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Calculating the Monthly Frequency for Cloud Cover in Baghdad Station

Zainab S. Muhammad, Osama T. Al-Taai*
Department of Atmospheric Sciences, Collage of Science, Mustansiriyah University, Iraq.
**Correspondent author email: aus_tar77@yahoo.com*

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Abstract

The science developed more there for depending on cloud cover become more through knowing the type of cloud and shape and height with climate changing followed that observing station start built and also systems able to observe cloud cover from surface in addition from space by using satellite. The aim of this research is calculating the monthly frequency for cloud cover in Baghdad station**.** Data about total cloud taken for three levels (high, middle, and low) clouds cover Baghdad city for rainy season from Uruapan medium Rang for casting (ECMWF) for year 2015 in Baghdad station. Calculating the monthly frequencies of the cloud cover. The highest frequency of high, medium, low and total clouds at 0octa in all months. Medium cloud cover lowest values or recurrence at (1, 2, 3, 4, 5, 6, 7, 8) octa.

Keywords: Cloud cover, Frequency, Observe, Classification, Baghdad.

الخلاصة

عند تطور العلوم ازداد الاعتماد على الغيوم من خلال معرفه انواعها واشكالها وارتفاعاتها والتغيرات المناخيه التابعه لها حيث انشئت مراصد ومنضومات قادره على رصدها من سطح الارض وكذالك من الفضاء بواسطة الاقمار الصناعيه. يهدف هذا البحث الى حساب التكرار الشهري للغطاء الغيمي في محطة بغداد. لذا تم اخذ بيانات الغطاء الغيمي العالي والمتوسط والواطئ والكلي فوق مدينة بغداد من المركز الاوربي للتنبؤات متوسطة المدى (ECMWF) لسنة 2015 في محطة بغداد. تم حساب التكرارات الشهرية للغطاء الغيمي. اعلى تكرارات للغيوم العالية والمتوسطة والواطئة والكلية عند 0Octa في جميع الاشهر والغطاء الغيمي المتوسط اقل قيم او تكرار معدوم عند octa (1, 2, 3, 4, 5, 6, 7, 8).

Introduction

Clouds is a phenomenon of condensation occurring water vapor in the sky, and rely on posed in the amount of moisture and the degree of stability of the air from the wind and blowing air classroom [**1**] [**2**], The types of clouds are [**3**]:

Stratus clouds class which is that when it is formed low air progressing with Stratus any form compact layers between them, cover large areas of the sky, they are horizontal proliferation rather than vertical format, usually found in the air stable, and are formed when the rush of warm air currents above the air low temperature cold, divided into two types. Such as the Withdrawal of Nimbo and medium clouds, and the clouds are low Stratus less thickness was sometimes accompanied by light rain occurs when you see them in the sky.

Cumulus clouds famous cumulus clouds presence in the air cases is unstable, and that is formed by air disturbances and the influence of wind speed and intensity, named Cumulus as they accumulate on top of each other on a vertical form differs from the type of Stratus that Stretch horizontally, and when gathering clouds and accumulate in very large quantities This indicates the presence of rain and sometimes snow hail, cumulus clouds cannot see the sky through which they covered entirely, but this is expected to be rainy weather with the wind when you see the clouds cumulus and snowfall as winter months.

Can be defined Stability is a situation where the air parcel cooler than the surrounding air at the same pressure (altitude). It will decrease air parcel. Often stability associated with hurricanes when they are removed convection

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currents that make the air is reduced to give a dry, sunny conditions and instability is the case where of the air parcel is warmer than the air surrounding it at the same pressure (altitude). Parcel of air buoyant. Will Rises air parcel. And at moisture condensation will consist cumulus clouds (associated with thunderstorms) [**4**].

Materials and Methodology

Clouds Classification

There are many different types of cloud which can be identified visually in the atmosphere. These were first classified by Lamarck in 1802, and Howard in 1803 published a classification scheme which became the basis for modern cloud classification. The modern classification scheme is used by the UK Mete. Office, with similar schemes used elsewhere, classifies clouds according to the altitude of cloud base [**5**], there being three altitude classes: low, medium and high clouds [**6**].

High level clouds

Ranges from how high clouds high level between the base (8-4) km, and in the tropics top of clouds extending to 20 km [**7**] and are given the prefix "cirro" Due to cold tropospheric temperatures at these levels, the clouds primarily are composed of ice crystals, and often appear thin, streaky, and white (although a low sun angle, e.g., near sunset, can create an array of color on the clouds). The three main types of high clouds are cirrus, cirrostratus, and cirrocumulus Shown in Figure 1.

