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Revista de Antropología, Ciencias de la Comunicación y de la Información, Filosofía, Lingüística y Semiótica, Problemas del Desarrollo, la Ciencia y la Tecnología

Año 35, 2019, Especial N° 21

Revista de Ciencias Humanas y Sociales

ISSN 1012-1587/ ISSNe: 2477-9385

Depósito Legal pp 198402ZU45

Universidad del Zulia

Facultad Experimental de Ciencias

Departamento de Ciencias Humanas

Maracaibo - Venezuela

Opcion, Año 35, Especial Nº 21 (2019):*2899-2921*
ISSN 1012-1587/ISSNe: 2477-9385

The General Path Of Trends In Dust Phenomena And Their Relationship To Climatic Elements In Najaf Station For The Period (1975-2017)

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Abstract

The research deals with analyzing the general course of trends in dust phenomena and their relationship to climatic elements in the Najaf climatic station. The study focused on finding the general trend of dust phenomena represented by dust storms, ascending dust, and suspended dust during the months of the year in addition to the annual total for each phenomenon and find the correlation between these dust phenomena and climatic elements, such as temperature, atmospheric pressure, wind speed, relative humidity, falling rain and evaporation, and to determine which of these relations are soft or inverse, or the relationship between them may not exist. The research aims to determine the general direction of dust phenomena in the Najaf climatic station and find the relationship between those phenomena and climatic elements through studying monthly and yearly rates, and determining the type of relationship between dust phenomena and climatic elements. The research reached several results, the most important of which are: 1- That the general trend of dust storms was to decrease during the months (January, February, July, August, September, December) while dust storms tended to rise during the months (March, April, May, June, October As for the annual total of dust storms, it is heading upward to reach (0.04). The general trend of bullish dust was downward during all months, and the annual total of bullish dust is heading downward to (-0.96). The general trend of trapped dust was upward during all months, while the annual total of trapped dust was heading upward to reach (2.22). 2- he relationship between dust storms and climatic elements

is very weak or not all. The correlation between ascending dust, temperature, wind speed, and evaporation is a direct correlation, while the correlation between ascending dust, atmospheric pressure, relative humidity and falling rain is an inverse relationship. The relationship between suspended dust, temperature, wind speed, and evaporation is a direct relationship. The relationship between suspended dust, atmospheric pressure, relative humidity, and precipitation is inverse.

Keywords: dust phenomena, general pathway, climatic elements

El camino general de las tendencias en los fenómenos de polvo y su relación con los elementos climáticos en la estación de Najaf para el período (1975-2017)

Resumen
La investigación trata de analizar el curso general de las tendencias en los fenómenos de polvo y su relación con los elementos climáticos en la estación climática de Najaf. El estudio se centró en encontrar la tendencia general de los fenómenos de polvo representados por tormentas de polvo, polvo ascendente y polvo suspendido durante los meses del año, además del total anual de cada fenómeno y encontrar la correlación entre estos fenómenos de polvo y elementos climáticos, como como temperatura, presión atmosférica, velocidad del viento, humedad relativa, lluvia que cae y evaporación, y para determinar cuáles de estas relaciones son suaves o inversas, o la relación entre ellas puede no existir. La investigación tiene como objetivo determinar la dirección general de los fenómenos de polvo en la estación climática de Najaf y encontrar la relación entre esos fenómenos y los elementos climáticos a través del estudio de las tasas mensuales y anuales, y determinar el tipo de relación entre los fenómenos de polvo y los elementos climáticos. La investigación alcanzó varios resultados, los más importantes son: 1- Que la tendencia general de las tormentas de polvo fue disminuir durante los meses (enero, febrero, julio, agosto, septiembre, diciembre) mientras que las tormentas de polvo tendieron a aumentar durante los meses. (Marzo, abril, mayo, junio, octubre En cuanto al total anual de tormentas de polvo, se dirige hacia arriba para alcanzar (0.04). La tendencia general del polvo alcista fue hacia abajo durante todos los meses, y el total anual de polvo alcista se dirige hacia

arriba hacia abajo hasta (-0.96). La tendencia general del polvo atrapado fue hacia arriba durante todos los meses, mientras que el total anual de polvo atrapado se dirigió hacia arriba para alcanzar (2.22). 2- La relación entre las tormentas de polvo y los elementos climáticos es muy débil o no La correlación entre polvo ascendente, temperatura, velocidad del viento y evaporación es una correlación directa, mientras que la correlación entre polvo ascendente, presión atmosférica, humedad relativa y lluvia que cae es una relación inversa. t, temperatura, velocidad del viento y evaporación es una relación directa. La relación entre el polvo suspendido, la presión atmosférica, la humedad relativa y la precipitación es inversa.

Palabras clave: fenómenos de polvo, camino general, elementos climáticos.

Introduction

Dust phenomena such as dust storms, ascending dust, and suspended dust are among the most frequent phenomena in the study area, so it is necessary to research them, know their relationship to climatic elements and determine their general direction. The research problem is thus (What is the general path for the trends of dust phenomena in the Najaf climatic station during the period (1975-2017)? And what is the relationship between those phenomena and climatic elements?) The research hypothesis is that (the path of the trends of dust phenomena varies between the rise and fall in a station Climatic Najaf, and the relationship between these phenomena and climatic elements varies between the direct and the reverse). The research aims to (determine the general trend of dust phenomena in the Najaf climatic station and find the relationship between those phenomena and climatic elements through studying monthly and yearly rates, and determining the type of relationship between dust phenomena and climatic elements represented by temperature, air pressure, wind, relative humidity, evaporation and rain).

As for the boundaries of the study area, it is represented by the Najaf station located in the western center of Iraq, at a latitude (75-31-N), and a longitude (91-44˚E) and at a height of (53m) as shown in Figure (1), to cover the data of this The climate station is the spatial boundary of Najaf, which borders it to the north, Babil Governorate, to the northwest, Karbala Governorate, to the west, Anbar Governorate, to the south, Saudi Arabia, to the southeast, Muthanna Governorate, and to the east, Qadisiyah Governorate. Najaf is part of the sedimentary plain and the western plateau. The governorate's land descends to the southwest, where its highest elevation is 420 m above sea level, to the northeast, until it reaches 20 m above sea level at the low sea of Najaf, and then rises secondly significantly as it reaches an altitude The old city of Najaf 55 m.

Figure (1) the location of the study area

Source: Republic of Iraq, Ministry of Transport and Communications, General Authority for Meteorology and Seismic Monitoring, Iraqi Climate Atlas, Baghdad, 1979.

The first topic ((climatic characteristics of the study area))

1- Normal temperature (° C): Table (1) shows that the annual average reached (24.7 ° C) and that the temperature increases in March to reach (18.2 ° C) as a result of the apparent sun's transition to become perpendicular to the equatorial width circle. On (March 21) and the temperature begins to rise until June, when sunlight becomes vertical or semi-vertical throughout the course of cancer in June on (June 21). The month of July records the highest temperature of (37.4 ° C). The reason for the high temperature is the long hours of the day, the large angle of sunlight fall, and the description of the sky. Then the temperature begins to decrease gradually from September

Table (1) Monthly averages for climatic elements in Najaf station for the period (1975 - 2017)

Evaporation (mm)	rain	Relative humidity (%)	Speed wind	Atmospheric pressure (mbar(	temp	Months
86.0	18.0	68	1.5	1020.1	10.8	January
122.4	13.8	57	1.9	1018.0	13.6	February
200.6	11.5	48	2.2	1015.0	18.2	March
281.6	12.1	41	2.3	1011.8	24.5	April
396.7	4.4	31	2.3	1008.3	30.7	May
511.3	0.0	24	3.0	1003.7	35.0	June
566.0	0.0	22	3.0	1000.1	37.4	July
529.4	0.0	23	2.5	1001.9	36.7	Father
386.8	0.0	28	1.8	1007.3	32.8	September
264.7	4.6	39	1.5	1013.4	26.3	October
139.2	15.2	56	1.3	1018.2	17.8	November
90.8	15.8	66	1.3	1020.5	12.4	December
3575.5	95.4	41.9	2.1	1011.5	24.7	the average

Source: Republic of Iraq, Ministry of Transport and Communications, General Authority for Meteorological and Seismic Monitoring, Climate Department and Water and Agricultural Resources Division, unpublished data, 2018.

