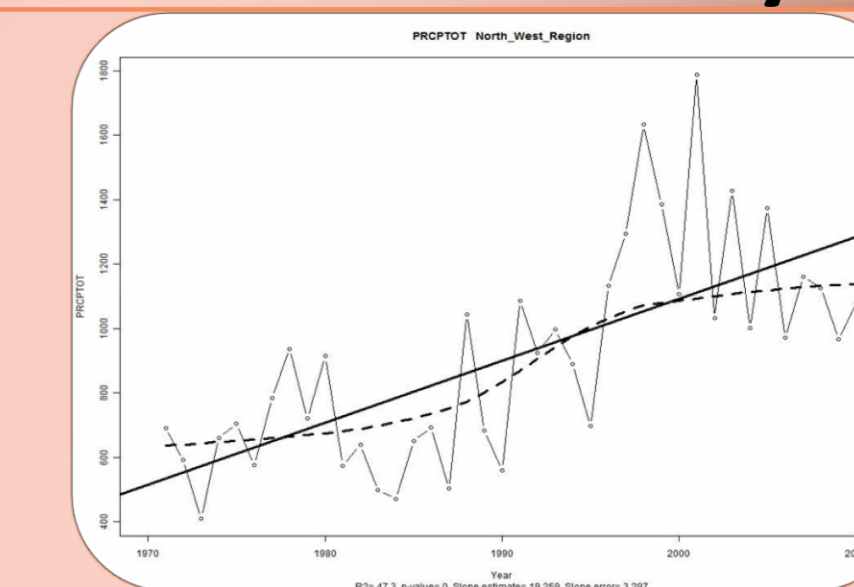
Study Area



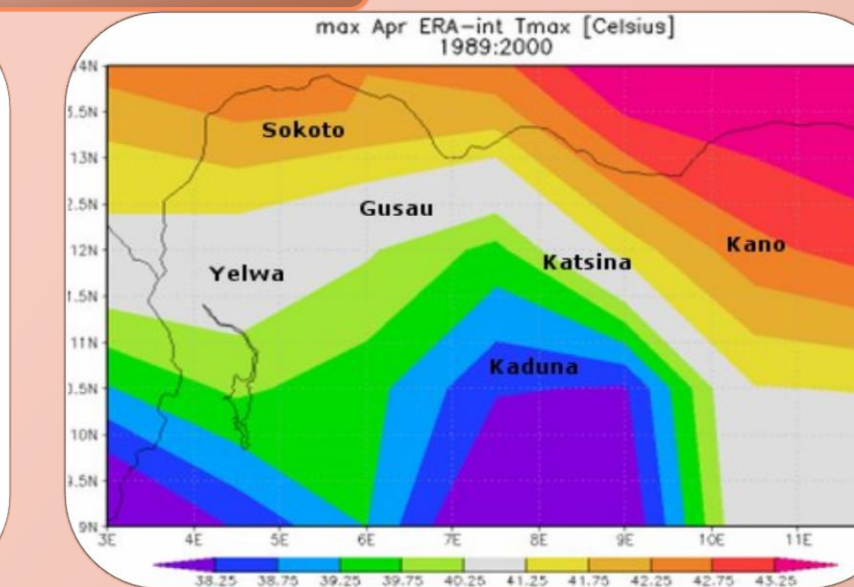
The Variability



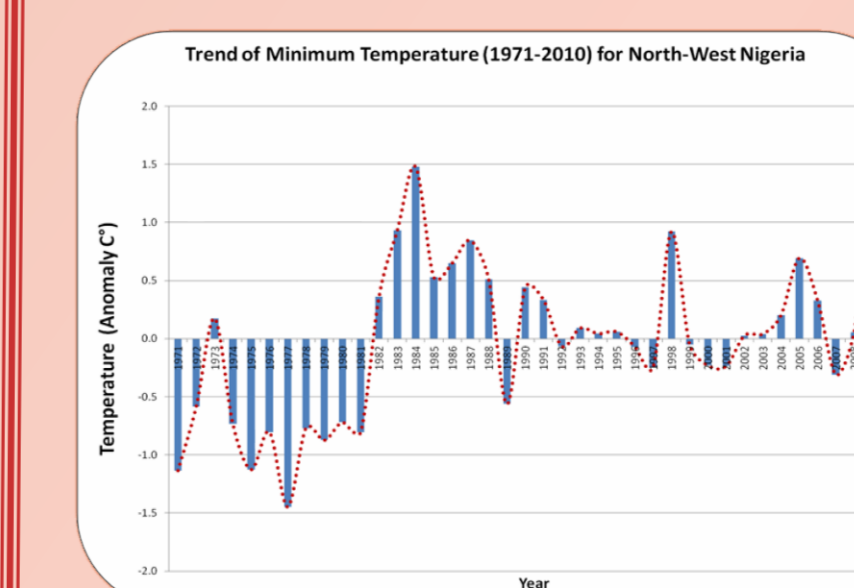
Trend in Annual Mean Tmax for the Period 1971 - 2010



