

## THE IMPORTANCE OF NATURAL ELEMENTS FOR THE DEVELOPMENT OF TOURISM IN NEGORSKA SPA - GEVGELIJA IN MACEDONIA

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### ABSTRACT

In this paper the natural elements are presented: geographic - orographic position, relief, climate, hydrography and geology of the area of non-forest spa. Special emphasis will be put on a weather climate and hydrothermal features, such as: air temperature, humidity, precipitation, insolation, spa features water therapy treatment, drinking and more. Features that have a direct impact on the development of spa tourism in Negorska spa - Gevgelija.

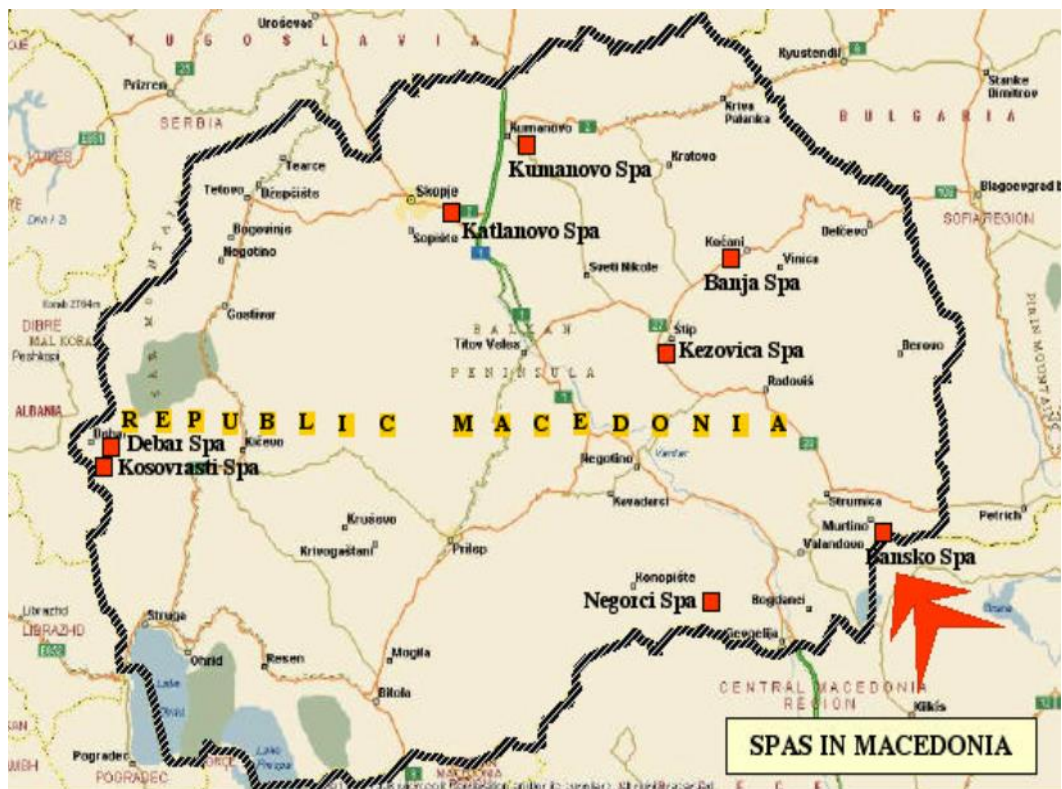
**Keywords:** natural elements, weather, climate, hydrothermal, spa tourism.

### INTRODUCTION

Gevgelija municipality occupies SE part of Macedonia, borders with a country of the European Union (Greece). It covers an area of 48.5 hectares or 485 km<sup>2</sup>. Negorci Negorski and spas are on the SE slopes of Mount Kozuf, 5 km north - west of the city of Gevgelija, and at an altitude of only 59 meters. Also, it is the lowest spa in Macedonia. This spa is considered to be used firstly by Shukri - Pasha.

### TRANSPORT CONNECTION

Here goes the highway E75 (European Corridor 10) which connects Central Europe with Greece and Asia Minor. The spa by air is connected to the world through airports in Skopje Petrovac (169km), Ohrid (262km) and Thessaloniki (99km). Vardar river, which is not navigable.



