ISSN: 0975-833X

Available online at http://www.journalcra.com

International Journal of Current Research
Vol. 11, Issue, 03, pp.1830-1832, March, 2019

DOI: https://doi.org/10.24941/ijcr.34598.03.2019

INTERNATIONAL JOURNAL OF CURRENT RESEARCH

RESEARCH ARTICLE

TIME DISTRIBUTION OF THE AIR TEMPERATURE IN BISSAU FROM 1971 TO 2015

***Njipouakouyou Samuel**

Faculty of Science, University of Dschang, Cameroon

ARTICLE INFO

Article History:
Received 10th December, 2018
Received in revised form
12th January, 2019
Accepted 20th February, 2019
Published online 31st March, 2019

Key Words:
Time distribution, Frequency, Minimal, Daily and Maximal temperatures, Global climate change, Sub intervals, Sub periods, Time tendencies, Lower and higher temperatures.

ABSTRACT

Monthly averages of the air temperature in Bissau have been grouped into classes of equal length, 1.0°C. The 45 years period of investigation has been divided into equal sub periods of 5 years each. The number of temperature in each class was counted and the results of this treatment presented in tabular forms. The analysis of these tables has shown that the air temperature in Bissau is slowly increasing, particularly by the end of the period of investigation.

Corresponding author:* **Njipouakouyou Samuel

***Citation*: *Njipouakouyou Samuel,* 2019.** "Time distribution of the air temperature in bissau from 1971 to 2015", *International Journal of Current Research*, 11, (03), 1830-1832.

INTRODUCTION

The global climate change has attracted the attention of the mankind. International conferences, workshops and others are frequently organized on this theme. Let us recall the one held in Rio de Janeiro in 1992 and recently CAP24 which took place in Paris some two-three years ago. It is established that the consequences of the climate change will be very dangerous and catastrophic to everyone. This is why authorities around the world are doing all what they can to control this phenomenon in order to reduce or even to eliminate its impacts. Some good results have been reached, many in the global scale and mostly for developed countries. It is evident that many works are still to be done mainly in developing countries, particularly in the local scale where phenomena are generated. The present investigation is classified in this context and concerns the time distribution of the air temperature in Bissau from 1971 to 2015, i.e. during the last 45 years. For what concerns the Republic of Guinea Bissau, some works of regional character have been done, (Saly et al., 2018). In this work attention was paid to the spatial-temporal variability of the rainfall in the basin of river Kayanga/Gêba crossing Guinea (Conakry), Senegal and Guinea Bissau. Recently and with the help of the United Nations the Guinea Bissau Government put down a project in which different points, priorities and budgets were defined, (UNDP Climate Change Adaptation, 17 Jul. 2012) and signed a convention on climate change, (The Republic of Guinea Bissau, 2018). It is also important to indicate that the Government has signed a convention on the climate change in Guinea Bissau, (The Republic of Guinea Bissau, 2018). We hope that after all those preparatory works, effective investigations will take place. The impacts of the time variation of the air temperature in the human daily activities and natural phenomena are obvious. Between others, these ones could be indicated. The development of plants in the fields and consequently their yields depend on the temperature. The formation of rain and its further development still depend on it. The comfort and consequently the daily human activities depend again on the temperature. Thus, the importance of this study is understandable. This study is divided into four paragraphs and the references. The first one introduces the subject of investigation. The second exposes the material and methodology. The third presents the results and their analysis. In the fourth are the conclusion, recommendation and acknowledgment. At last, the references in an alphabetic order are presented.

MATERIALS AND METHODS

Material: The data treated in this work are from the National Service of Meteorology in Bissau. All the observations were made at the station situated at the internal airport of the city. The quality of the used instruments is good, the personnel are well-trained and the observations are regular. Therefore, it is clear that these data are accurate and representative. They concern the monthly averages of the minimal, daily and maximal temperatures of the air in Bissau from 1971 to 2015, 45 years period. Thus for each parameter we have 540 for a total of 1620 temperatures were treated and analyzed.

