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Variation Charactristic Ofrainfall and Visibilityover Ilorin in the Tropics

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Abstract: *Variation characteristic of rainfall andvisibility enhances the understanding of the significance of indicated trends of variability to everyday life and factors that might be responsible for such variations. This research work critically analyses the seasonal trends between rainfall and visibility in Ilorin, Nigeria. The data used for this work was obtained from the Nigerian Meteorological services, Oshodi, Lagos State. Simple graphical method was adapted to analyze the trends of variation, using average monthly values for each parameter. The minimum value of visibility and a high value of rainfall of 0.16 km and 285.5mm respectively were recorded during the month of July and May. The results of analyses revealed that the curves on the rainfall are directly proportional to observed curves on visibility.*
Keywords: *hail, rain gauge,rainfall, trend, weather, and visibility.*

I. Introduction

Rain is a liquid precipitation, as opposed to non-liquid kinds of precipitation such as snow, hail and sleet. Rain requires the presence of a thick layer of the atmosphere to have temperatures above the melting point of water near and above the Earth's surface (Steve, 2009). On earth, it is the condensation of atmosphere water repair into the surface. The globally average annual precipitation is 990 millimeters (39in). Climate classification system such as the koppen climate classification system use average annual rainfall to help differentiate between differing climate gimes. Antaretica is the Earth's driest continent. Rain is also known or suspected on other words, composed of methene, iron, neon and sulphuric acid rather than water (Mark, 2005). Quantitative precipitation forecast (abbreviated Qpt) is the expected amount of liquid precipitation accumulated over a specified 12hour period over specified area (Jack, 1999). The standard way of measuring rainfall or snowfall is the standard rain gauge, which can be found in 100-mm (4-in) plastic and 200-mm (8-in) metal varieties (Northern, 2009).

Rainfall is measured through the use of rain gauges. Rainfall amounts are estimated actively by weather radar and passively by weather satellites. The urban heat island effect leads to increased rainfall.Visibility is defined a measure of the distance at which an object or light can be clearly discern (Usman et al, 2011).This study aims at the following: To undertake a precise study of the seasonal variation trends of visibility and associated parameter; to enhance the understanding of the significance of indicated trends of variability to our everyday lives, the factor that might be responsible for such variations and to carry-out a critical analysis of the relationship between visibility and rainfall. The recent research work includes that of Usman (2011).

II. Materials And Methods

A 4 year record (2004—2007) of the monthly means ofrainfall and visibilitywere obtained from the Nigeria meteorological services, Oshodi Lagos State. Simple graphical method was adapted to analyses, the trend of variations, using average monthly mean values for each parameter.

III. Results And Discussion

The monthly mean visibility and rainfall were calculated from the data obtained from the Nigeria meteorological services Oshodi, Lagos. Also, the annual mean distributions of the associated parameters are determined. These were shown in Table 1 and 2.

From Table 1 and 2, it was observed that for the period considered, 2007 had the highest value of rainfall of 285.5mm. Also the highest value of visibility of 13km was noted for the same year.

Table 1: Calculated Monthly Visibility (Km) And Visibility Against Rainfall (Mm)

Mean Visibility (km)					**Mean rainfall (mm)**			
Months	2004	2005	2006	2007	2004	2005	2006	2007
January	2.06	1.00	0.26	13.00	2.1	0.0	0.6	0.0
February	5.07	4.20	3.50	9.00	0.0	0.8	10.0	0.0
March	4.02	0.33	5.06	8.00	0.9	60.1	7.5	20.5
April	8.07	0.25	4.1	0.35	49.8	108.8	47.8	98.9
May	8.07	0.28	0.25	0.32	164.1	255.7	81.6	285.5
June	8.07	0.27	0.25	0.32	245.8	211.5	79.2	158.2
July	0.16	0.30	0.24	0.32	153.2	133.8	158.3	199.3
August	0.24	0.38	5.06	8.15	112.3	63.8	36.5	134.1
September	5.7	0.25	0.17	0.40	154.9	271.5	107.7	291.7
October	5.06	0.30	0.24	0.38	77.7	179.8	197.0	152.9
November	5.01	0.30	5.06	10.00	9.2	1.0	0.0	6.3
December	5.06	3.70	4.05	9.50	0.0	11.9	0.0	6.6

Source Nigeria meteorological service, Oshodi, Lagos (2011)

Table 2: Calculated Annual Mean Distribution Of Visibility And Rainfall

Years	Visibility (km)	Rainfall (mm)
2004	4.81	12
2005	0.96	108.2
2006	2.35	60.51
2007	4.98	100.5

Source: Author's computation, 2011.