Cirrus Cloud (Ci):

Base is typically between 20,000 and 40,000ft in the UK, and may be considerably higher in the tropics. Cirrus clouds do not produce precipitation which reaches the ground, though streaks of particles (known as fall streaks) are often observed below these clouds. Various halos and other optical effects may be produced by cirrus cloud. In some cases these clouds are also thick enough to hide the sun. Cirrus clouds typically form at temperatures below -40^{o}C and consist entirely of ice particles.

Cirrostratus Clouds (Cs):

Cirrostratus clouds are difficult to spot and appear as a pale, milky lightening of the sky. Cirrostratus clouds never block out the sun completely, but rather produce a variety of optical effects.

Cirrocumulus Clouds (Cc):

Cirrocumulus clouds are usually a transitional phase between cirrus and cirrostratus clouds. Large numbers of cirrocumulus clouds may indicate poor weather is approaching.



Cirrostratus Clouds (Sc) Cirrus Cloud (Ci) Cirrocumulus Clouds (Cu)

Figure 1: The high level clouds [**8**].

Medium level clouds

The foundations of clouds in the middle level of the troposphere, and given to the beginning of the word "Alto " altitude base of the earth's surface (4-2) km in the polar regions, extending to 8 km in the tropics [**7**]. Depending on the altitude, time of year, and vertical temperature structure of the troposphere, these clouds may be composed of liquid water droplets, ice crystals, or a combination of the two, including super cooled droplets (i.e., liquid droplets whose temperatures are below freezing) As in Figure 2.

Altostratus Cloud (As):

Thicker forms of these clouds often produce continuous light precipitation and hide the sun or moon, though thinner forms show the sun or moon with a ground glass appearance [**5**]. Altostratus are potentially dangerous to aircraft because they can cause ice accumulation on the wings.

Altocumulus Cloud (Ac):

Can occasionally produce precipitation and be thick enough to hide the sun or moon.

Nimbostratus Clouds (Ns):

The nimbostratus cloud has no species or varieties it is a thick, wet blanket with a ragged base caused by the continual precipitation.



Altocumulus Cloud (Ac)



Altostratus Cloud (As)



Nimbostratus Clouds (Ns)

Figure 2: The medium level clouds [**8**]

Low level clouds

Height ranges between base (2-1.5) km, and normally consist of liquid water droplets or even super cooled droplets, except during cold winter storms when ice crystals and snow comprise much of the clouds Shown in Figure 3.

Stratus Clouds(St):

Stratus clouds are the lowest forming and are often called fog or mists when they are earth-bound Stratus clouds are formed when a large air mass cools at the same time (e.g. a warm air parcel drifts into or above a cooler region).

Cumulus Cloud (Cu):

Though often temperature rises after formation, leading to an increase in cloud base height. These clouds are generally formed by air rising as a result of surface heating and may occasionally produce light showers.

Stratocumulus Cloud (Sc):

Though sometimes may be higher. While not generally producing precipitation these clouds may produce drizzle, particularly in hilly or coastal areas, and may be thick enough to obscure the sun or moon. These clouds consist entirely of liquid drops and are often formed close to the top of the planetary boundary layer.

Cumulonimbus cloud (Cb):

These clouds associated with thunderstorms, which May exceed speed (100Km / h) which is in the form of clouds or a separate part of the clouds high peak white lines while Opaque base completely, consists of the lower layers contain water droplets and upper crystals. This icy clouds formed by the presence of large air moisture as well as thermal currents carry severe.



Cumulus Cloud (Cu)



Stratus Clouds (St)



Cumulonimbus cloud (Cb)



Stratocumulus Cloud (Sc)

Figure 3: The low level clouds [**8**].

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Results and Discussion

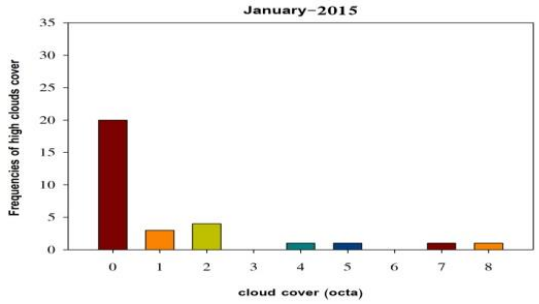
Through Tables 1, 2, 3 and 4, and Figures 4, 5, 6, and 7 illustrating the monthly frequencies for cloud cover (high, medium, low, and total) in Baghdad station for year 2015 by calculating the amount of (high, medium, low and total) daily cloud cover in Baghdad station and its frequency during the month.