Methodology: During the period of investigation the three temperatures varied from 16.0° to 38.0°C. This interval was

divided into 20 sub intervals of equal length, 1.0°C, as follows: [16.5°,17.5°], [17.5°,18.5°], [18.5°,19.5°],…, [35.5°,36.5°], [36.5°,37.5°]. Each sub interval was represented by its middle. Thus we obtained the sequence 17.0°; 18.0°; 19.0°; …; 36.0°; 37.0°C which was considered for the further treatment. The period was also divided into 9 equal sub periods of length 5 years each. For a sub interval we counted the number (frequency) of temperatures for each sub period and built tables of frequencies. The analysis of these tables gave us the opportunity to determine the sub period modal frequency and their time tendencies when passing from one sub period up to another. Depending on the direction of their displacement, we hada local warming or a local cooling if the sub period modal frequencies moved tower the higher of lower temperatures, respectively.

RESULTS

The minimal temperature: The results of treatment of this parameter are presented in Table 1. Table 1 shows that at mostly the modal frequency of the air minimal temperature in Bissau occurred in the sub interval [21.5°, 24.5°]. For the first sub period, the modal frequency, 18 cases over 60 for a probability of 30%, occurred in the sub interval [22.5°, 23.5°]. For the second sub period 32 cases over 60 for a probability of 53.33% occurred in the sub interval [21.5°, 24.5°]. Concerning the third sub period 20 cases over 60 for a probability of 33.33% were in the subinterval [22.5°, 23.5°]. The fourth, fifth, eighth and ninth sub periods with modal frequencies21, 20, 23 and 20 for the probabilities of 35%, 33.33%, 38.33% and 33.33% respectively occurred in the sub interval [23.5°, 25.5°]. For the sixth and seventh sub periods 13 cases for a probability of 21.66% was in the sub interval [20.5°, 21.5°] and 14for a probability of 23.33%, in [22.5°, 23.5°].

Table 1 also shows the appearance starting from the second sub period of new cases with higher temperature. Their number progressively increased from 1 up to 11 by the end of the period while the number of cases with lower temperature was decreasing. This indicates that during the considered period, the air in Bissau was getting warmer and warmer. For the whole period the modal frequency of 242 cases over 540 for a probability of 44.81% occurred in [22.5°, 24.5°].

Daily temperature: The results of treatment of this parameter are presented in Table 3.2. For this parameter only the three first and last sub periods are considered for the analysis as the time tendencies of the frequencies remain unchanged. Table 3.2 shows that the modal frequencies occurred in the sub interval [26.5, 27.7°] with 24 cases for the sub period 1971-1975, 31 in the sub period 1976-1980, 23 cases for the sub period 1981-1985 and 21 cases for the sub period 2001-2005, for the probabilities of 40%, 51.66%, 38.33% and 35%, respectively.

During the two last sub periods these modal frequencies were shifted to the sub interval [27.5, 28.5°] with 28 cases in 2006-2010 and 20 cases in 2011-2015 for the probabilities of 46.66% and 33.33%. Table 2 also indicates that during the period of investigation, the air daily temperature was increasing with time. This is explained by the apparition of new cases of higher daily temperature when passing from one sub period up to another like the 15 cases in the sub interval [28.5,29.5°] at the last sub period 2011-2015. The modal frequencies of the air daily temperature in Bissau tended to move from lower to higher temperatures during the period of investigation when passing from one period up to another. This is the consequence of the local warming of the air temperature.