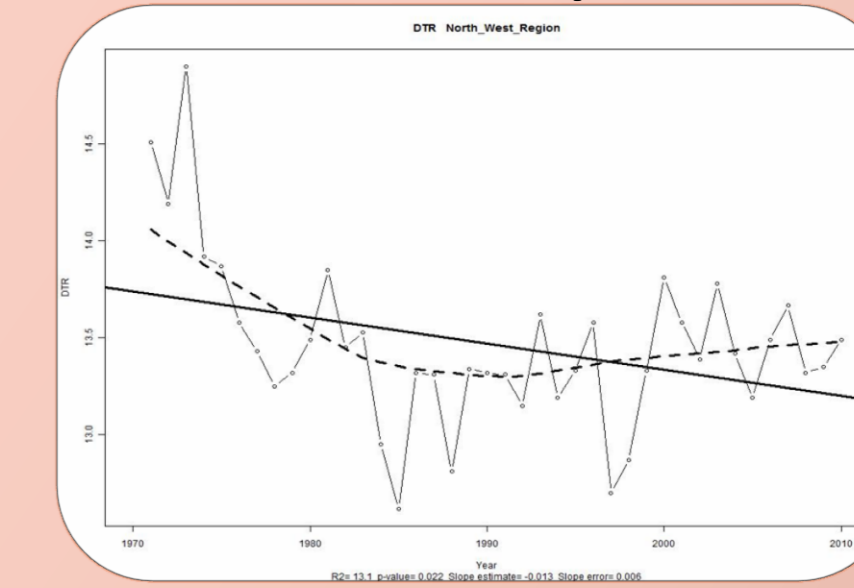
Trend in Annual Total PRCP of Wet Days (RR>=1mm) (1971 - 2010)



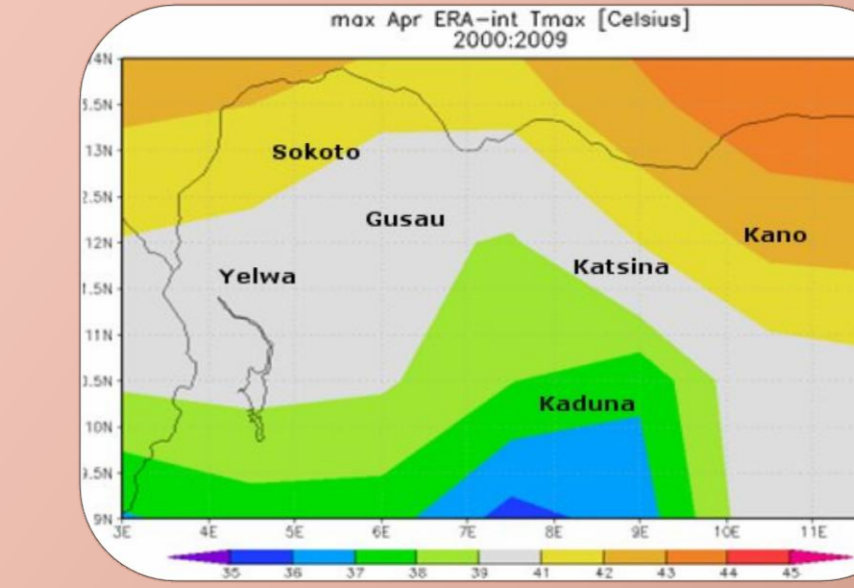
Tmax for the month of April ERA-int (1989-2000)