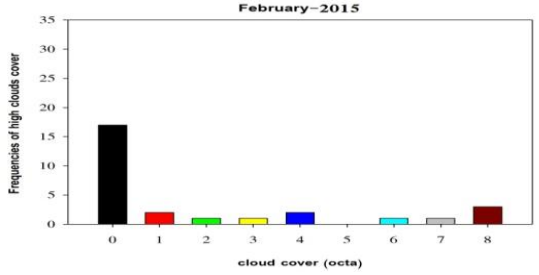
High Clouds Cover

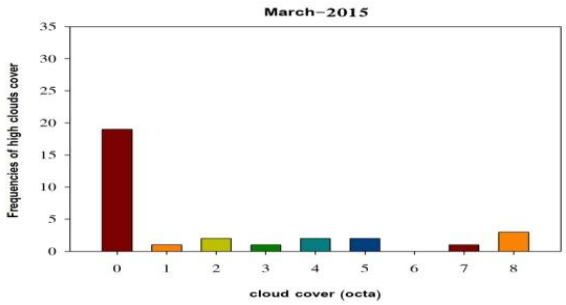
Through Table 1, and Figure 4, the highest repeat values for high cloud cover are found at 0octa and the lowest repeat values are at 6octa in all months in the year 2015.

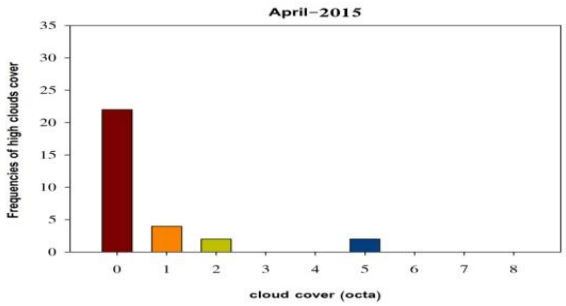
Table 1: The monthly frequencies for high cloud cover in Baghdad station for year 2015.

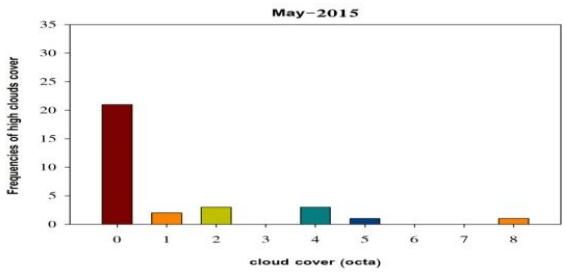
Month	Frequencies of high clouds cover								
	0	**1**	**2**	**3**	**4**	**5**	**6**	**7**	8
January	20	3	4	-	1	1	-	1	1
February	17	2	1	1	2	-	1	1	3
March	19	1	2	1	2	2	-	1	3
April	22	4	2	-	-	2	-	-	-
May	21	2	3	-	3	1	-	-	1
June	28	-	1	1	-	-	-	-	-
July	25	5	-	-	1	-	-	-	-
August	29	-	1	1	-	-	-	-	-
September	23	3	2	2	-	-	-	-	-
October	17	9	2	3	-	-	-	-	-
November	21	3	2	2	1	-	-	-	1
December	18	2	2	2	-	1	-	-	6