To reach (32.8˚m) as a result of the apparent sun's transition to become perpendicular to the equatorial circle on September 23, and the decrease in temperature continues until December, when sunlight becomes vertical or almost vertical throughout the course of Capricorn in the month of December on (21) December) The month of January records the lowest temperature of (10.8 ° C), and the reason for the decrease in temperature is the shortening of daylight hours and the inclination of sunlight. The region is exposed to the influence of polar air masses (cP) and temperatures have a role in increasing dust phenomena, as temperatures rise during the day and decrease them At night as well as summer and winter conditions lead to expansion and contraction of Rocky Konate to turn over time to wind or washed disposers rain to other areas.

2- Atmospheric pressure (mbar): Table (1) shows that the annual rate reached (1011.5 mbar), and that the average air pressure increases in winter, and its highest levels are recorded in December to reach (1020.5 mbar) due to the decrease in temperature and the influence of continental polar air masses. . While air pressure rates decrease in the summer, and July recorded its lowest levels to reach (1000.1 millibars) due to the high temperature that allows air molecules to expand and pressure to drop.

3- Wind speed (m / s): Table (1) shows that the annual rate reached (2.1 m / s) and the wind speed starts to increase in April to reach (2.3 m / s) due to the emergence of pressure grooves. The wind speed reaches the highest rates in June and July to reach (3.0 m / s) due to the air currents that increase its activity in summer due to the increase in land heating and the increase in the depth of the seasonal low temperature. The wind records its lowest speed in January and December to reach (1.3 m / D) Because of the low thermal activity, the decrease in the seasonal depression, the weak thermal load currents, and the prevalence of the influence of air elevations during the cold season. The wind raises the grains of soil and dust particles, and moves them and transports them from one place to another, and the flour from them remains stuck in the air for different periods, so the frequency of dust phenomena increases during the spring and summer months, especially in the study area due to the lack of vegetation and being open to the desert.

4- Relative humidity (%): Table (1) shows that the annual average relative humidity reached (41.9%) and the relative humidity rates begin to increase in October with the beginning of the arrival of air depressions to reach (39%) and the relative humidity rates continue to increase, reaching The month of January, where the highest humidity levels were recorded, reached (68%), in conjunction with a decrease in temperature, high levels of cloudiness, a decrease in evaporation rates, increased amounts of rainfall, and the impact of the area on marine polar air masses (mP) coming from Europe and carrying moisture after passing through the Mediterranean. Relative humidity rates decrease in May with the effect of depressions decreasing to reach (31%). Relative humidity rates continue to decrease until July. The lowest relative humidity rates are recorded at the lowest rates (22%) due to high temperature and control of the continental orbital air masses (cT) low levels of cloudiness, high rates of evaporation and rainfall. And moisture has its role in the cohesion of fine soil atoms such as clay and silt where water slowly leaks and thus retains it for a long time, unlike large atoms such as sand, which is characterized by a relative breadth of voids, which causes water to leak through it at a rapid rate and dry at a faster rate than micro atoms. And the high humidity levels work to stick the soil grains together, and vice versa, in the case of low humidity levels, as it increases the disintegration of the soil grains (1).

5- Falling rain (mm): Table (1) shows that the annual total of rainfall has reached (95.4 mm). And that rain falls begin to fall in October with the beginning of the arrival of the Mediterranean depressions to reach the amount of rain (4.6 mm), and the amount of rain falls increases to reach the peak of the rain in January to reach (18.0 mm) and the rain falls in its quantities during the month of May to reach (4.4 mm)) Because of the low impact of the depressions so that the rain falls during the summer months due to the dominance of the continental air masses that do not allow precipitation to occur. The rain affects the properties of the soil and leads to the lack of natural plants and their seasonality, as the roots of plants contribute to keeping the soil.

6- Evaporation (mm): Table (1) shows that the annual rate of evaporation reached (3575.5 mm) as it increases due to high temperature, increased wind speed, low relative humidity and lack of vegetation, and monthly rates of evaporation begin to increase in March due to high temperature And it continues to increase to reach its peak during the month of July to reach (566.0 mm) due to the high temperature, clarity of the sky, lack of clouds and an increase in wind speed in summer. Evaporation values decrease due to lower temperatures starting in October, and monthly averages reach their lowest levels in January to reach (86.0 mm) due to low temperature and high humidity levels. Increasing evaporation rates reduces the moisture content of the soil, making it susceptible to increase and rise.

The second topic ((dust phenomena of the study area and its general direction))

First: dust storms

They are minute dust particles flying in the air (2). They are particles with diameters less than (0.06 mm). The International Meteorological Organization defines a dust storm as the wind that carries dust with it, and the visibility range is less than (1 km) and the wind speed is more than (7.7 m / s) (3). It is clear from Table (2) and Figure (2) that the total annual recurrence of dust storms reached (5.0 days) and it appears that April is the most common month in which the frequency of dust storms increases by an average of (1.4 days) due to the presence of instability in the blocks Aerobic.

Table (2) monthly rates of dust events (day) for the period (1975 - 2017) in Najaf station

total	dec	nov	oct	sep	aug	july	june	may	apr	mar	feb	jan	Months
5.0	0.1	0.1	0.2	0.1	0.0	0.1	0.7	0.8	1.4	0.8	0.3	0.2	Dust storms
40.8	0.7	0.8	1.8	1.7	4.0	6.8	7.5	4.9	4.3	4.3	2.6	1.5	Rising dust
87.7	2.6	3.4	7.3	5.3	6.2	9.9	10.7	12.7	11.2	9.2	5.5	3.7	Sticking dust

Source: Republic of Iraq, Ministry of Transport and Communications, General Authority for Meteorological and Seismic Monitoring, Climate Department, unpublished data, 2018.

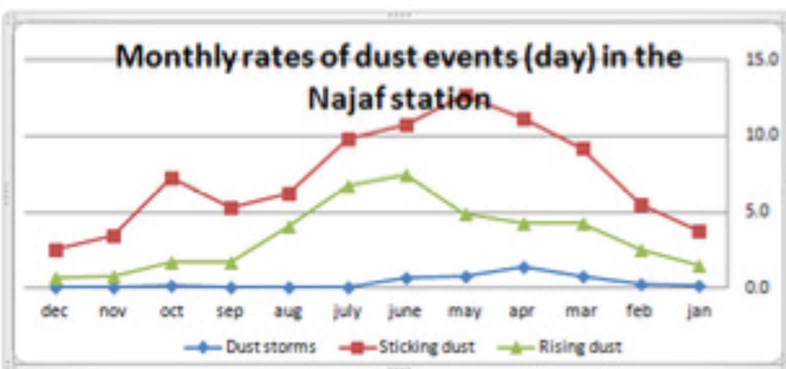


Figure (2) monthly rates of dust events (day) for the period (1975 - 2017) in Najaf station
Source: Table (2)

Second: upward dust
Ascending dust means solid particles that are transported by air and may

be naturally caused by the factors
Living or artificially, due to cement quarries, dust is one of the dust phenomena that arises when rapid changes in the strength of the slope of air pressure occur, i.e. when instability occurs to the air, which creates air vortices due to the lifting of dust particles to (15 m) in In the event that the dust particles are medium or large in size, and the winds have a speed between (15-20 km / h), but if the minutes are small in size and the wind speed exceeds (50 km / h), then they rise to (1000 m) and this is rare to get (4). In general, the diameter of the dust particles of upward dust ranges between (1 - 10 microns) (5). And the dust rises as a result of the instability of the air resulting from high temperatures and interruptions of rain, as it results from heating the surface of the earth continuously, which causes a current that leads to carrying the dust to the top, as well as dry soil and an increase in wind speed, or occur during the night when the wind speed increases It ranges between (15-25 km / h) (6). It is clear from Table (2) and Figure (2) that the annual total of recurring dust reached (40.8 days) and it appears that June is the most month in which the frequency of ascending dust increases at an average of (7.5 days) due to heating the surface of the earth due to high temperatures In this month, less rainfall and increased wind speed, the month of December recorded the lowest rate of recurring upward dust reaching (0.7 days) due to the stability of the air and the control of air heights.

Third: sticking dust

They are dry dust particles suspended in the air with calm or light winds and sometimes static winds (7). The suspended dust consists of small particles of clay, silt and sand, and this type of dust appears after the occurrence of dust storms and ascending dust, and this phenomenon lasts for a long time as the atmosphere is not free of them (8). The range of visibility ranges between (1 - 5 km), where the amount of suspended dust minutes per cubic meter in the air ranges from (7490 - 56000 micrograms) and decreases in a number of cases to (1 micrograms) to be called dense dust and suspended due to the small size of dust particles (9). The dust remains in the air for a period ranging between (1 - 15 hours) and this type appears after the phenomena of ascending dust and dust storms, as the particles remain stuck in the air even after the winds remain (10). It is clear from Table (2) and Figure (2) that the annual total of suspended dust frequency has reached (87.7 days) and it appears that May is the most month with which the frequency of suspended dust increases at an average of (12.7 days) due to the instability of air masses and high temperatures The increase in the heating of the surface of the earth and the height of the suspended dust particles. The month of December recorded the lowest frequency of ascending dust reaching (2.6 days) due to the stability of the air and the control of air heights.

