THE NEFIC CONDITIONS IN HUEDIN DEPRESSION

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Abstract

The purpose of this paper is to study the characteristics of the nebulosity from Huedin depression habitat. In this paper I tried an analysis of the evolution of the monthly and annual condition of the total and inferior nebulosity, its frequency, as well as the frequency of the types of clouds.

The analysis of this climatic element was realized based on the data found in the tables of meteorological observation over the period of 39 years, from the station studied.

Key words: nebulosity, frequency, clear sky, covered sky.

INTRODUCTION

Nebulosity represents the degree of sky cloud coverage and it is expressed in tenths of covered sky.

In the meteorological practice there is a total nebulosity which refers to all the clouds existent on the sky in the moment of observation, and a partial nebulosity, which refers to the clouds situated in the inferior story.

The varied aspect of the clouds is given by the microphysical structure and by the processes its showing and development is based on.

The main factors that determine the emergence of nebulosity are: the atmospheric circulation, atmospheric humidity, underlying surface (topography, geological structure, vegetation), seasons, anthropogenic factors (pollutants). The presence of the solid particles in the atmosphere determines the growth of the nebulosity, because they constitute condensation nuclei. The clouds influence the evolution of the other climatic elements through the degree of which the sky is covered with clouds, through shape, duration and formation. Therefore, the nebulosity influences the conditions of the radiative-caloric balance of the earth surface and atmosphere, and the type and frequency of clouds influences the duration, intensity and type of precipitations.

MATERIAL AND METHODS

In order to realize this study I used a series of methods. The main methods used are: analysis method, deductive method, comparison method, statistic-mathematic and graphic method.

The utilization of the methods and means characteristic to the climatological research, had as a purpose a very accurate available data processing, following the role the relief plays as a climatic factor in the evolution of nebulosity.

With the help of the statistic-mathematic methods we processed the data from the A.N.M. Archives. The results obtained through statistical and mathematical methods were then presented graph to clearly emphasize the variability in time of the climatic element.

To highlight the characteristics of nebulosity Huedin Depression (560 m), we used data from the period 1970 to 2008 obtained from visual observations.

RESULTS AND DISCUSSION

The monthly and annual condition of nebulosity

The annual average of the total nebulosity in Huedin Depression is 5.9 tenths.

The character of nebulosity in the warm period is totally different from the cold period of the year. The evolution of the total nebulosity from a month to another, during a year, shows that the greatest values are recorded during the winter, in December (6.9 tenths), when the thermodynamic processed are alleviated.

The maximum values from the winter months, recorded in lower areas, are a result of the frontal activity given by the intensification of the activity of the Polar Mobile Anticyclones which transports cold air to the central south-eastern regions of Europe and by the activation of the Island Anticyclone, that descends towards lower latitudes.

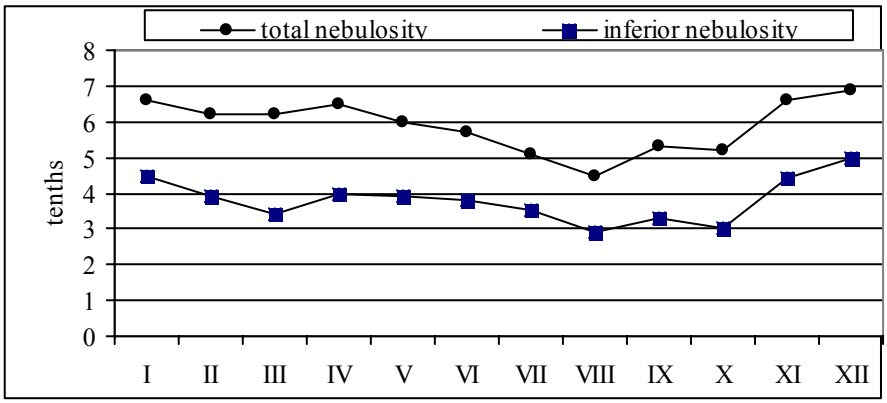

Figure 1 Anual activity of the total and inferior nebulosity at Huedin, during 1970 – 2008

The travel of the Polar Mobile Anticyclones towards lower latitudes is a result of the intensification of the activity of the mediterranean cyclones that bring humid and instable masses of air, they have a smaller pressure and attract the air masses with a higher pressure. At the contact of the 2 baric forms there will be thermic inversions, the fog is formed, as well as stratiform clouds, which have a higher degree of sky cloud coverage.