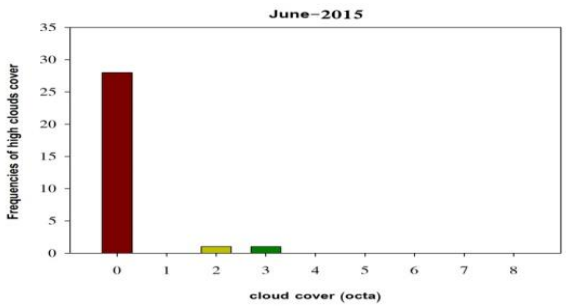


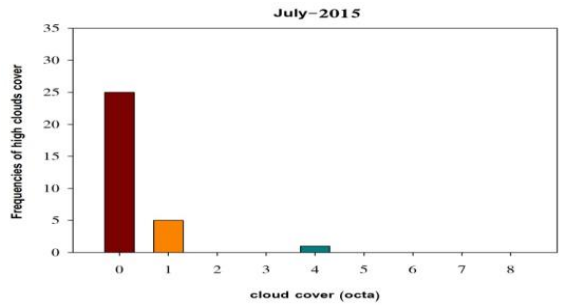


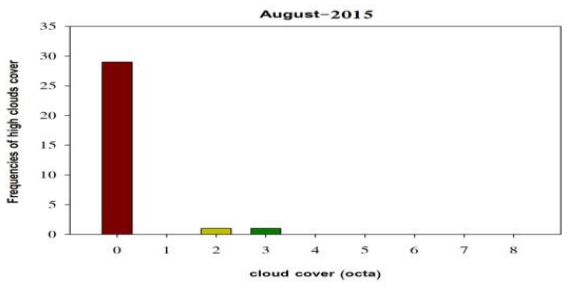












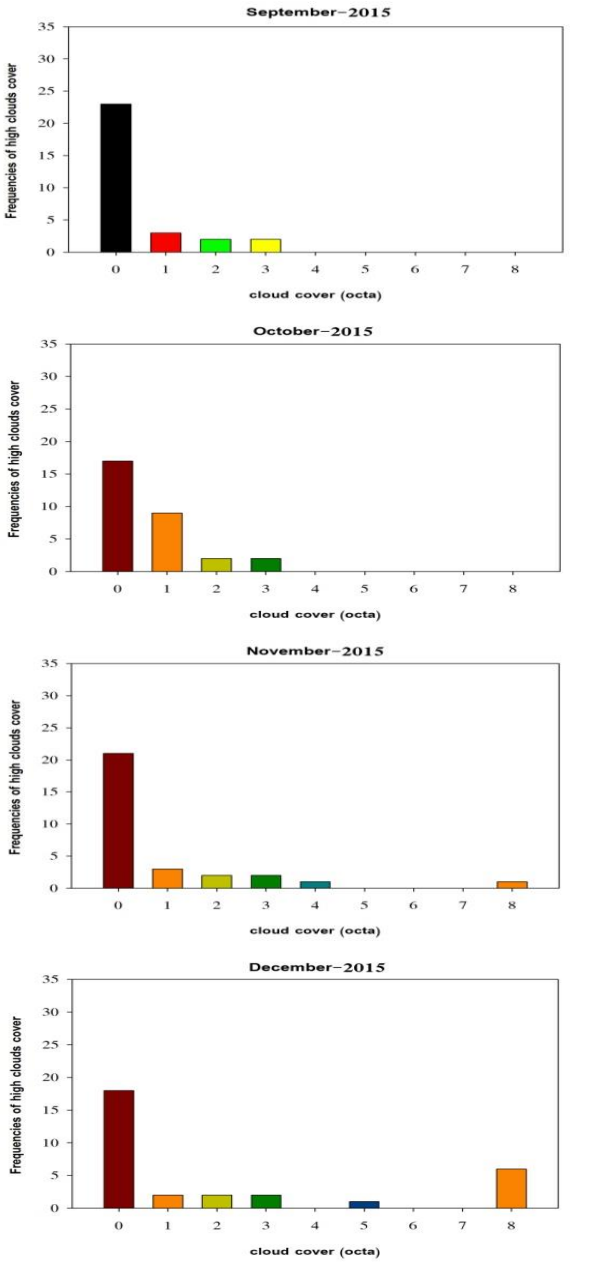


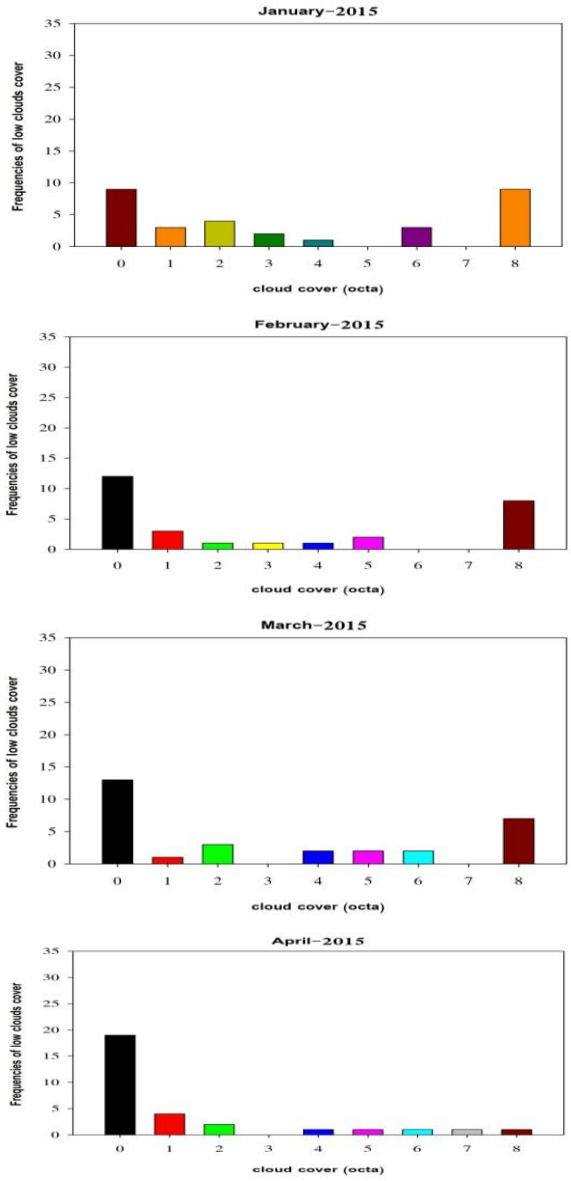
Figure 4: The monthly frequencies for high cloud cover in Baghdad station for 2015.