The third topic ((the general trend of dust phenomena in the study area))

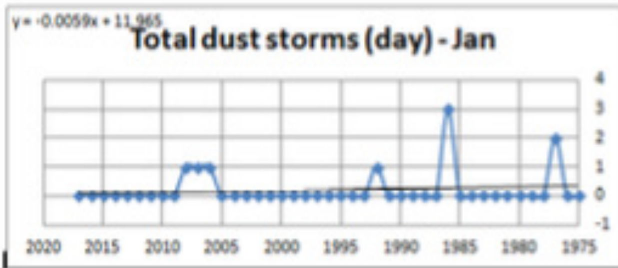
First: The general trend of dust storms in the study area

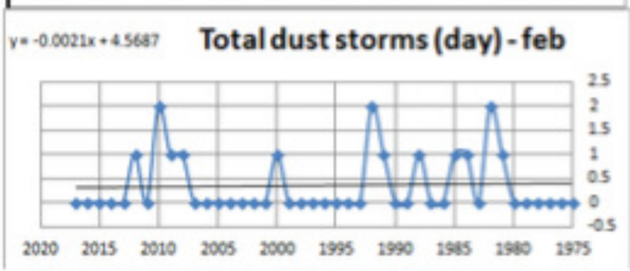
It is clear from Table (3) and Figure (3) that the general trend of dust storms in the study area is to decrease during the months (January, February, July, August, November, December) and the trend value has reached (0.005, 0.002- , 0.001-, 0.0002-, 0.0002-, 0.004-, 0.004-) respectively. While the dust storms tend to rise during the months (March, April, May, June, October) and the direction value reached (0.02, 0.01, 0.001, 0.02, 0.0008) respectively. This is due to the increase in wind speed and the different pressure systems, which leads to dust excitement. As for the annual total of dust storms, it is heading upward, and the value of the trend reached (0.04) and the highest value of fluctuation (458.1%) occurred during the month of August. The lowest value of volatility was (99.1%) during the month of April. While the value of fluctuation for the total annual dust storms (86.7%)

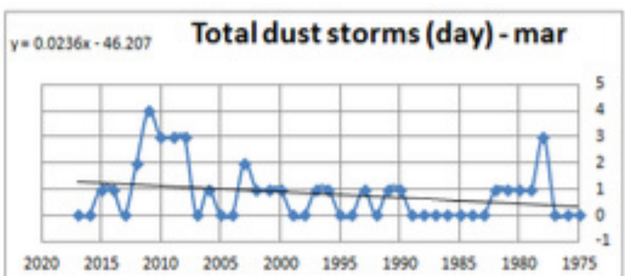
Table (3) the general trend, standard deviation, and fluctuation of monthly rates and the annual total of dust storms (days) in Najaf station for the period (1975 - 2017)

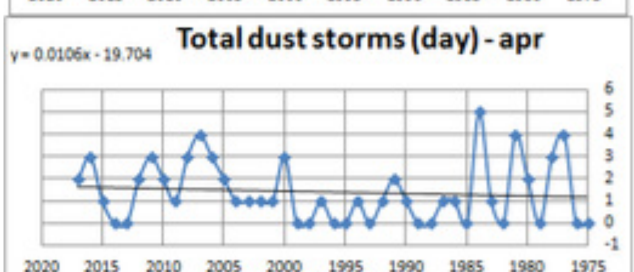
The general trend	Oscillation	SMA	Months
-0.005	286.6	0.6	January
-0.002	175.6	0.6	February
0.02	129.3	1.1	March
0.01	99.1	1.4	April
0.001	104.0	0.9	May
0.02	172.1	1.2	June
-0.001	251.3	0.4	July
-0.0002	458.1	0.2	Father
-0.0002	315.9	0.3	September
0.0008	242.0	0.5	October
-0.004	393.5	0.4	November
-0.004	369.5	0.3	December
0.04	86.7	4.3	the average

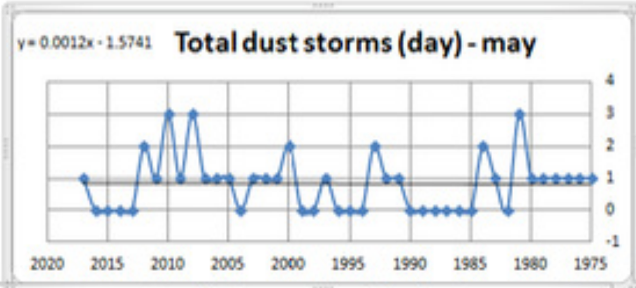
Source: researcher's work

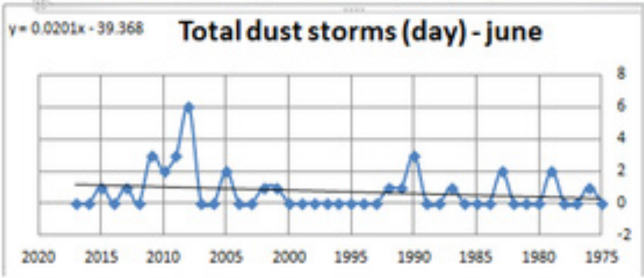

y = -0.0059x + 11.965
Total dust storms (day) - Jan
4
3
2
1
0
-1
2020 2015 2010 2005 2000 1995 1990 1985 1980 1975

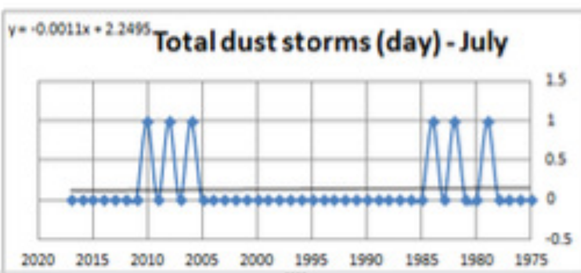

y = -0.0021x + 4.5687
Total dust storms (day) - feb
2.5
2
1.5
1
0.5
0
-0.5
2020 2015 2010 2005 2000 1995 1990 1985 1980 1975

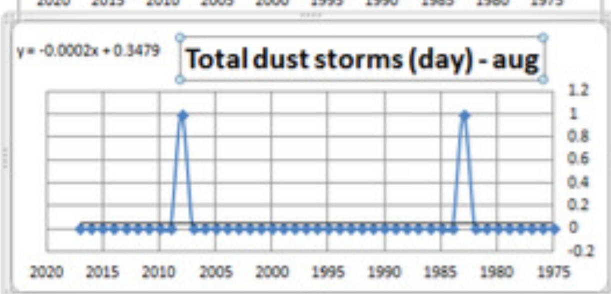

y = 0.0236x - 46.207
Total dust storms (day) - mar
5
4
3
2
1
0
-1
2020 2015 2010 2005 2000 1995 1990 1985 1980 1975

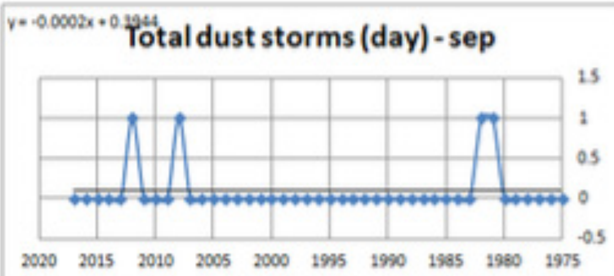

y = 0.0106x - 19.704
Total dust storms (day) - apr
6
5
4
3
2
1
0
-1
2020 2015 2010 2005 2000 1995 1990 1985 1980 1975

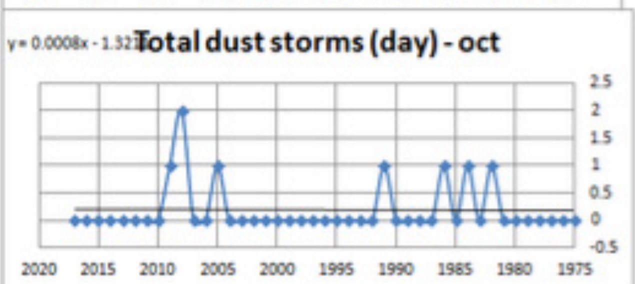

y = 0.0012x - 1.5741
Total dust storms (day) - may
4
3
2
1
0
-1
2020 2015 2010 2005 2000 1995 1990 1985 1980 1975