It was observed in fig 1 and 2, that the average rainfall showed the same values in the month of January for the year 2005 and 2007. Also the average rainfall showed the same values in the month of December for the year 2004 and 2006. The month of May has the highest rainfall of 285.5mm.

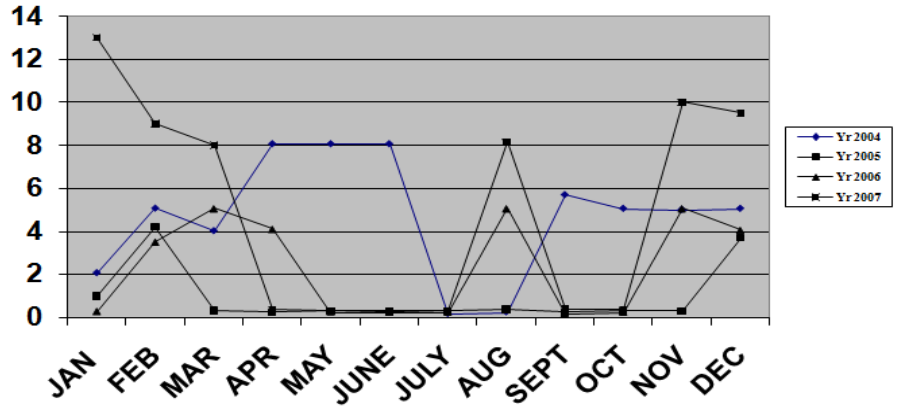

Figure 1: Graph of mean visibility (km) for four years in Ilorin, Nigeria

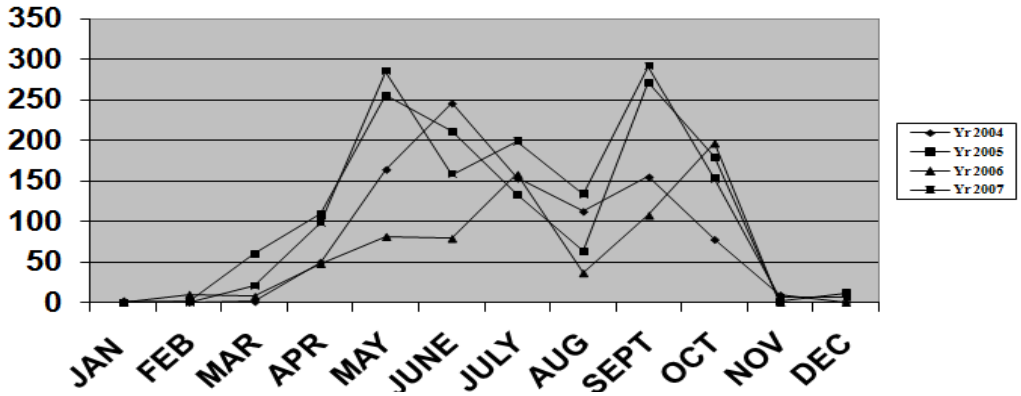

Figure 2: Graph of mean rainfall (mm) for four years in Ilorin, Nigeria.