Medium Clouds Cover

The Table 2 and Figure 5, the highest repeat values of the medium cloud cover were found at 0octa and lowest repeat or zero values when the other cloud cover values remained in all months of the year 2015.

Table 2: The monthly frequencies for medium cloud cover in Baghdad station for year 2015.

Month	Frequencies of medium clouds cover								
	0	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
January	28	1	-	-	-	1	1	-	-
February	27	1	-	-	-	-	-	-	-
March	30	-	-	-	-	-	-	-	1
April	29	1	-	-	-	-	-	-	-
May	31	-	-	-	-	-	-	-	-
June	30	-	-	-	-	-	-	-	-
July	31	-	-	-	-	-	-	-	-
August	31	-	-	-	-	-	-	-	-
September	30	-	-	-	-	-	-	-	-
October	30	-	1	-	-	-	-	-	-
November	23	2	-	2	1	-	1	-	1
December	27	1	-	-	-	2	-	1	-



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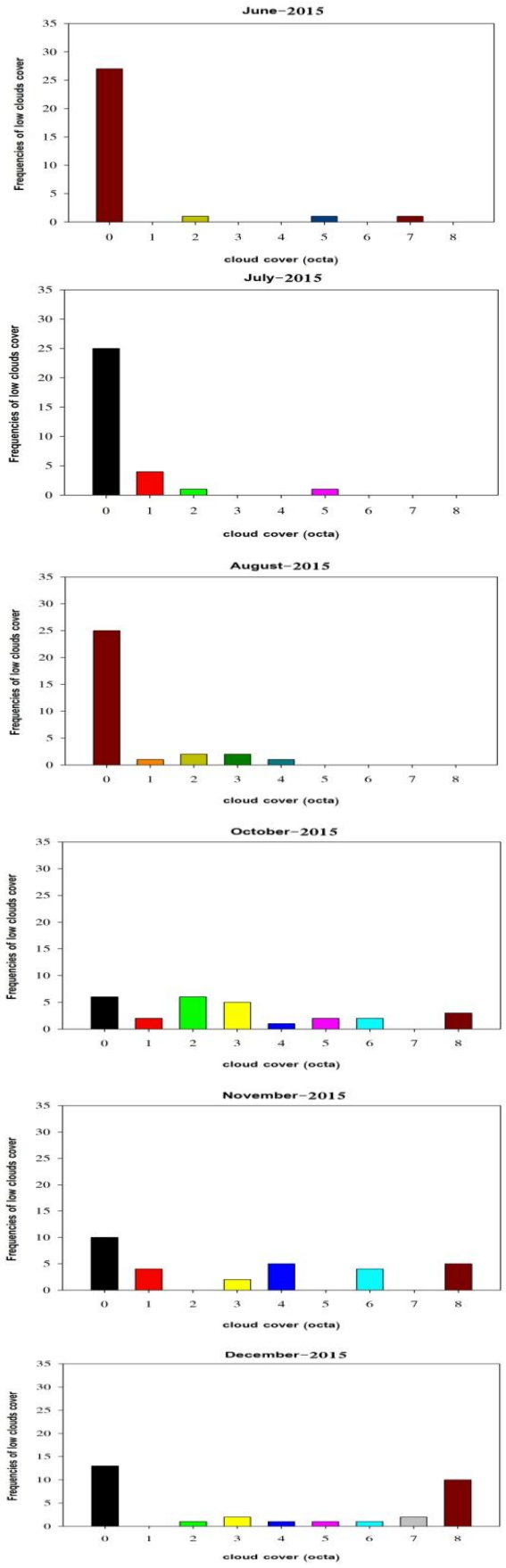


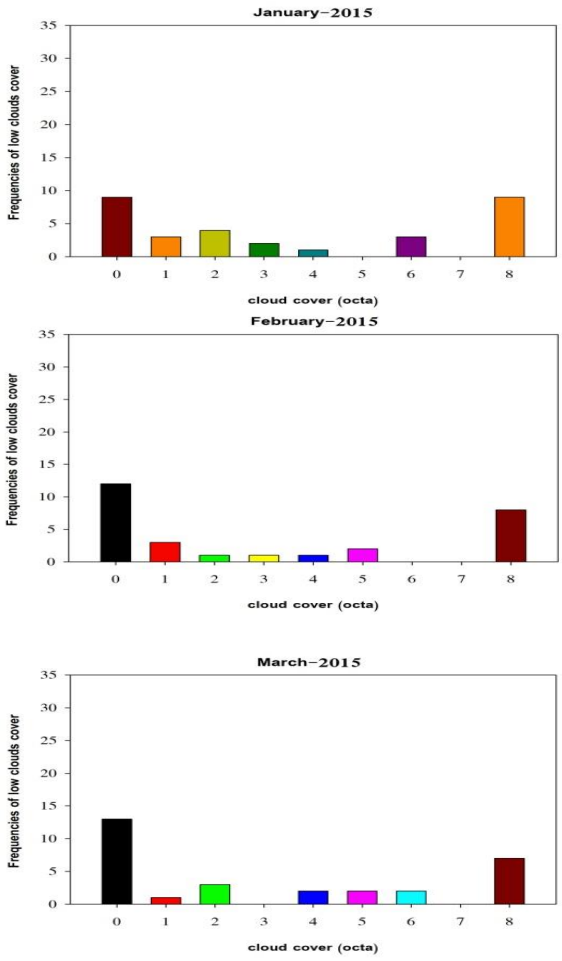
Figure 5: Monthly frequencies for medium cloud cover in Baghdad station for year 2015.