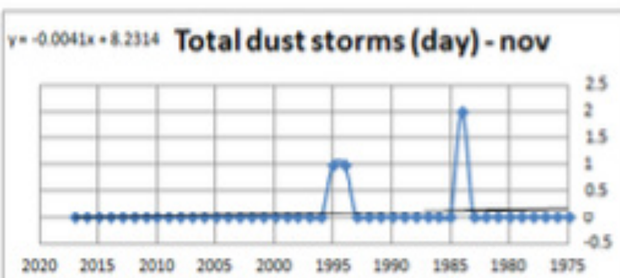

y = 0.0201x - 39.368
Total dust storms (day) - june
8
6
4
2
0
-2
2020 2015 2010 2005 2000 1995 1990 1985 1980 1975

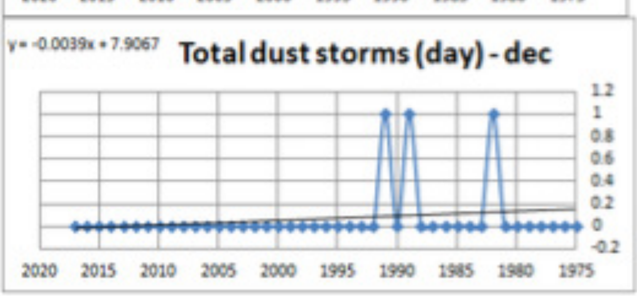

y = -0.0011x + 2.2495
Total dust storms (day) - July
1.5
1
0.5
0
-0.5
2020 2015 2010 2005 2000 1995 1990 1985 1980 1975


y = -0.0002x + 0.3479
Total dust storms (day) - aug
1.2
1
0.8
0.6
0.4
0.2
0
-0.2
2020 2015 2010 2005 2000 1995 1990 1985 1980 1975


y = -0.0002x + 0.3944
Total dust storms (day) - sep
1.5
1
0.5
0
-0.5
2020 2015 2010 2005 2000 1995 1990 1985 1980 1975


Total dust storms (day) - oct
2.5
2
1.5
1
0.5
0
-0.5
2020 2015 2010 2005 2000 1995 1990 1985 1980 1975


y = -0.0041x + 8.2314
Total dust storms (day) - nov
2.5
2
1.5
1
0.5
0
-0.5
2020 2015 2010 2005 2000 1995 1990 1985 1980 1975


y = -0.0039x + 7.9067
Total dust storms (day) - dec
1.2
1
0.8
0.6
0.4
0.2
0
-0.2
2020 2015 2010 2005 2000 1995 1990 1985 1980 1975

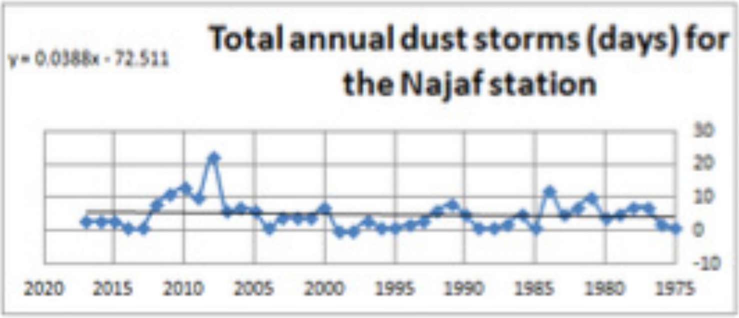


Figure (3) the general trend of dust storms in the study area

Source: Table (3)

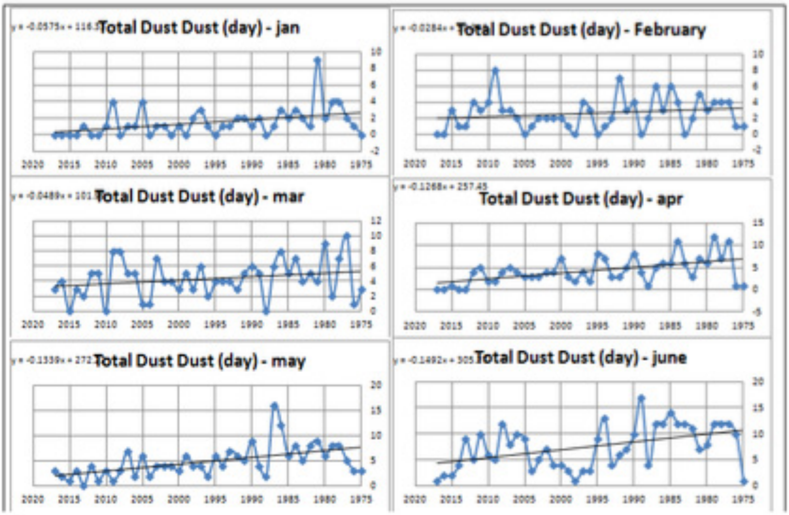
Second: The general trend of bullish dust in the study area

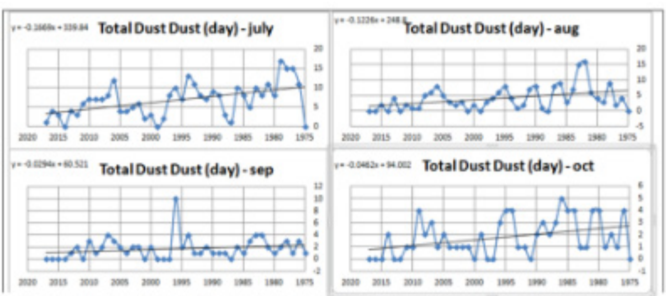
It is clear from Table (4) and Figure (4) that the general trend of rising dust in the study area is to decrease during all months. Also, the annual total of bullish dust is declining and the trend value has reached (-0.96). The highest value of volatility was (154.2%) during the month of December. The lowest value of volatility was (55.6%) during the month of June. While the value of fluctuation for the annual total of upward dust (46.4%).

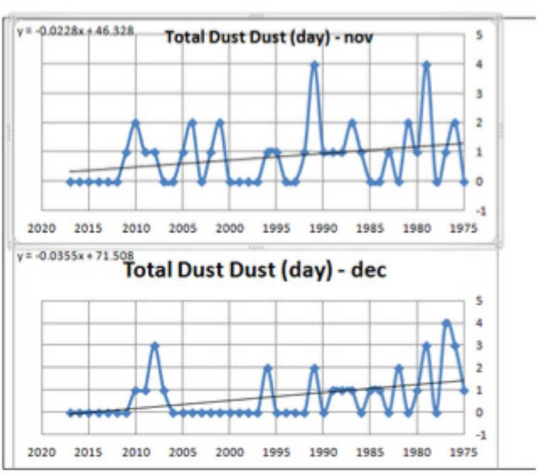
Table (4) the general trend, standard deviation, and fluctuation of monthly rates and the annual total of bullish dust (day) in Najaf station for the period (1975 - 2017)

The general trend	Oscillation	SMA	Months
-0.05	114.9	1.7	January
-0.02	76.2	2.0	February
-0.04	55.9	2.4	March
-0.12	69.8	3.0	April
-0.13	63.9	3.1	May
-0.14	55.6	4.1	June
-0.16	62.5	4.2	July
-0.12	93.7	3.8	Father
-0.02	102.5	1.8	September
-0.04	85.4	1.5	October
-0.02	123.6	1.0	November
-0.03	154.2	1.0	December
-0.96	46.4	18.9	the average

Source: researcher's work


Total Dust Dust (day) - jan
Total Dust Dust (day) - February
Total Dust Dust (day) - mar
y = -0.1268x + 257.45
Total Dust Dust (day) - apr
Total Dust Dust (day) - may
Total Dust Dust (day) - june


Total Dust Dust (day) - july
Total Dust Dust (day) - aug
Total Dust Dust (day) - sep
Total Dust Dust (day) - oct


y = -0.0228x + 46.328
Total Dust Dust (day) - nov
y = -0.0355x + 71.508
Total Dust Dust (day) - dec

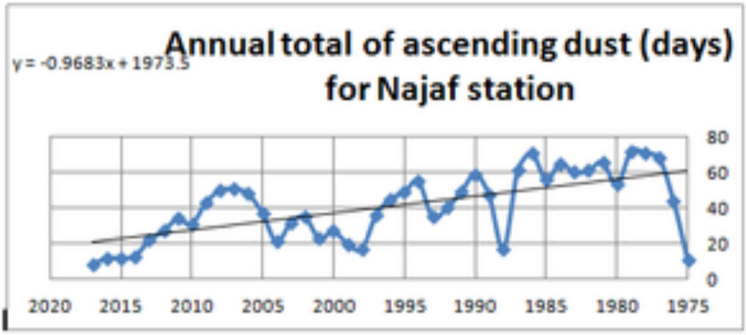


Figure (4) the general trend of ascending dust in the study area

Source: Table (4)