Trend in Annual Mean Tmin for the Period 1971 - 2010

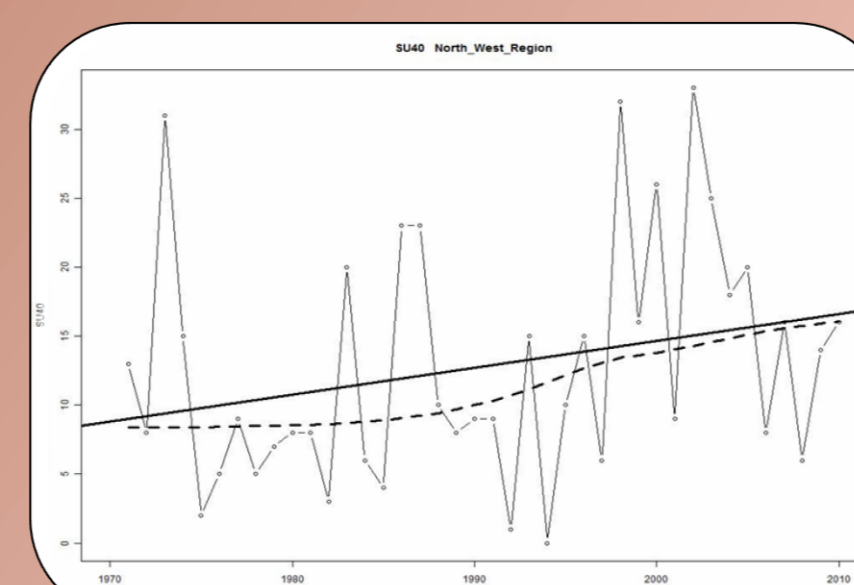


Trend in Diurnal Temperature Range (DTR) (1971 - 2010)

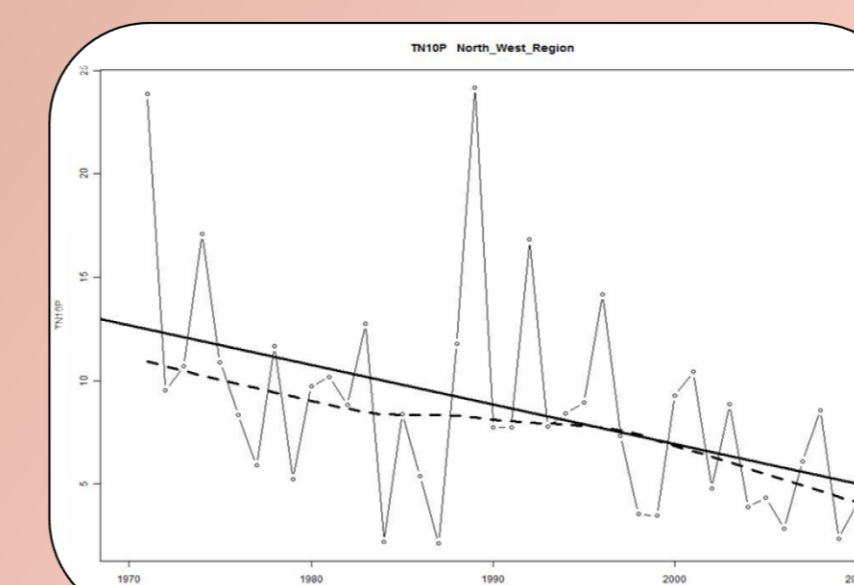


Tmax for the month of April ERA-int (2000-2009)