The smallest values of the nebulosity are recorded in August and are determined by the presence of the masses of air of the continental-tropical origin, with masses of warm and dry air, strong insolation that determines the evaporation of the condensing products, reduced air humidity. These smaller values are, also, determined by the fact that in the warm season the cumuliform clouds are developed, clouds that develop more vertically and less horizontally. Therefore, the values are in between 4.5 tenths in August and 5.1 tenths in July (see figure 1).

The annual average of the inferior nebulosity is influence by altitude and local conditions, in general it grows with the altitude and in Huedin this records 3.8 tenths.

The monthly course of the inferior nebulosity is similar to the course of the total nebulosity, therefore the maximum values are recorded during the winter, in December, 5 tenths and the smallest values are recorded in August, 2.9 tenths.

The frequency of the nebulosity

The number of days in which the sky is totally or partially covered constitutes the frequency of the nebulosity. In order to appreciate the sky cloud coverage degree it was established after the daily average value (the mean of the 4 climatological terms) two types days: cloudless and covered days.

Through day with clear sky we mean the day in which the sum of the recorded nebulosity recorded at climatological hours (0, 6, 12, 18) does not pass 4 tenths.

Through day with covered sky we mean the day in which sum of the recorded nebulosity recorded at climatological hours (0, 6, 12, 18) is at least 32 tenths.

The number of days with clear and covered sky

The average multiannual number of the days with clear sky records a value of 51.5 days. The number of days with covered sky is a lot higher than the one of the clear sky day, its average multiannual value is 111.7 days.

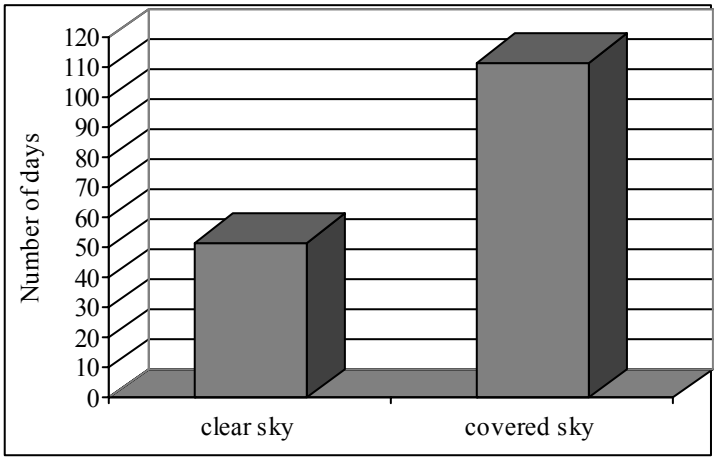

Figure 2 Average number of days with clear and covered sky in Huedin, during 1970 – 2008

Analyzing the multiannual monthly values of the days with clear sky we discover that there are the smallest in April with an average of 2.4 days.

The biggest monthly number of days with clear sky is being recorded in August with 7.5 days (see figure 3).

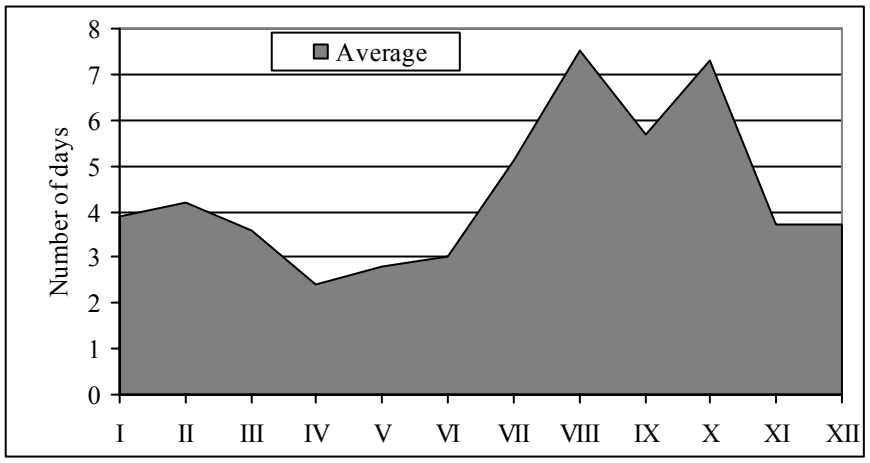

Figure 3 Average monthly number of days with clear sky in Huedin

During the year, the biggest number of days with covered sky is recorded in the winter months, therefore in December we have the maximum value of 14.5 days, and the smallest number of days with covered sky is registered in August with 4.3 days (see figure 4).