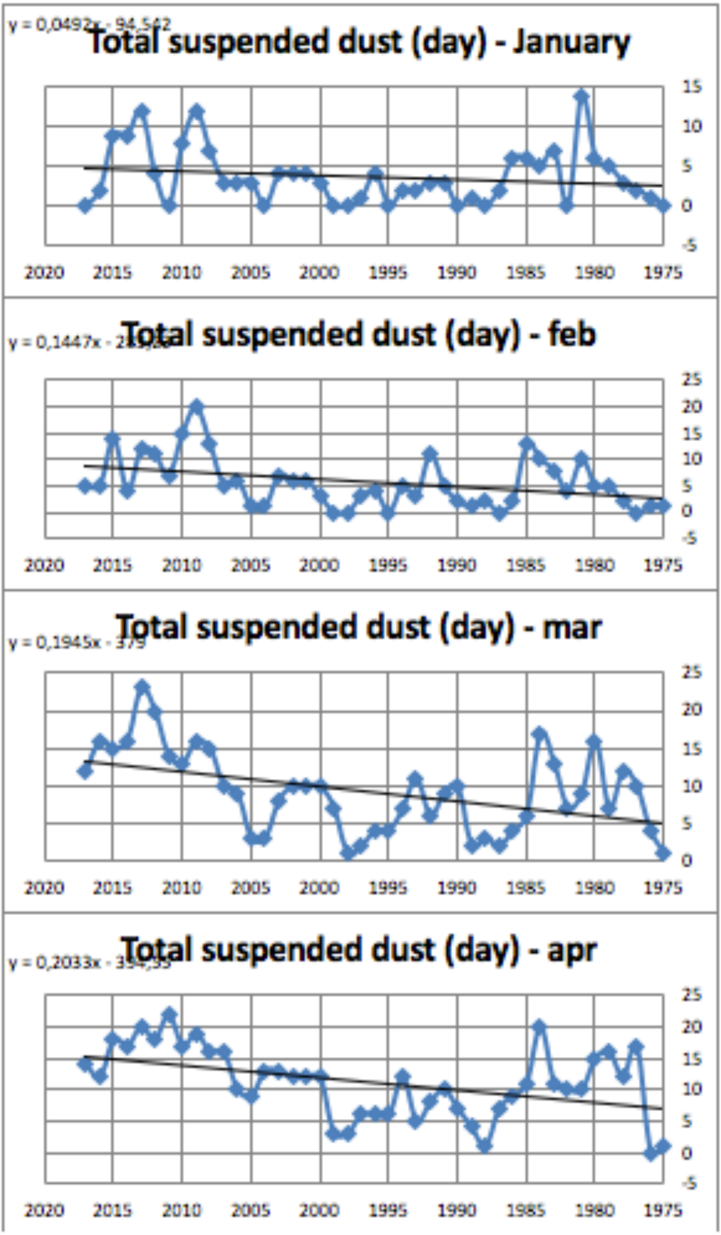
Third: The general trend of the dust trapped in the study area

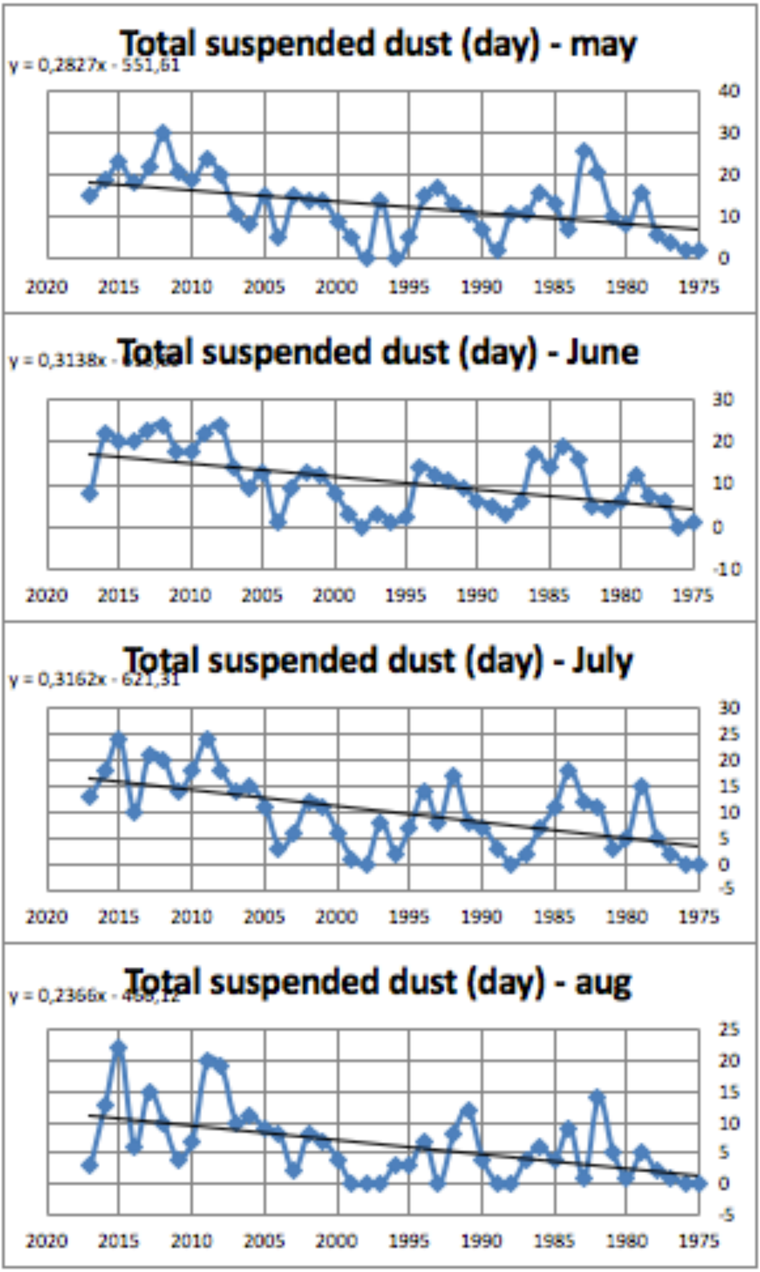
It is clear from Table (5) and Figure (5) that the general trend of dust in the study area is to rise during all months. Also, the annual total of suspended dust is heading upward and the trend value has reached (2.22). The highest value of volatility was (118.0%) during the month of December. The lowest value of volatility was (50.4%) during the month of April. While the value of fluctuation for the annual total of suspended dust (59.7%).

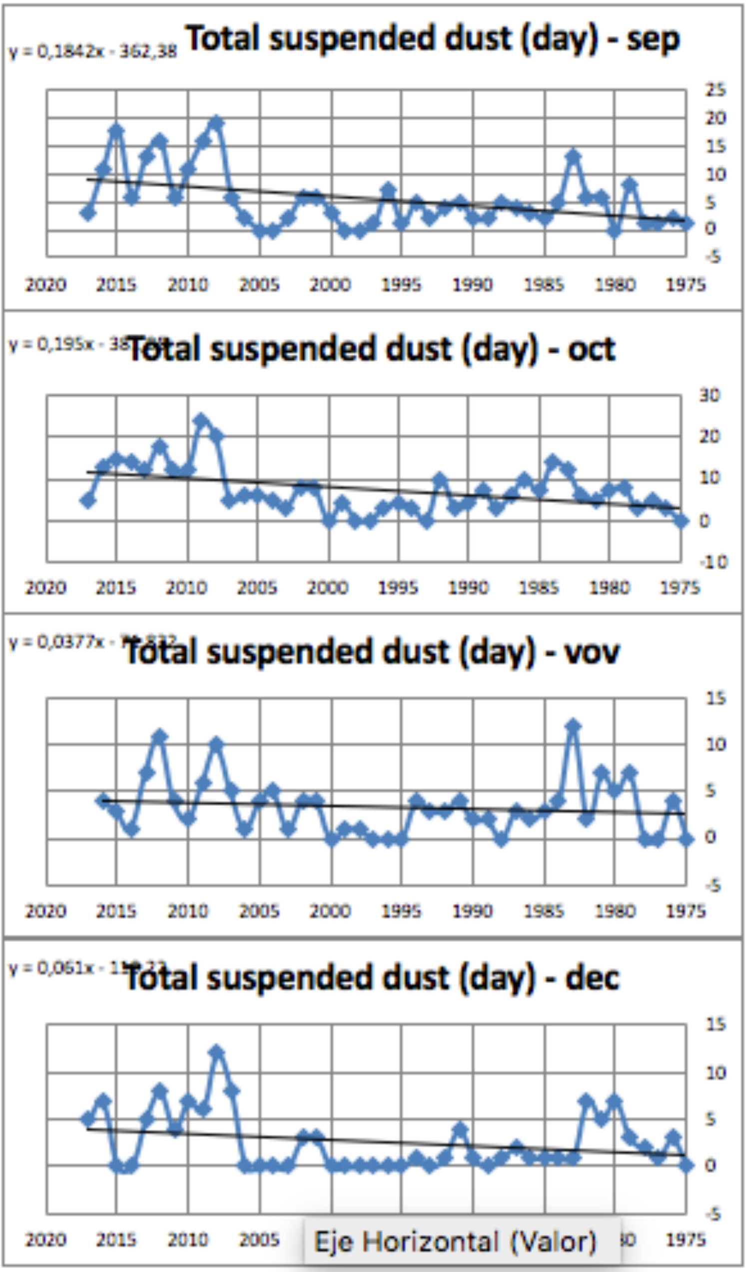
Table (5) the general trend, standard deviation, and fluctuation for monthly rates and the annual total of suspended dust (day) in Najaf station for the period (1975 - 2017)