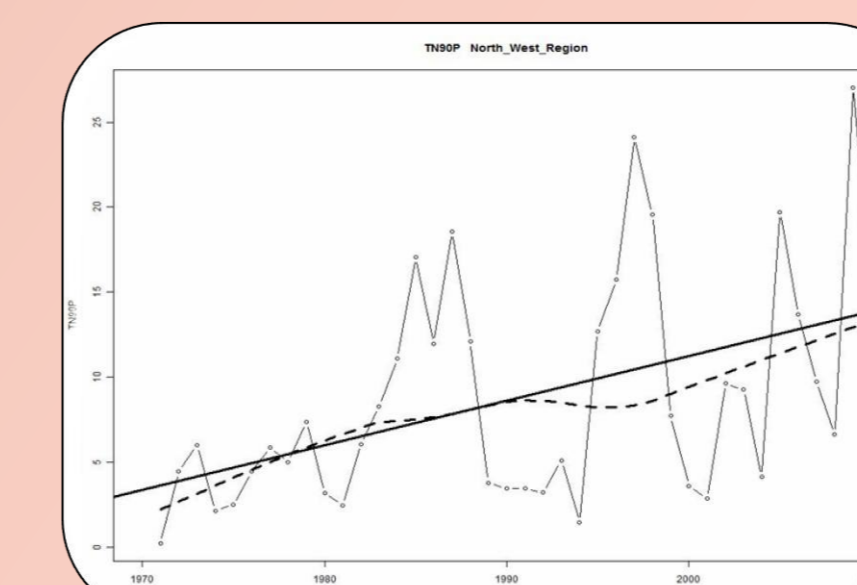
The Extreme Events



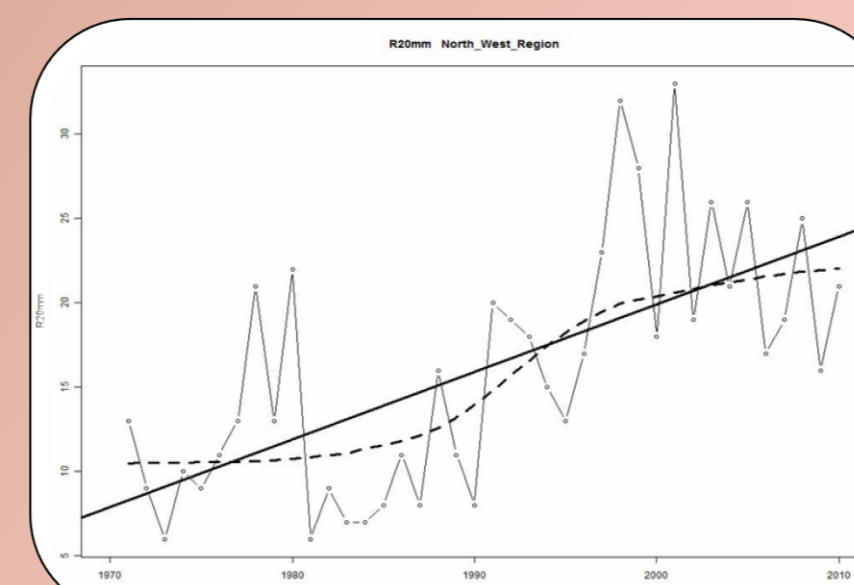
Annual Count of Hot Days with Tmax >98 Percentile (1971 - 2010)



