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# THE BALNEARY AND CLIMATIC POTENTIAL OF OGLINZI RESORT

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**Abstract:** This paper presents the balneary and climatic potential of the resort Oglinzi, underlining certain aspects regarding climate, bioclimate and air ionization. The resort can use these therapeutic natural factors to practice climate therapy, extremely important in North Moldavia.

## Introduction

Oglinzi resort is situated in the North-East Romania, on the western part of the Moldavian Marginal Corridor, 4 km North-West of Targu Neamt city. The hilly area has a large opening and a slight inclination towards the Moldavian Corridor and it is closed by Moldavia's sub-Carpathians in the North-West. The altitude of the resort is between 390- 430 m with Culmea Plesului in the North-West of the city, reaching over 680 meters in altitude, even 915 in the North.

The balneary and climatic potential of the resort is represented by the following therapeutic natural factors: mineral waters- chlorides, sodics, hypertonic, out of which 4 wells can be exploited at present and 4 drillings have small flow rates and cannot be exploited; the resort's bioclimate is sedative irrespective of the sparing; the air ionization shows the air enriched with negative ions.

## 1. Working methods

The specific values of the climatic parameters were obtained on the basis of the measurements at the closest meteorology station – Targu Neamt, between 1961 and 2006, these being related to the dates in the climatologic Atlas.

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The topoclimatic determinations were established in September 2006, in a period with fewer tourists / when there were not many tourists, in 3 observatory places.

Based on the temperature, relative humidity, steam tension and wind data, the following bioclimatic indexes have been estimated:

- *thermo comfort*, EET values (effective equivalent temperature) obtained by means of the Yakovenko diagram – usual scale (Baibakova - 1964, Teodoreanu - 1984)

- *bioclimatic stress*, represented by the *cutaneous stress (*Siple, Passel - 1945, Besancenot - 1974, Teodoreanu, Dacos - 1980*)* and lung stress (scale J.P.Nicolas, Besancenot - 1974, Teodoreanu - 1984); both use the same parameters as thermo comfort, with the difference that the stresses emphasize more the monthly averages, unlike thermo comfort which uses especially hour values;

*The determination of air ionization* conditions was made by means of an Ebert type ion counter with bifilar electrometer. Its purpose was to establish negative and positive ion concentration and also unipolarity rate. The period and also the observatory places were the same like for the topoclimatic determinations.

**2. Climatic, bioclimatic and air ionization data**

Air temperature is an altitude dependent element and presents an evolution related to the major relief of the area. Therefore, the average annual temperature has a value around 8.2 °C. The coldest month of the year is January when the average temperature is -3.3 °C, and the hottest month is July with the average value reaches 19.1°C.

The absolute maximum temperature, 36.9°C was recorded in August 2000 and the absolute minimum -10.9 °C recorded in January 1963.

The average number of winter days (maximum temperature $\leq$ 0°C) is around 42 days per year; winter may even begin in October and last until April.

The average number of summer days (maximum temperature $\geq$ 25°C) is around 48 days per year.

The nebulousness is a factor depending on altitude, relief and position to predominant air masses. The annual average nebulousness is around 5-6 tenths, the months with the lowest value of nebulousness being July, August and September. The months with the highest value of nebulousness are December, January and February.

The sun shining duration has an annual average of 2031.5 hours, the highest values registered in July- August, with over 250 hours/month.

The relative air humidity, an element depending on air temperature, which represents the ratio between the steam tension at a certain moment and the maximum tension, presents an annual average of 79%. The highest values of this

parameter are registered in winter months (84% - November and December) and the lowest humidity is registered in spring months (73% April, May).

The average annual quantity of precipitation registers over 630 mm in the studied area. The biggest quantities of precipitations are registered during the hot season but anyhow they do not rise above the monthly value of 105 mm (June, July). In winter, these quantities are reduced, even under 20 mm in February.

The snow layer is related to altitude. The average number of days with snow layer for the studied area is around 28 days/ year, the months with the snowiest days being January and February.

The atmospheric pressure decreases along with the altitude, and has an annual average of 970.8 mb. The evolution of atmospheric pressure during the year is characterized through a maximum registered in autumn (September and October- 974.2 mb) and a minimum in summer (June- 969.1 mb).

The wind conditions are determined by the activity of the main baric centers operating on our country, modified locally by relief. The main wind direction is from North-East and South-East, but on the corridors and valleys in the area it may be noticed an entering of the west winds. The average value of wind speed doesn't rise above 3m/s, with the maximum speed of 3.6 m/s in April and the minimum of 2.4 m/s in July.

The relationship between the climatic elements and the human body is best represented through the bioclimatic characterization. The climatic factors are considered sedative in certain meteorological conditions, between certain limits and they do not influence the form of an organism. They create a comfortable and relaxing environment, and climatic stability. Except for these tolerance limits, the climatic factors can act upon the organism, in certain cases as stimulants, in other cases they become demanding, their action being too strong.

The meteorological data regarding temperature, humidity and wind, daily values, for the month of July, at 13:00 PM, the period between 2000 and 2005, were used for the bioclimatic characterization.

*The thermo comfort* is a bioclimatic method frequently used indicating the rate between air temperature and wind on one hand and comfort and discomfort condition of the organism on the other hand. The comfort area for our country has been estimated between 16.8 and 20.6°C (Hygiene Institution).