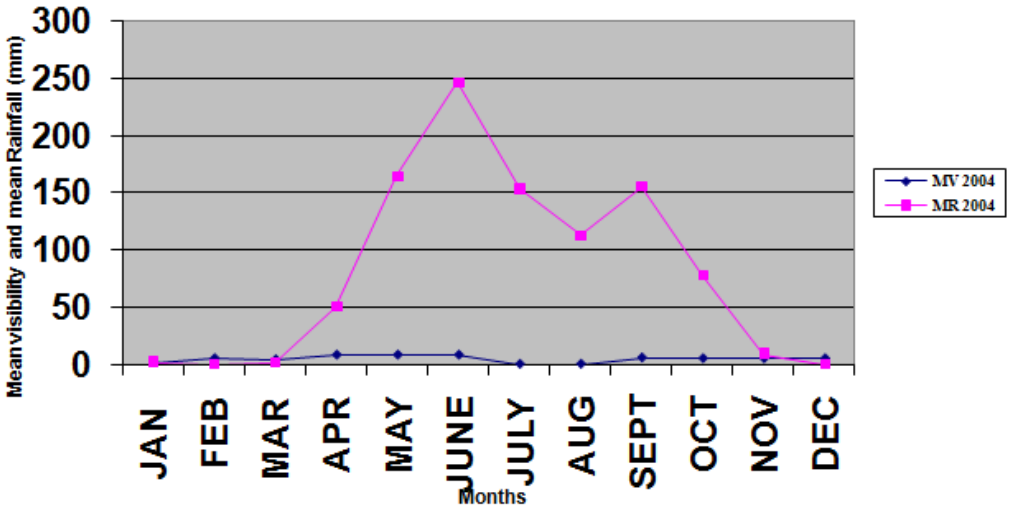

Fig. 3: Graph Show the variation of visibility (km) and rainfall (mm) in the year 2004.

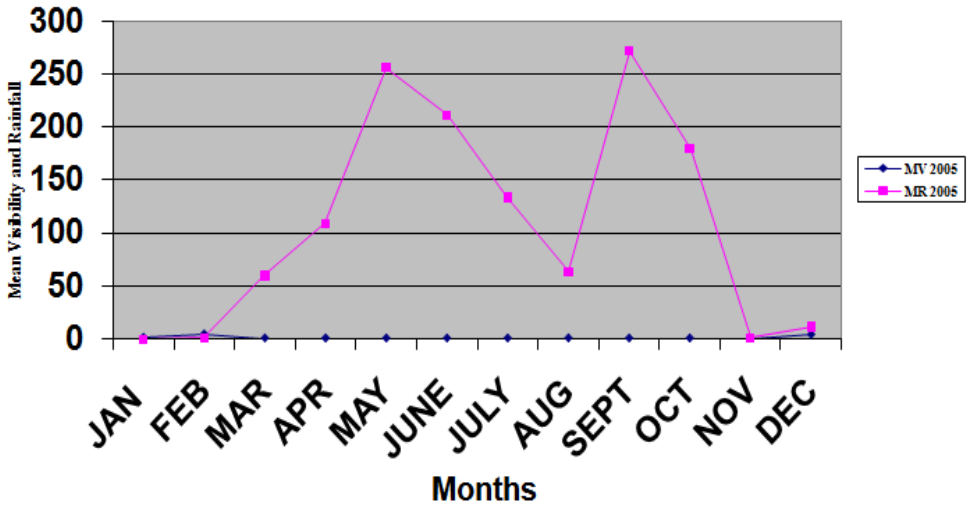

Fig. 4: Graph Show the variation of visibility (km) and rainfall (mm) in the year 2005.