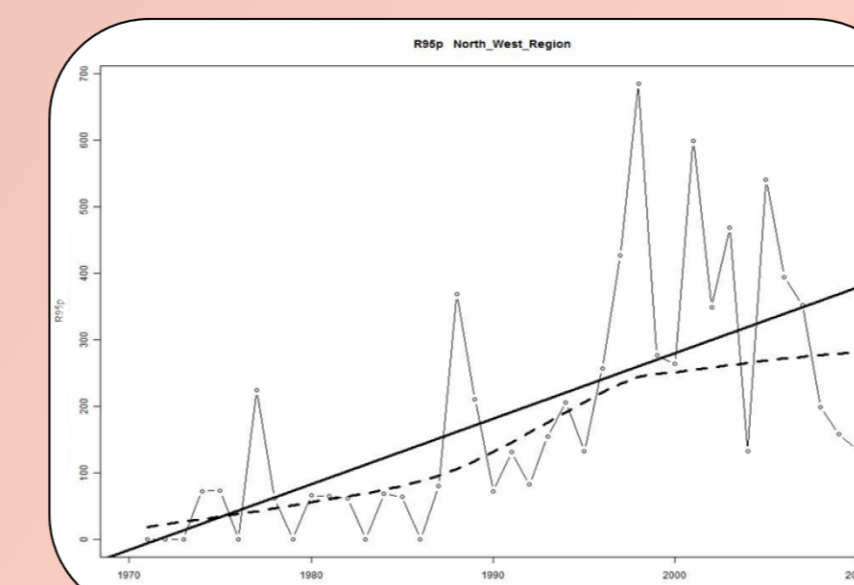
Annual Count of cool Nights with Tmin < 10th Percentile



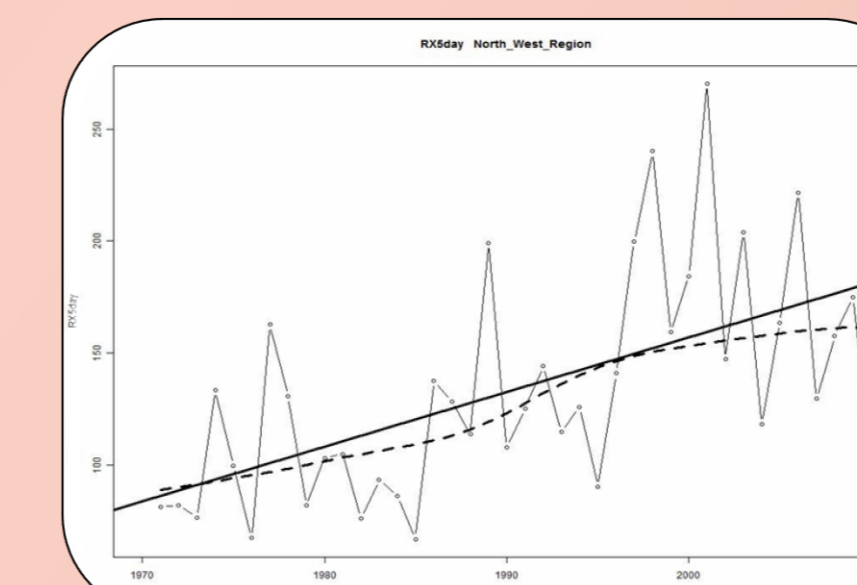
Annual Count of Warm Nights with Tmin > 90 Percentile (1971 - 2010)