Low Cloud Cover

Through the Table 3, and Figure 6, the highest repeat values for the low cloud cover were found at 0octa and lowest repeat values at 7octa in all months of the year 2015.

Table 3: The monthly frequencies for low cloud cover in Baghdad station for year 2015.

Month	**Frequencies of low clouds cover**								
	0	**1**	**2**	**3**	**4**	**5**	**6**	**7**	8
January	9	3	4	2	1	-	3	-	9
February	12	3	1	1	1	2	-	-	8
March	13	1	3	-	2	2	2	-	7
April	19	4	2	-	1	1	1	1	1
May	14	2	2	1	1	4	1	3	3
June	27	-	1	-	-	1	-	1	-
July	25	4	1	-	-	1	-	-	-
August	25	1	2	2	1	-	-	-	-
September	15	3	4	3	1	1	-	1	2
October	6	2	6	5	1	2	2	-	3
November	10	4	-	2	5	-	4	-	5
December	13	-	1	2	1	1	1	2	10



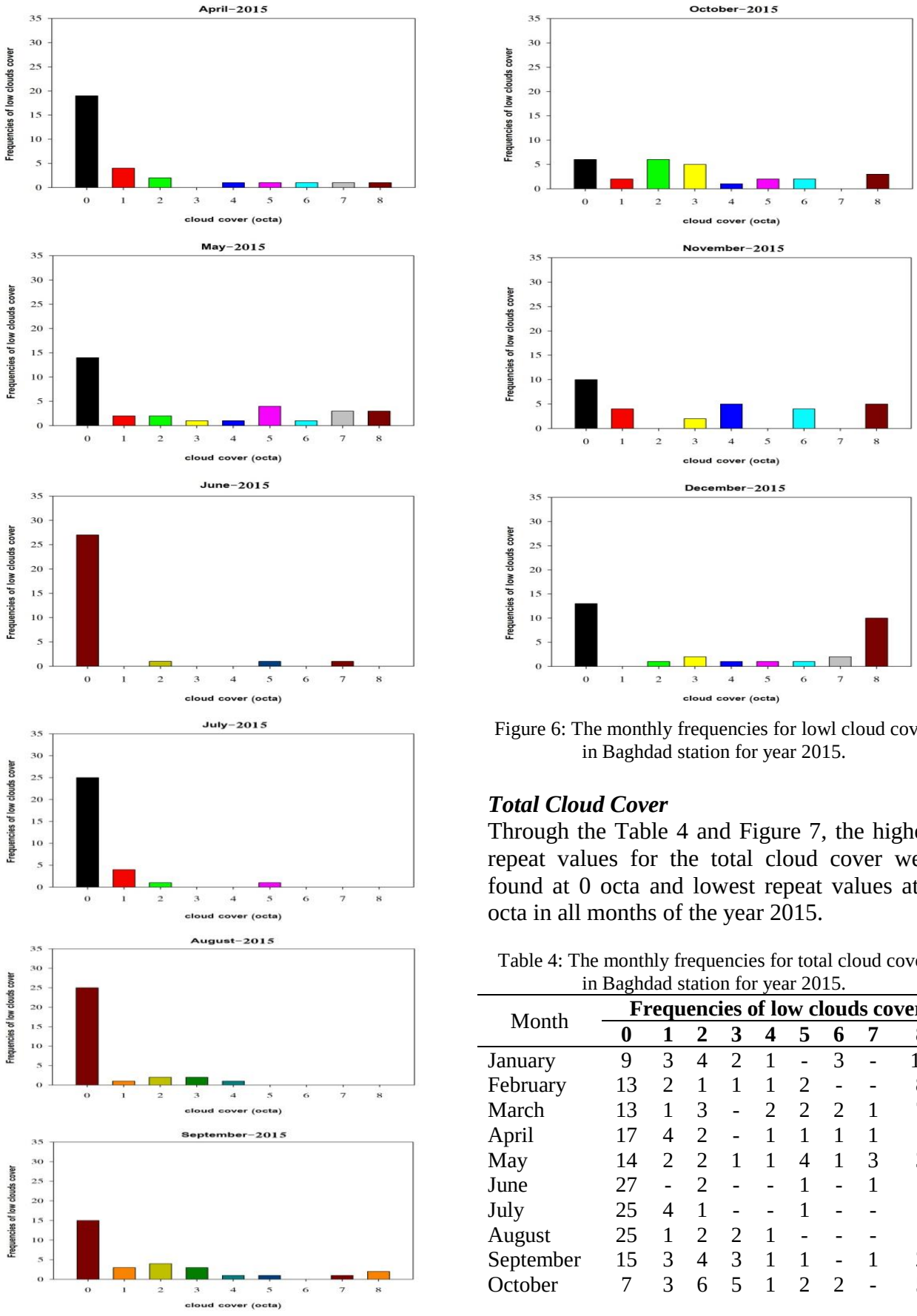


Figure 6: The monthly frequencies for lowl cloud cover in Baghdad station for year 2015.

Total Cloud Cover

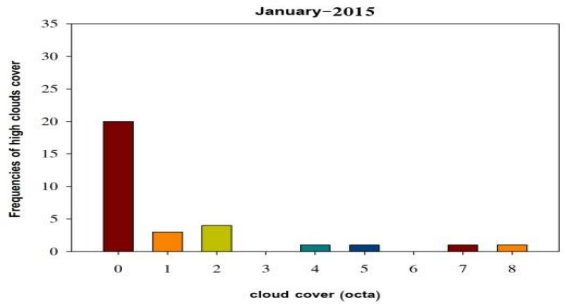