Map 1. Geopgrafska position Negorska spa in Macedonia



Map 2. Geographical location of the Municipality of Gevgelija in Macedonia

## RELIEF FEATURES

Relief rather affects the climate of the flora and fauna as well as the distribution of the population and the determination of its lifestyle. According to geological and pedological composition and morphological characteristics of the area the spa separates into different parts.

Most important for the spa Mount Kozuv where dyskinesia sides down to the spa and is an important factor for the development of tourism, especially for picnic recreational activities. Beautiful landscapes and forest vegetation provide beautiful walks.

## CLIMATE CHARACTERISTICS OF THE SPA AREA

The spa is influenced by the Mediterranean, it is located only 80 km from the coast of the Gulf. On the north it is surrounded by mountains and the continental influence from the north of Macedonia is poorly felt.

## AIR TEMPERATURE

In the period 1961-1990, Negorska spa has the highest air temperature of all spas in Macedonia 14.0 ° C, while in the period 1991-2013 year highest average annual air temperature was recorded in 2013 of 16.3 ° C. The highest temperatures occur from June to September, especially in July and August. This temperature allows excellent conditions for the hat season. In winter the temperature does not fall below zero and it provides excellent living conditions through winter, in the spa, which is a huge advantage over other spas in Macedonia. Between 1961-1990 and 1991- 2013 year notice an increase in air temperature in the area of non-forest spa of 14 ° C to 16.3 ° C.

*Table 1. Average annual air temperature in ° C in the area of non-forest spa in Gevgelija - R. Macedonia in the period 1961-1990 and 1991-2013 godina.*

Year	Medium/year
1960/1990	14.0
1991	13.8
1992	14.5
1993	14.7
1994	16.1
1995	14.6
1996	14.4
1997	14.6
1998	15.3
1999	15.7
2000	15.8
2001	15.6
2002	15.6
2003	15.2
2004	15.2
2005	15.3
2006	14.6
2007	15.7
2008	15.8
2009	15.4
2010	15.7
2011	15.0
2012	15.0
2013	16.3

Data Source: State Statistical Office of the Republic of Macedonia, Statistical year book for the period 1962-2014 year.

## PRECIPITATION

According precipitation Negorska spa has a Mediterranean regime.

**Table 2.** Annual amounts of rainfall (mm) in the area of non-forest spa - Gevgelija in Macedonia.

Year / Amount	Year
682.4	1960/1990
555.7	1991
541.7	1992
447.2	1993
752.0	1994
773.4	1995
832.6	1996
591.3	1997
657.1	1998
658.3	1999
348.7	2000
491.7	2001
948.8	2002
846.3	2003
932.7	2004
534.4	2005
889.8	2006
588.5	2007
631.4	2008
968.1	2009
970.9	2010
441.6	2011
765.9	2012
761.6	2013

Data Source: State Statistical Office of the Republic of Macedonia, Statistical yearbook for the period 1962-2014 year.

In the period 1961-1990, the maximum in the months of November and December 93.1mm 74.1mm, while the period from 1991 to 2013 year the maximum was recorded in 2010 in the months of February to October 168.0 mm 334.8 mm. According to the table we see that precipitation for the period 1961-1990 is higher by 18.4 mm in the period 1991 to 2013 year, where the average annual precipitation is 664.0 mm mean precipitation in the last 23 years of continuous decline in the area of non-forest spa. Most of the precipitation during the year in the form of rain.

## SOLAR INSOLATION

The area of non-forest spa has the lowest number of cloudy days of all spas in Macedonia. On average there are 69.4 days and a tourist importance value.

**Table 3.** A year in the amount of osonchuvanje (hours) in the area of non-forest spa - Gevgelija R. Macedonia in the period 1961-2013 year.