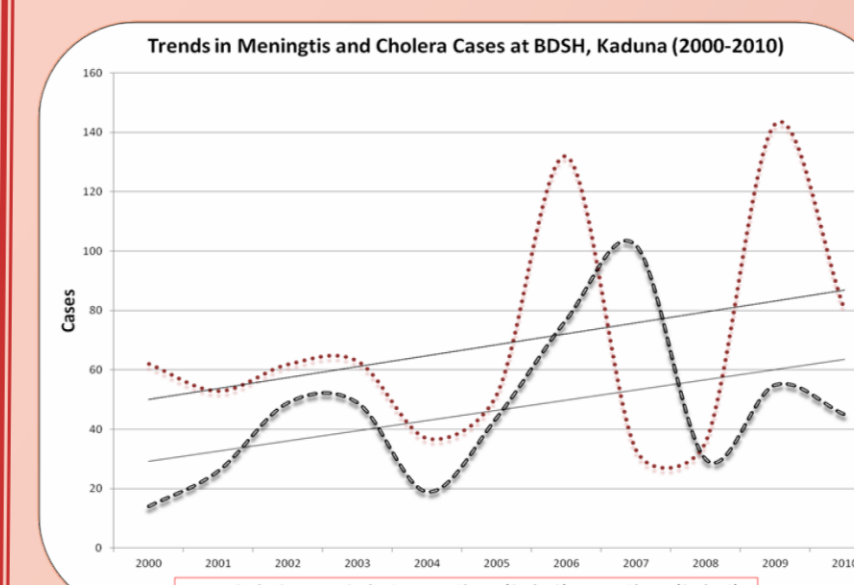
Annual Count of Days with heavy PRCP >20mm (1971 - 2010)



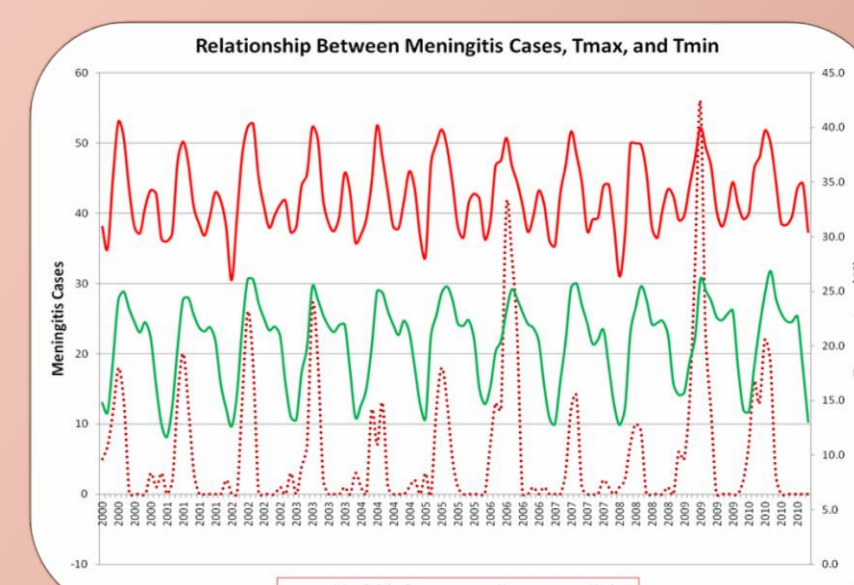
Annual count of Very Wet Days when PRCP is > 95th Percentile (1971 - 2010)



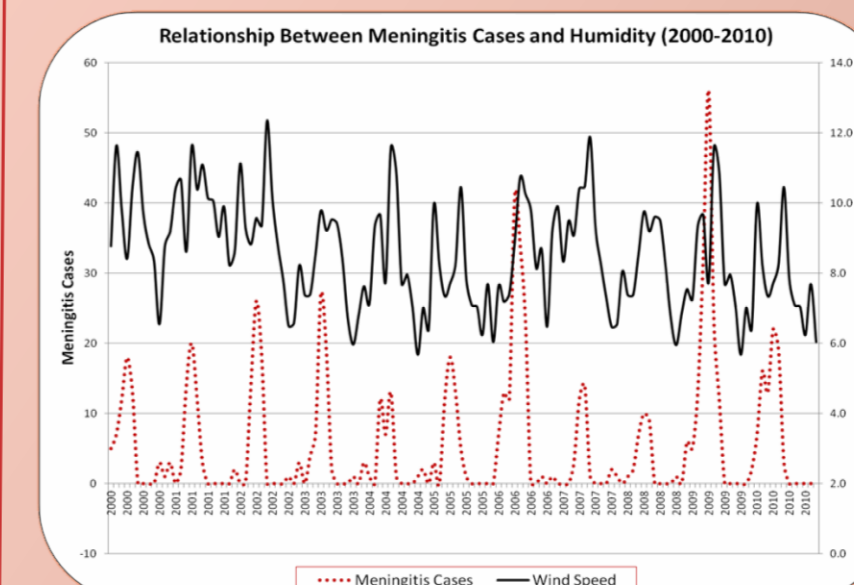
Monthly Maximum with Consecutive 5-Days PRCP (1971 - 2010)