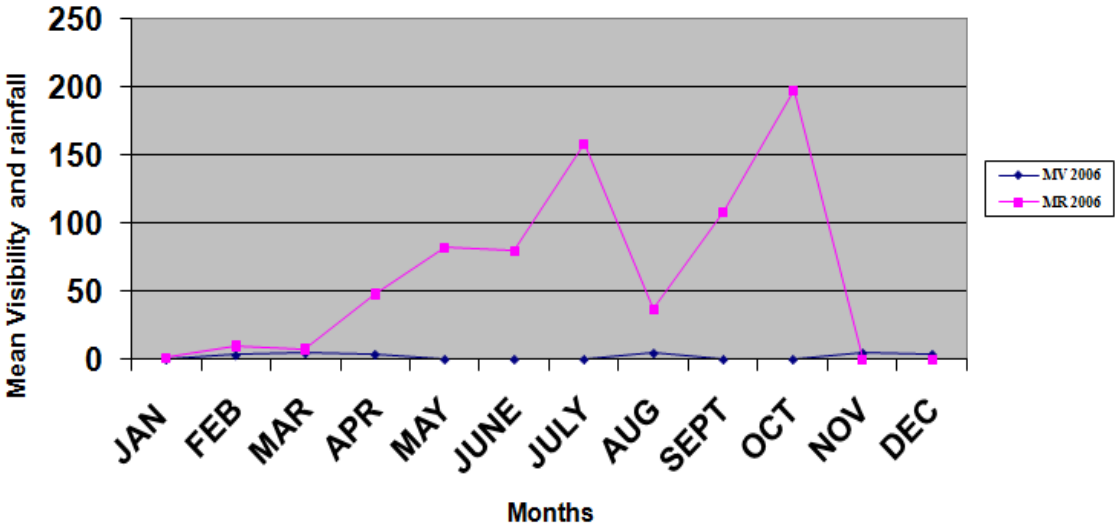

Fig. 5: Graph Show the variation of visibility (km) and rainfall (mm) in the year 2006.

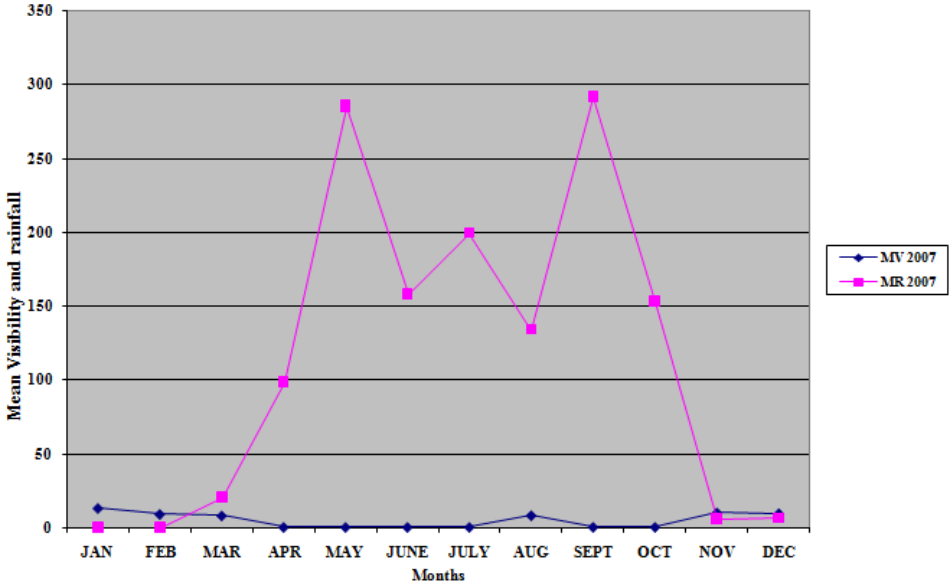

Fig. 6: Graph Show the variation of visibility (km) and rainfall (mm) in the year 2007.

This shows that the month of September has the minimum value of visibility and high value of rainfall, respectively for the period considered. The 2 curves in the graph were not linearly correlated. The curve for visibility showed a uniform pattern for the values, while the rainfall formed irregular pattern. Within the month of February – December, the visibility is inversely proportional to the rainfall for the period under consideration.

The trends and patterns of variation in the parameter studied may provide helpful information in the prediction of natural processes that occur in the atmosphere. This relationship can be used to explain the effect of rainfall on the visibility and can also serve as information for the prediction of visibility.

IV. Conclusion

This research examines the relationship between visibility and rainfall over Ilorin, Nigeria. The highest values of rainfall are recorded during the monsoon periods. The harmattan period showed high values of visibility and low values of rainfall. This is used to explain the effect of rainfall on visibility. The periodic assessments of the associated parameters have positive effect on the environment as it is shown from the data, mean visibility decreases with increase in the amount rainfall for each month of the year.

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