Through the Table 4 and Figure 7, the highest repeat values for the total cloud cover were found at 0 octa and lowest repeat values at 6 octa in all months of the year 2015.

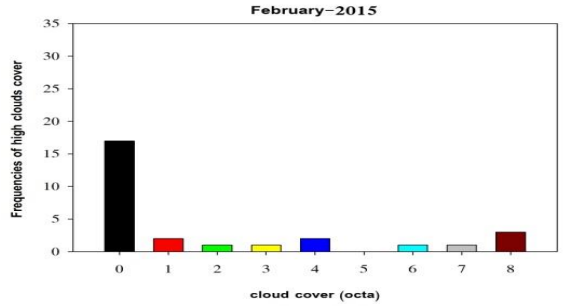
Table 4: The monthly frequencies for total cloud cover in Baghdad station for year 2015.

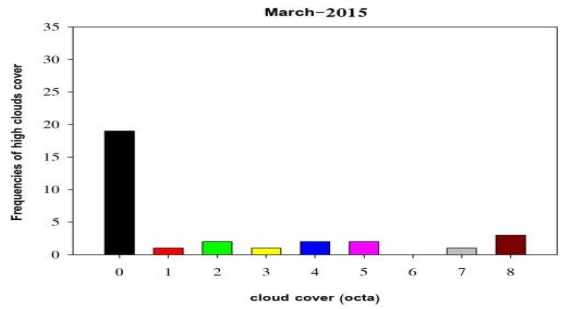
Month	Frequencies of low clouds cover								
	0	**1**	**2**	**3**	**4**	**5**	**6**	**7**	8
January	9	3	4	2	1	-	3	-	10
February	13	2	1	1	1	2	-	-	8
March	13	1	3	-	2	2	2	1	7
April	17	4	2	-	1	1	1	1	1
May	14	2	2	1	1	4	1	3	3
June	27	-	2	-	-	1	-	1	-
July	25	4	1	-	-	1	-	-	-
August	25	1	2	2	1	-	-	-	-
September	15	3	4	3	1	1	-	1	2
October	7	3	6	5	1	2	2	-	5

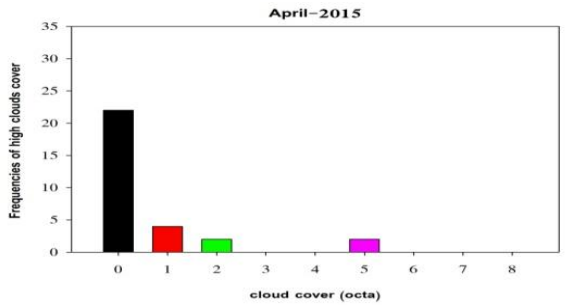
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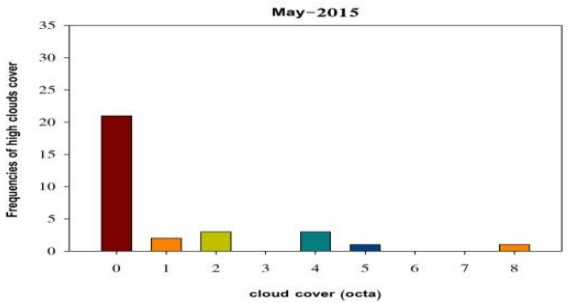
November	10	4	-	2	5	-	4	-	5
December	13	1	2	1	1	1	1	2	10