For the determination of the effective temperature (ETT), the Jacovenko nomogram (1927, cf. Baibakova et. al., 1964, Teodoreanu, 1980) was used for normal scale (lightly dressed man, making gentle moves). The most number of days with thermo comfort, around 10 days, are registered in July, around noon.

*Air baths* are useful to practice air therapy in best conditions. Air baths were measured in relation with the local dynamic and hygrometric conditions and thermo baths. We can approximate that the medium dynamic air baths prevail, with

wind speeds that do not exceed 3.4 m/s except in April (3.6 m/s) and wet air baths with a relative humidity between 71- 85 % during the whole year.

The bioclimatic stress indexes represent, like thermo comfort, a complex relationship between three basic meteorological elements (temperature, humidity and air currents) in the biological relation between environment and human body.

The *cutaneous bioclimatic stress* refers to the feeling of hot and cold that human body experiences at the skin level in the process of thermo regulation. The cutaneous stress presents an annual average index of 26, this value representing the sum up of night-time stress index and the day- time one during the 12 months of the year. In these conditions the *relaxing months*, which do not demand thermo regulation are April, May, June, September and October.

Tab. 1 - Air ions concentration in the hot season in some resorts in Romania

| Resort<br>Altitude | S ($n_+ + n_-$)<br>ions/cm$^3$ |
|---|---|
| VATRA DORNEI<br>(850m) | 1265 |
| MONEASA<br>(280m) | 1230 |
| STÂNA DE VALE<br>(1100m) | 1200 |
| CĂCIULATA<br>(300m) | 1174 |
| SOVATA<br>(500m) | 1170 |
| OGLINZI<br>(400m) | 1180 |
| BUCUREŞTI<br>(center) | ≤ 400 |

During *summer*, the meteorological conditions are favorable for the release of thermolysis; the index that expresses this relation is *hypotonic* and in Oglinzi, it resort occurs in July and August.

During *winter* time, stress is produced through the solicitation of thermogenesis, the index is *hypertonic*, corresponding to the months of January, February, March, November and December. This type of stress has a stimulating effect, which demands physiologic functions, muscular tonus strengthens and body vitality generally increase.

*Bioclimatic lung stress* is based on the steam in the atmosphere, used by human body in the breathing process. It has an annual average index of 31, value

resultant from the sum up of the night-time stress with the day-time stress during the 12 months of the year. The lung stress presents *two balanced months* (non-stressful), May and September.

From November until March we have a *dehydrating index*, characteristic for winter months and from May to September we have a *hydrating index*, characteristic for summer months, much easier to bear because it's emollient for the mucous.

*Bioclimatic absolute stress* represents the result of the sum up of the two former stresses. For the area of Oglinzi this presents a rate of 57. This together with the altitude and the climatic conditions allow us to define the bioclimate in Oglinzi resort as sedative- indifferent.

Considering the air ionization measurements done in Oglinzi resort, we may say that the level of air ions content indicates air electric conditions situated among the average rates from other tourist and balneary places of interest in the country. The ion content reached, according to some measurements, over 1100 ions/ $cm^3$, which is a very high value, close to the ones recorded in a few resorts in our country. To exemplify we will provide some air ions concentration values in the hot season, in some resorts in Romania (chart 1.)

The unipolarity coefficient (the ratio between the concentration of positive ions and the one of negative ions) presented values between 0.4 and 1.6. The change from subunit values to upperunit ones appears most frequently around noon. According to over half of the measurements the ionization was prevalent negative, especially in the morning which indicates a clean air, whose electric composition is favorable for the human body.

**Conclusions**

The balneary and climatic resort of local interest Oglinzi has *continental temperate hill climate*, given to the physical and geographic conditions in which it is situated, with slight nuances of excess due to the climatic influences from the east of the continent. The values of the climatic parameters are reduced thermicaly, hydrically and dynamically by the local geographic conditions.

The sedative - indifferent bioclimate characterized by moderate climatic factors throughout the year, indicate that in these climatic circumstances the human body doesn't make a great effort to acclimatize because the stimuli received are not very intense. This type of bioclimate does not have therapeutic counter indications.

Clime therapy can be practiced in the resort starting with March until November, while the winter months are recommended only for young persons, to strengthen the body and for rest.

The sedative- indifferent bioclimate is recommended for persons that do not bear the stress of the climatic factors, for example the elders who have to take a

balneary treatment (cure) for joint pain, but who also have a serious cardiovascular disease, children with irritability problems, healthy people with over-work problems, people in convalescence.

All people taking this balneary cure in these bioclimatic conditions have to expose themselves to air, sunlight, water progressively, according to the thermo comfort state, following the doctor's indications.

It is well known that natural, rich air ionization, mainly negative has benefic results of sedation, for certain disorders: neurosis, bronchial asthma, high blood pressure, this way, increasing the balneal-medical value of the resort.

In most of the balneary and climatic resorts of our country, air ionization has modest values that do not exceed 700-1000 ions/ $cm^3$, but there are situations when they do, like in the case of Oglinzi resort. (see chart 1).

The favorable air electric climate characteristic for Oglinzi (1180 ions/$cm^3$) is the result of the absence of pollution sources in the area and also due to Culmea Plesului mountain, which acts as a protection barrier against the mentioned phenomenon and separates the resort from Targu Neamt city.

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