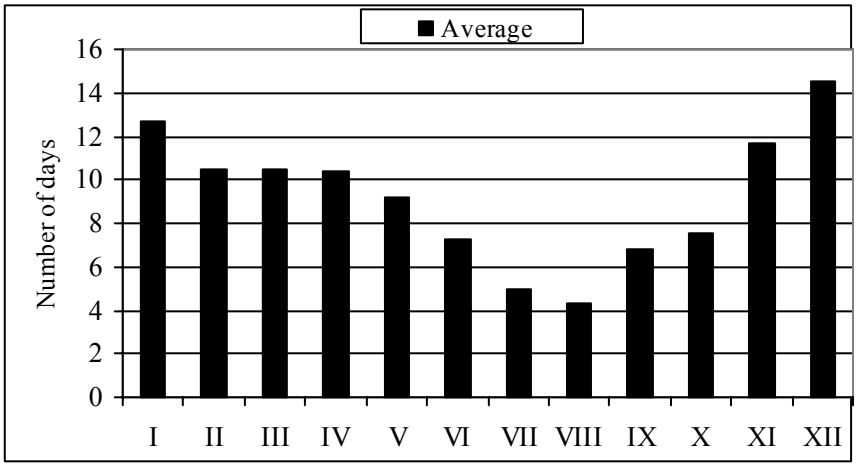

Figure 4 Average monthly number of days with covered sky in Huedin

The frequency of clouds types

The frequency of different types of clouds, their shape and height differ depending on altitude, latitude, physical geographical factors, type of air mass or atmospheric front, thermical or dynamical convection.

Analyzing the annual values of the different types of clouds from the Huedin Depression we establish that the biggest frequency belong to the *Altocumulus* clouds with 24.7%. The clouds with the smallest frequency are *Cirrocumulus* clouds with 0.4% (see figure 5).

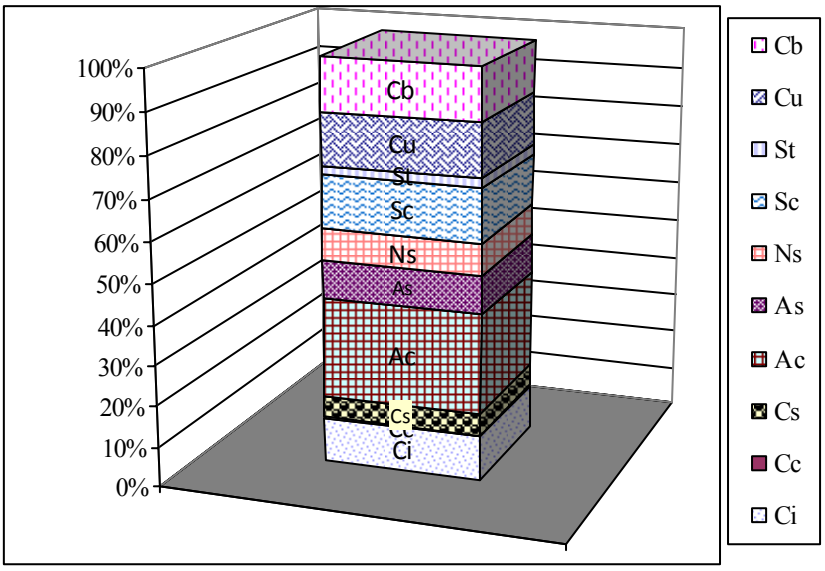

Figure 5 The annual frequency of the types of clouds in Huedin, during 1970 – 2008

Among the superior clouds, *Cirrus* clouds have the biggest frequency, 11%, in the analyzed area. Among the clouds found in the middle story, *Altocumulus* have the biggest frequency, followed by the *Altostratus* with a frequency of 9.5%. The inferior clouds with the biggest frequency are *Stratocumulus* with 13.2%. The most rare in this floor are the *Stratus* clouds with values of 2.2%.

Among the clouds that develop vertically, the most common are the *Cumulonimbus* with a frequency of 13.2%. The *Cumulus* clouds can be found in a percent of 13.1 (see figure 5). The frequency of the clouds that develop vertically grows with the altitude, maximum values being recorded in high areas.