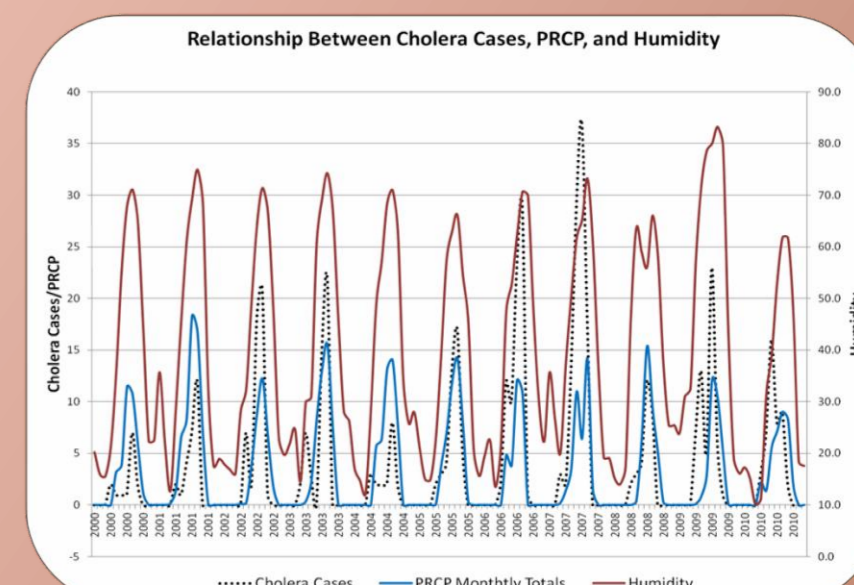
Meningitis and Cholera Cases Reported at Barau Dikko Specialist Hospital, Kaduna, (2000 - 2010)



Relationship between Tmax, Tmin and reported cases of Meningitis at BDSH, Kaduna, (2000-2010)



Relationship between Wind Speed and reported cases of Meningitis at BDSH, Kaduna, (2000-2010)



Relationship between Tmax, Tmin and reported cases of Cholera at BDSH, Kaduna, (2000-2010)

Variables	Correlation	99 CL
Tmax	0.681	0.000
Tmin	0.411	0.000
PRCP	-0.273	0.002
Humidity	-0.189	0.030
W/speed	0.455	0.000

Result of Pearson Correlation between climatic variables and reported cases of Meningitis at BDSH, Kaduna.

Variables	Correlation	99 CL
Tmax	-0.100	0.252
Tmin	0.369	0.000
PRCP	0.659	0.000
Humidity	0.568	0.000
W/speed	-0.501	0.000

Result of Pearson Correlation between climatic variables and reported cases of Cholera at BDSH, Kaduna.

Regionalised time series of temperature and precipitation were obtained by method described (Jones and Hulmes, 1996), and extreme climate indices were calculated using *RclimDex.r* developed by (Wang and Feng, 2010)

Future Work

Future work will focus on Investigating changes and variability in the future climate of the region, and also the statistical modelling of the impact of climate change on the incidences of meningitis and cholera up to 2050s.