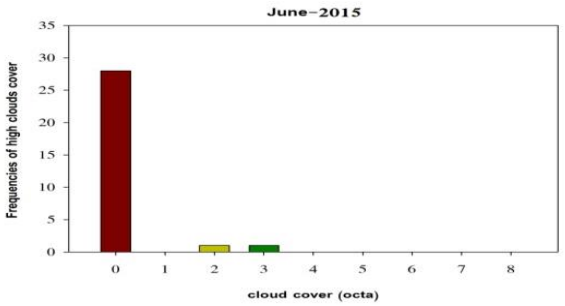


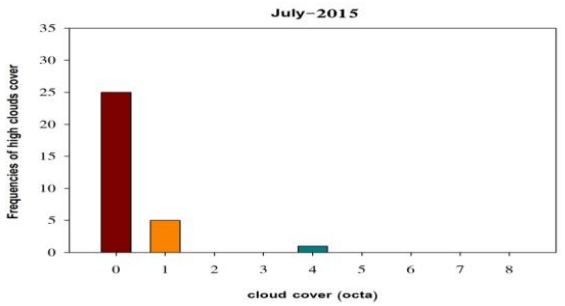


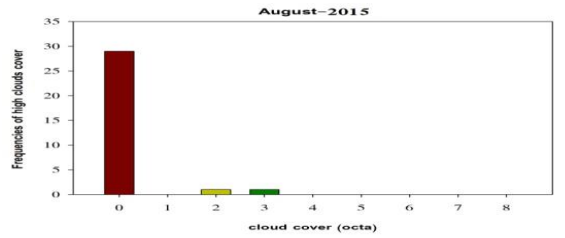


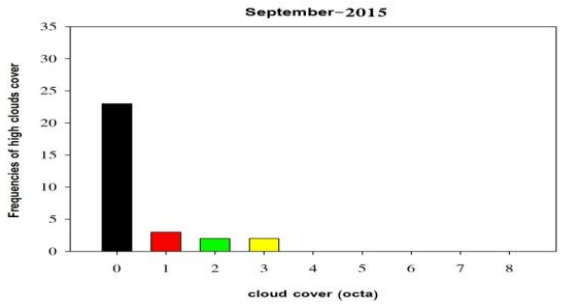


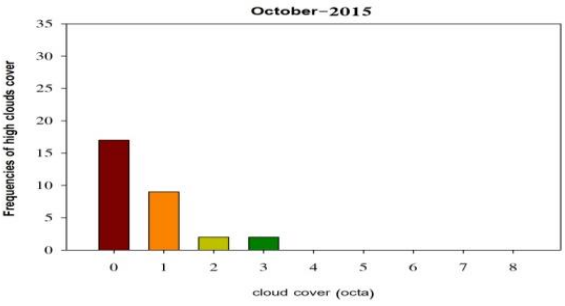


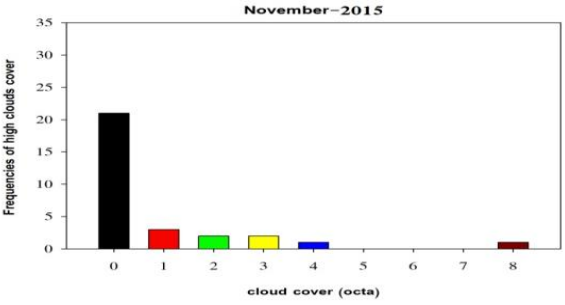












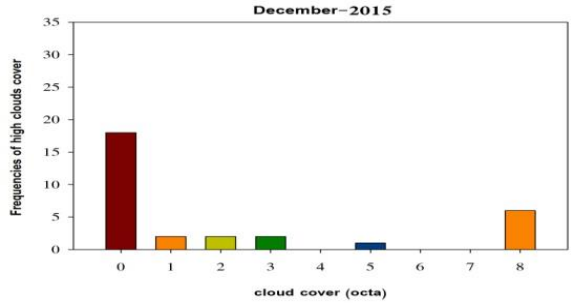


Figure 7: The monthly frequencies for total cloud cover in Baghdad station for year 2015.

Conclusions

1. The largest recurrences of high, medium, low and total at 0octa of all the month
2. The high cloud cover at 1octa in October is 9 recurrences and at 8octa in January 6 recurrences.
3. medium cloud cover Lowest values or none recurrence at (1,2,3,4,5,6,7,8) octa.
4. The low cloud cover at 8octa in January and December 10 recurrences.
5. Total cloud cover highest frequency in 8octa in January and December 10 Frequency.
6. The values are different in all other cloud cover values.

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