Analyzing the monthly frequency of the types of clouds we can notice that in the summer months the clouds with vertical development are predominant, therefore the *Cumulonimbus* clouds are more frequent during June with 25.3%. *Cumulus* clouds are more frequent during July with 20.8%. From the inferior clouds story, *Stratocumulus* have the biggest values. *Stratus* clouds have a smaller frequency, found mostly during the winter months. Their values are between 7.1% in January and 0.3 – 0.4 in the summer months.

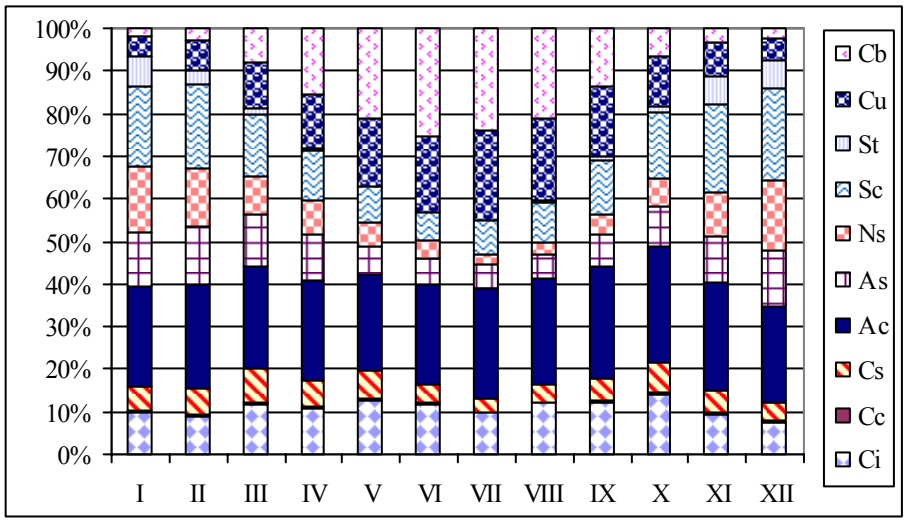

Figure 6 The monthly frequency of the types of clouds (%) in Huedin, during 1970 – 2008

Among middle clouds with higher frequency we find *Altocumulus* clouds and they have a uniform repartition throughout the year, maximum values are recorded during October and minimum values in December. Therefore at Huedin the maximum value is recorded in October with 27.4%, and the minimum value in December of 22.4%.

Among the superior clouds, *Cirrus* clouds have the biggest frequency, maximum values being recorded in October, therefore values between 14.3% in October and 7.7% in December. The *Cirrocumulus* clouds are the most rare clouds in the area examined, with a monthly frequency between 0.2% - 0.5% cases (see figure 6).

CONCLUSIONS

The multiannual average of the total nebulosity in Huedin Depression records 5.9 tenths. During a year, the biggest values are recorded in the winter, in December (6.9 tenths), when the thermodynamic processes are attenuated, and the smallest values are recorded in August and are determined by the presence of air masses of tropical continental origin, with dry and warm air masses, strong insolation that determines the evaporation of the condensing products, air humidity reduced. These smaller values are also determined by the fact that in the warm season the cumuliform type of clouds are developing, more vertically than horizontally.

The annual average of the inferior nebulosity is influenced by the altitude and local conditions recorded with 3.8 tenths. The monthly course goes similar with the one of the total nebulosity, therefore the maximum values are recorded during the winter, in December 5 tenths, and the minimum values in August, 2.9 tenths.

The multiannual average number of the days with clear sky is recorded with a value of 51.5 days, while the number of days with covered sky is a lot bigger, recording 111.7 days.

Throughout the year, the multiannual monthly values of the days with clear sky are smaller in April with an average of 2.4 days and are a lot bigger in August, 7.5 days.

Throughout the year, the biggest number of days with covered sky is recorded during the winter, in December with the value of 14.5 days, and the smallest number is recorded in August with 4.3 days.

In Huedin Depression, the *Altocumulus* have the biggest frequency, with 24.7%, and *Cirrocumulus* have the smallest frequency. In monthly conditions, in the summer months the clouds with vertical development are more prevailing, therefore the *Cumulonimbus* clouds are more frequent, in June with 25.3% of cases.

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