Table 1. Time distribution of the air minimal temperature in Bissau from 1971 to 2015

	17.0	18.0	19.0	20.0	21.0	22.0	23.0	24.0	25.0
1971-1975	0	0	8	11	5	8	18	10	
1976-1980	2	0	1	7	11	6	16	16	1
1981-1985	0	0	4	7	6	6	20	13	4
1986-1990	0	1	5	4	6	7	12	21	4
1991-1995	4	0	1	4	10	7	7	20	7
1996-2000	0	0	3	7	13	12	7	11	7
2001-2005	5	5	9	8	9	9	14	1	-
2006-2010	0	0	3	4	4	11	8	23	7
2011-2015	0	1	2	11	3	7	5	20	11
Period: 1971-2015	11	7	36	63	67	73	107	135	41

Table 2. Time distribution of the air daily temperature in Bissau from 1971 to 2015

	24.0	25.0	26.0	27.0	28.0	29.0	30.0
1971-1975		4	20	24	12		
1976-1980		4	11	31	14		
1981-1985		5	9	23	22	1	
2001-2005	1	9	16	21	13		
2006-2010		1	5	19	28	7	
2011-2015		3	6	15	20	15	1
Periode 1971-2015	1	26	57	133	109	23	1

Table 3. Distribution of the air maximal temperature in Bissau from 1971 to 2015

	29.0	30.0	31.0	32.0	33.0	34.0	35.0	36.0	37.0
1971-1975	7	7	14	15	11	6			
1976-1980	4	12	14	15	11	4			
1981-1985	2	12	13	18	8	5	2		
1986-1990	2	11	13	15	13	5	1		
1991-1995	3	9	18	14	6	7	3		
1996-2000	0	6	14	15	15	8	2		
2001-2005	0	5	10	11	20	6	7	1	
2006-2010	1	7	10	20	12	6	2	2	
2011-2015	1	3	11	20	14	6	5		
Period 1971-2015	20	72	117	143	110	53	22	3	

Maximal temperature: The results of treatment of this parameter are presented in Table 3. It indicates that during the whole period, the modal frequencies occurred in the sub interval [31.5, 32.5°] except 2001-2005 where 20 cases for a probability of 33.33%, were in the sub interval [32.5, 33.5°]. These modal frequencies were 15 in the first, second, third and fourth sub periods respectively for a probability of 25%. Both eighth and ninth sub periods have a same modal frequency of 20 for a probability of 33.33%. Table 3 also shows that the modal frequencies of the air maximal temperature when passing from one sub period up to another was slightly moving with time from lower to higher temperatures. Moreover, three cases with the highest temperatures in the sub interval [35.5; 36.5°] has appeared at the end of the period, particularly in the eighth and ninth sub periods. This confirms the fact that during these last 45 years the air temperature in Guinea Bissau was increasing with time. For this period a modal frequency of 143 cases for a probability of 26.48% was in the sub interval [31.5, 32.5°]. Also a modal frequency of 370 cases for a probability of 68.52% was in the sub interval [30.5, 33.5°].

Conclusion and recommendation

This investigation shows that the air temperature in Guinea Bissau is slowly increasing with time. If this phenomenon will be reinforced, the inhabitants should wait for some catastrophic consequences such as drought, hunger, new diseases.

The authorities should take important measures just by now, between others avoiding existent forests exploitations, planting new trees, creating public green gardens and parks. The author ceases this occasion to sincerely thank Dr. Njipouakouyou Yvonne, M.D. working at the UN hospital in Bissau, Njipouakouyou Ntentié Marie, M. SC. and Ph.D. student, Vice Dean in the Faculty of Foreign Students at the People's Friendship University in Moscow, Njipouakou you Vladimir, M. SC. who gave him the opportunity to come to Bissau and also encourage him to do this investigation. The author hopes that the results of his research will be very helpful for the country.

REFERENCES

SalySambou, Honoré Dacosta et Jean-Emanuel Paturel, 2018. *Variabilité spatio-temporelle des pluies de 1932 à 2014 dans le bassin versant du fleuve Kayanga/Gêba (République de Guinée, Sénégal, Guinée Bissau)*. Physio-Géo, Géographie Physique et Environnement, vol. 12/2018: varia 2018,January, p. 61-78.

The Republic of Guinea Bissau, January 2018. *Third National Communication United Nations Framework Convention on Climate Change*. *Ministry of Environment and Sustainable development*, 156p.

UNDP Climate Change Adaptation, 2012. *UNDP Guinea Bissau Project Document*. 17 Jul.

****