The general trend	Oscillation	SMA	Months
0.04	96.1	3.6	January
0.14	86.8	4.8	February
0.19	59.1	5.5	March
0.2	50.4	5.6	April
0.28	58.1	7.3	May
0.31	68.0	7.3	June
0.31	69.6	6.9	July
0.23	92.4	5.7	Father
0.18	95.8	5.1	September
0.19	76.5	5.6	October
0.03	87.0	3.0	November
0.06	118.0	3.0	December
2.22	59.7	52.3	the average

Source: researcher's work


y = 0,0492x - 94,542
Total suspended dust (day) - January
15
10
5
0
-5
2020 2015 2010 2005 2000 1995 1990 1985 1980 1975
Total suspended dust (day) - feb
25
20
15
10
5
0
-5
2020 2015 2010 2005 2000 1995 1990 1985 1980 1975
y = 0,1945x - 379
Total suspended dust (day) - mar
25
20
15
10
5
0
2020 2015 2010 2005 2000 1995 1990 1985 1980 1975
Total suspended dust (day) - apr
25
20
15
10
5
0
-5
2020 2015 2010 2005 2000 1995 1990 1985 1980 1975


Total suspended dust (day) - may
y = 0,2827x - 551,61
40 30 20 10 0
2020 2015 2010 2005 2000 1995 1990 1985 1980 1975
Total suspended dust (day) - June
y = 0,3138x
30 20 10 0 -10
2020 2015 2010 2005 2000 1995 1990 1985 1980 1975
Total suspended dust (day) - July
y = 0,3162x - 621,31
30 25 20 15 10 5 0 -5
2020 2015 2010 2005 2000 1995 1990 1985 1980 1975
Total suspended dust (day) - aug
y = 0,2366x
25 20 15 10 5 0 -5
2020 2015 2010 2005 2000 1995 1990 1985 1980 1975


y = 0,1842x - 362,38
Total suspended dust (day) - sep
Total suspended dust (day) - oct
Total suspended dust (day) - vov
Total suspended dust (day) - dec
2020 2015 2010 2005 2000 1995 1990 1985 1980 1975
Eje Horizontal (Valor)

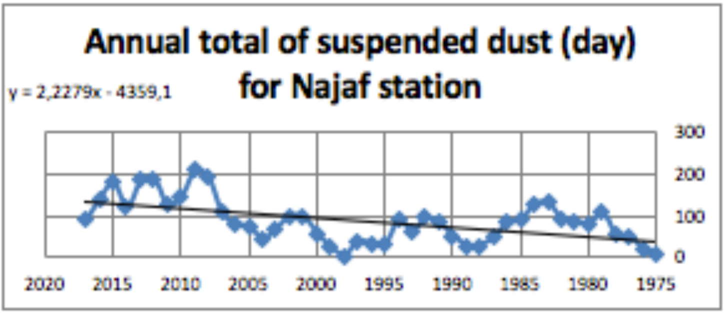


Figure (5) the general trend of dust trapped in the study area

Source: Table (5)

The fourth topic ((The relationship between dust phenomena and climatic elements in the study area))

First: The relationship between dust storms and climatic elements in the study area

It is clear from Table (6) and Figure (6) that the relationship between dust storms and temperature is a very weak direct relationship (0.021) and the computational value (T) reached (3.163). By comparing it with the tabular value (T) we note that there is significant significance on it accepting the alternative hypothesis Which states that there is a correlation between dust storms and temperature, that is, the more heat, the more dust storms reach, and the effect of temperature on dust storms (0.04%) is very weak.

The relationship between dust storms and atmospheric pressure is a very weak inverse relationship that reached (0.025-) and the computational value (T) reached (3.163). By comparing it with the tabular value (T), we note that there is a significant significance on it that accepts the alternative hypothesis which states that there is a correlation relationship between dust storms and pressure Atmospheric, that is, the greater the atmospheric pressure, the fewer dust storms, and the influence of the atmospheric pressure on dust storms (0.06%) is very weak. As for the relationship between dust storms and wind speed, it is a very weak direct relationship that reached (0.35) and the computational value (T) reached (3.376). By comparing it with the tabular value (T), we note that there is a significant significance on it that accepts the alternative hypothesis which states that there is a correlation relationship between dust storms and speed Wind, that is, the higher the wind speed, the greater the dust storms. The impact of the wind speed on dust storms is 12.25%, which is very weak.

Table (6) the relationship between dust storms and climatic elements

The coefficient of determination	Calculate T	connect	Climatic elements
0.0004	3.163	0.021	Temperature (° C)
0.0009	3.163	-0.025	Atmospheric pressure (mbar)
0.1225	3.376	0.350	Wind speed (m / s)
0.01	3.179	-0.102	Relative humidity (%)
0.009	3.177	0.097	Precipitation (mm)
0.0009	3.164	0.030	Evaporation (mm)

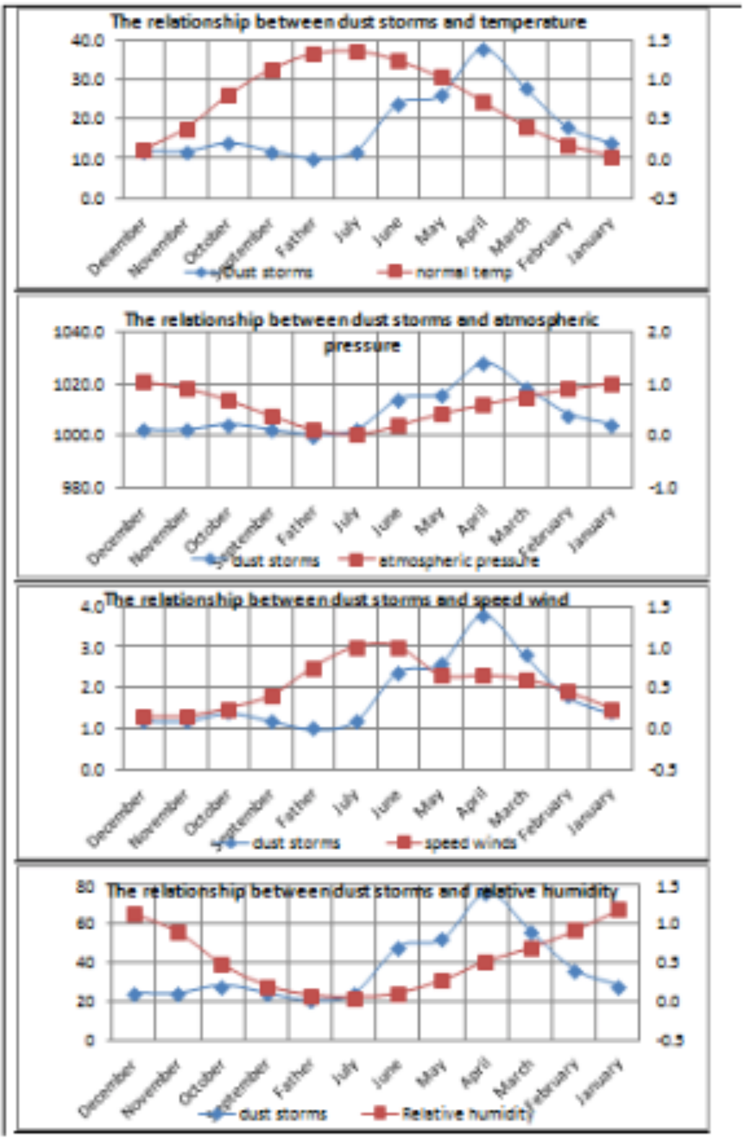
Table (T) value at the level of significance (5%) and degree of freedom (10) = 2.228

Source: Table (1) and Table (2)

The relationship between dust storms and relative humidity is a very weak inverse relationship that reached (0.102-) and the computational value (T) reached (3.179). By comparing it with the tabular value (T), we note that there is significant significance on it that accepts the alternative hypothesis which states that there is a correlation between dust storms and humidity Relative, that is, the higher the relative humidity, the less dust storms and the relative humidity effect in dust storms (1.04%) is very weak.