Among / year	Year
2374.0	1960/1990
2266.5	1991
2386.9	1992
2563.6	1993
2518.1	1994
2378.1	1995
2150.7	1996
2434.4	1997
2452.2	1998
2467.6	1999
2634.7	2000
2467.7	2001
2301.7	2002
2511.1	2003
2392.0	2004
2397.7	2005
2363.0	2006
2531.5	2007
2403.4	2008
2290.0	2009
2266.5	2010
2439.9	2011
2503.4	2012
2407.5	2013

Data Source: State Statistical Office of the Republic of Macedonia, Statistical yearbook for the period 1961-2013 year.

Total insolation between 1961-1990 totaled 2374.0 hours is one of the most important tourist values which Negorska spa has in relation to all other spas in Macedonia. The insolation is most permanent during the summer months and is very important for tourist arrivals to the spas. In the period 1991-2013, the greatest insolation was in 2000 where insolation reached 2634.7 hours. In the period 1991-2013, the average annual insolation was 2414.3 hours an increase of insolation for 40.3 hours in the period 1961-1990.

## RELATIVE HUMIDITY

Relative humidity is also a very important climate element for the curing opportunities of the spa.

Table 4. Annual relative humidity in the area of non-forest spa - Gevgelija - R. Macedonia in the period 1951-1975 and the 1991-2013 year.

Year	1951/1975	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Medium / Year	71	64	60	59	59	66	70	65	66	72	66	65	72	73	72	66	65	61	62	63	65	64	62	64

Data Source: State Statistical Office of the Republic of Macedonia, Statistical yearbook for the period 1952-1976 and the 1992-2014 year.

Between 1951- 1975 years the average annual humidity amounted to 71%, while in the period from 1991 to 2013, the highest relative humidity was in 2002 73%. In the past 23 years from 1991-2013 the average annual relative humidity amounted to 65.3%. In the period 1951-1975, the relative humidity was reduced to 5.7%.

## WINDS IN (‰)

Table 5. Average annual frequency of wind (‰) in the area of non-forest spa - Gevgelija - R. Macedonia.

Place	N	NE	E	SE	S	SW	W	NW	C
Gevgelija	224	23	70	101	73	29	27	136	317

Data Source: State Statistical Office of the Republic of Macedonia.

Winds have low speed and perform ventilation and act refreshingly. In the space of Vardarec Negorska bath appears NW wind at an annual frequency of 136 ‰, the wind moves from the mountain Kozuv along the river Sermenska. This wind occurs in the summer months of July with frequency of 238 ‰ and August of 220 ‰.

## FEATURES OF THE WATER AND CURING CAPABILITIES

Water springs have volcanic origin. There are three sources, that "hot spa", with temperature of 40 ° C, and "cold spa" with water temperature of 36 ° C, New measurements 40 ° C. In its chemical and physical properties the water is homo thermal, slightly mineralized and slightly radioactive. The main chemical composition of the water comprises of sodium sulfate. The water is used for the treatment of: a neurological disorders, gynecological disorders, respiratory disease, chronic bronchitis - laryngitis and tracheitis, chronic gastritis, ulcers and stomach cancer, inflammatory bile, inflammatory bowel disease, disorders of the locomotors system, condition after rheumatic fever, Behterova disease - initial stage, degenerative rheumatism (arthritis, spondylosis), extra-articular rheumatism, consequences of trauma and war wounding, uric diathesis in periodically stronger deterioration, cardio vascular diseases, all forms of coronary disease, chronic inflammatory motor rheumatism, chronic evolutionary polyarthritis.

## CONCLUSION

- Negorska spa has a favorable geographical position;
- The spa has a favorable road, rail and air connection;
- The spa has a favorable landscape features;
- Average annual air temperature in the period 1961-90 and 1991 / 2013year increased from 14 ° C to 16.3 ° C;
- Precipitation mostly represented by rain, precipitation in the period 1961-90 is higher by 18.4mm compared to the period from 1991 / 2013year;
- Relative humidity in the period 1991 / 2013year decreased in the period 1951 / 75year of 5.7%;
- The most common winds in the area of non-forest spa Vardarec, NW and local winds.
- Water from Negorska spa has tremendous healing capabilities.

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