While the relationship between dust storms and falling rains is a very weak direct relationship, which reached (0.097) and the computational value (T) reached (3.177). By comparing it with the tabular value (T), we note that there is a significant significance on it that accepts the alternative hypothesis which states that there is a correlation relationship between dust storms Downpours, i.e. the more rain falls, the more dusty storms increase. The impact of falling rains on dust storms (0.94%) is very weak.

As for the relationship between dust storms and evaporation, it is a direct relationship that reached (0.030) and the computational value (T) reached (3.164). By comparing it with the tabular value (T), we note that there is a significant significance on it that accepts the alternative hypothesis, which states that there is a correlation relationship between dust storms and evaporation, that is, the greater the increase Evaporation: Dust storms increased, and the effect of evaporation in dust storms (0.09%) is very weak. It is clear from the foregoing that the correlations between climatic elements and dust storms are very weak or totally absent. There is hardly any effect of climate elements in the study area on dust storms, due to the fact that storms come from outside the boundaries of the study area, so there is no effect of climate elements on them.



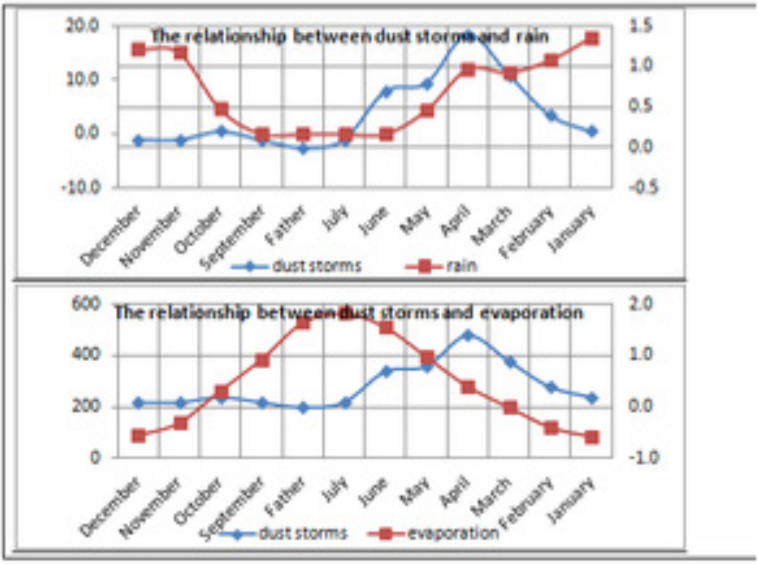


Figure (6) the relationship between dust storms and climatic elements

Source: Table (1) and Table (2)

Second: The relationship between rising dust and climatic elements in the study area

It is clear from Table (7) and Figure (7) that the relationship between upward dust and temperature is an intermediate direct relationship of (0.674) and the computational value of (T) reached (4.280). By comparing it with the tabular value (T) we note that there is a significant significance on it that accepts the alternative hypothesis that It states that there is a correlation between the ascending dust and the temperature, that is, the higher the temperature, the more the ascending dust will reach, and the effect of the temperature on the ascending dust will be (45.4%). The relationship between upward dust and atmospheric pressure is an inverse relationship that reached (-0.765) and the computational value (T) reached (4.909). By comparing it with the tabular value (T), we note that there is significant significance on it that accepts the alternative hypothesis which states that there is a correlation relationship between upward dust and atmospheric pressure, i.e. The higher the atmospheric pressure, the less the dust will rise, and the greater the effect of the atmospheric pressure on the rising dust (58.5%). As for the relationship between ascending dust and wind speed, it is a strong direct relationship that reached (0.974) and the computational value (T) reached (14.003). By comparing it with the tabular value (T), we note that there is significant significance on it that accepts the alternative hypothesis which states that there is a relationship between ascending dust and wind speed, i.e. The higher the wind speed, the higher the upward dust, and the effect of the wind speed on the upward dust (94.9%). The relationship between upward dust and relative humidity is an inverse relationship that reached (0.713-) and the computational value (T) reached (4.508). By comparing it with the tabular value (T), we note that there is significant significance on it that accepts the alternative hypothesis which states that there is a relationship between upward dust and relative humidity, i.e. whenever The relative humidity of the rising dust decreased, and the relative humidity effect on the rising dust reached (50.8%).

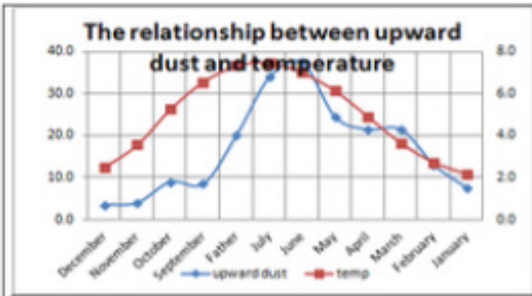
While we note that the relationship between dust storms and downpours is an inverse relationship that reached (-0.609) and the computational value (T) reached (3.987) and by comparing it with the tabular value (T) we note that there is a significant significance on it that accepts the alternative hypothesis which states that there is a relationship between rising dust Falling rain, that is, the higher the fallen rain, the lesser the dust will decrease, and the effect of the falling rain on the rising dust will be (37.1%). As for the relationship between ascending dust and evaporation, it is a direct relationship that reached (0.77) and the computational value (T) reached (4,957). By comparing it with the tabular value (T), we note that there is significant significance on it. The upward dust increased, and the effect of evaporation on the upward dust reached (59.3%).

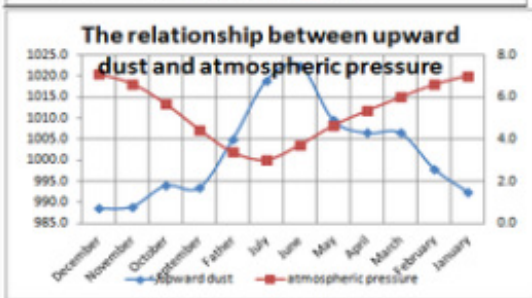
Table (7) The relationship between rising dust and climatic elements

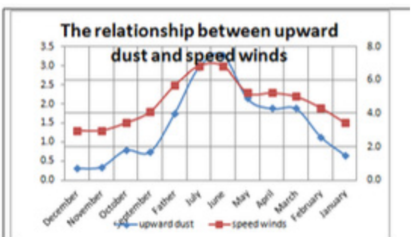
The coefficient of determination	Calculate T	connect	Climatic elements
0.454	4.280	0.674	Temperature (° C)
0.585	4.909	-0.765	Atmospheric pressure (mbar)
0.949	14.003	0.974	Wind speed (m / s)
0.508	4.508	-0.713	Relative humidity (%)
0.371	3.987	-0.609	Precipitation (mm)
0.593	4.957	0.77	Evaporation (mm)

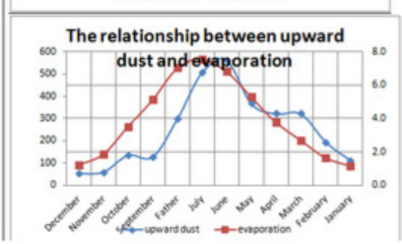
Table (T) value at the level of significance (5%) and degree of freedom (10) = 2.228

Source: Table (1) and Table (2)


The relationship between upward dust and temperature
40.0
30.0
20.0
10.0
0.0
8.0
6.0
4.0
2.0
0.0
December
November
October
September
Father
July
June
May
April
March
February
January
upward dust
temp


The relationship between upward dust and atmospheric pressure
1025.0
1020.0
1015.0
1010.0
1005.0
1000.0
995.0
990.0
985.0
8.0
6.0
4.0
2.0
0.0
December
November
October
September
Father
July
June
May
April
March
February
January
upward dust
atmospheric pressure


The relationship between upward dust and speed winds
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
8.0
6.0
4.0
2.0
0.0
December
November
October
September
Father
July
June
May
April
March
February
January
upward dust
speed winds


The relationship between upward dust and evaporation
600
500
400
300
200
100
0
8.0
6.0
4.0
2.0
0.0
December
November
October
September
Father
July
June
May
April
March
February
January
upward dust
evaporation

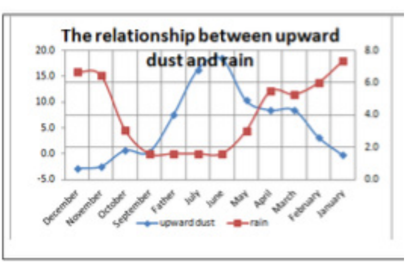

The relationship between upward dust and rain
20.0
15.0
10.0
5.0
0.0
-5.0
8.0
6.0
4.0
2.0
0.0
December
November
October
September
Father
July
June
May
April
March
February
January
upward dust
rain

Figure (7) the relationship between rising dust and climatic elements
Source: Table (1) and Table (2)
Third: The relationship between trapped dust and climatic elements in the study area

It is clear from Table (8) and Figure (8) that the relationship between the suspended dust and temperature is an intermediate direct relationship of (0.581) and the computational value of (T) reached (3.887). By comparing it with the tabular value (T), we note that there is significant significance on it that accepts the alternative hypothesis that It states that there is a correlation between the suspended dust and the temperature, that is, the more heat, the more suspended dust, and the percentage of the influence of temperature on the suspended dust (33.8%). The relationship between suspended dust and atmospheric pressure is an inverse relationship that reached (-0.592) and the computational value of (T) reached (3.922). By comparing it with the tabular value (T), we note that there is a significant significance on it that accepts the alternative hypothesis which states that there is a correlation relationship between suspended dust and air pressure, i.e. The higher the atmospheric pressure, the lesser the suspended dust, and the greater the effect of the atmospheric pressure on the suspended dust (35.0%)

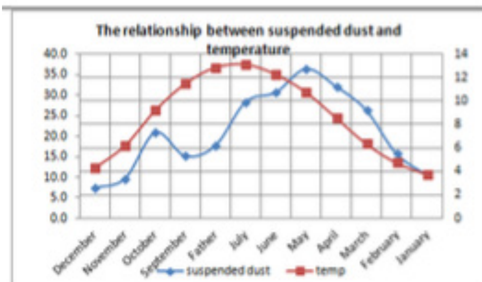
As for the relationship between the suspended dust and the wind speed, it is a direct relationship that reached (0.764) and the computational value (T) reached (4,903). By comparing it with the tabular value (T), we note that there is significant significance on it that accepts the alternative hypothesis which states that there is a relationship between the suspended dust and the wind speed, i.e. whenever The wind speed increased, the suspended dust increased, and the effect of the wind speed on the suspended dust (58.4%). While the relationship between suspended dust and relative humidity is an inverse relationship that reached (-0.647) and the computational value of (T) reached (4.149) and by comparison with the tabular value (T) we note that there is significant significance on it accepting the alternative hypothesis which states that there is a relationship between suspended dust and relative humidity That is, the higher the relative humidity, the less the suspended dust will reach, and the higher the relative humidity effect on the suspended dust (41.9%). The relationship between suspended dust and falling rain is a weak inverse relationship that reached (-0.498) and the computational value of (T) reached (3.647). By comparison with the tabular value (T), we note that there is a significant significance on it that accepts the alternative hypothesis which states that there is a relationship between suspended dust and falling rain, i.e. The higher the rainfall, the less trapped dust, and the effect of the falling rain on the suspended dust (24.8%). As for the relationship between suspended dust and evaporation, it is a direct relationship that reached (0.602) and the computational value (T) reached (3.959). By comparing it with the tabular value (T), we note that there is significant significance on it that accepts the alternative hypothesis which states that there is a relationship between suspended dust and evaporation, that is, the more evaporation The suspended dust increased, and the effect of evaporation on the suspended dust reached (36.2%)

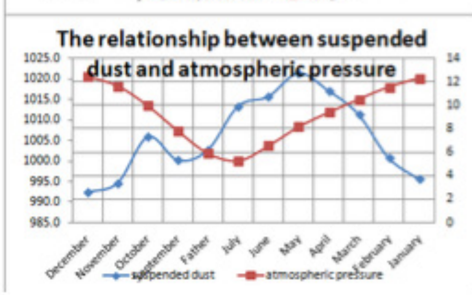
Table (8) The relationship between suspended dust and climatic elements

The coefficient of determination	Calculate T	connect	Climatic elements
0.338	3.887	0.581	Temperature (° C)
0.35	3.922	-0.592	Atmospheric pressure (mbar)
0.584	4.903	0.764	Wind speed (m / s)
0.419	4.149	-0.647	Relative humidity (%)
0.248	3.647	-0.498	Precipitation (mm)
0.362	3.959	0.602	Evaporation (mm)

Table (T) value at the level of significance (5%) and degree of freedom (10) = 2.228

Source: Table (1) and Table (2)





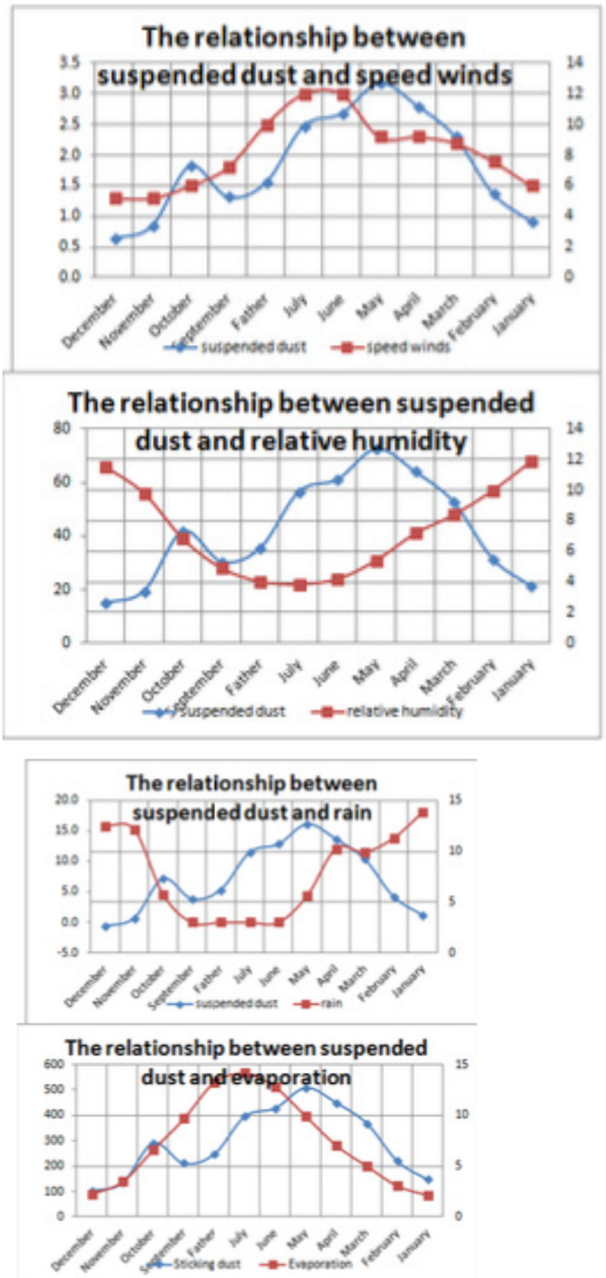


Figure (8) the relationship between suspended dust and climatic elements
Source: Table: (8).

Conclusions:

1-That the general trend of dust storms was to decrease during the months (January, February, July, August, September, December) while dust storms tended to rise during the months (March, April, May, June, October As for the annual total of dust storms, it is heading upward to reach (0.04). The general trend of bullish dust was downward during all months, and the annual total of bullish dust is heading downward to (-0.96). The general trend of trapped dust was upward during all months, while the annual total of trapped dust was heading upward to reach (2.22)

2- The correlation between dust storms and climatic elements is not all. The correlation between the ascending dust, temperature, wind speed, and evaporation is a direct correlation, while the correlation between ascending dust, atmospheric pressure, relative humidity and falling rain is an inverse relationship. The relationship between suspended dust, temperature, wind speed, and evaporation is a direct relationship. The relationship between suspended dust, atmospheric pressure, relative humidity, and precipitation is inverse.

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Revista de Ciencias Humanas y Sociales

Año 35, Especial N° 21, (2019)

Esta revista fue editada en formato digital por el personal de la Oficina de Publicaciones Científicas de la Facultad Experimental de Ciencias, Universidad del Zulia.
Maracaibo - Venezuela

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