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GEOGRAPHICAL POSITION AND PHYSICAL GEOGRAPHIC DEPARTMENTS IN THE REGION MARIOVO, AS PART OF THE FLOW OF THE BLACK RIVER IN THE REPUBLIC OF MACEDONIA

Abstract: The chapter on the boundaries, the size and the geographical position of the Mariovo region, the physical geographical features of the Mariovo region, geological structure and tectonics, relief features, climatic, hydrographic and pedological characteristics will be processed in the scientific paper.

Keywords: boundaries, geological, relief, climatic, hydrographic and pedological characteristics.

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1. GEOGRAPHICAL SITUATION OF MARIOVO IN MACEDONIA

The northern border of Mariovo begins North east from Prilep with the peak Livada on the Dren Mountain (1864m), the Limunsa River (1152m), the Pletvar mountain pass, the peak Markovi Kuli (1510), the maple Klen (990), the peak Smilova Tumba (1028m) Atari in the villages Galiste and Gujakovo, then the border makes one arch and cuts the River Crna at the cat (388m).

The eastern border continues along the border of village villages of Vitolishte and Klinovo to the top Elder (1027m), to the south under the peak Meshnik (1470m), the locality Arnicko and Tumba, the atarities between the villages Vitolishte and Rozen cut one edge from the spring part of the river Blashtica , And moves along the border between the villages of Polchishte and Majdan to the peak Pulevets (1165m), where it merges with the state border of the Republic of Greece, the peak Kamila (1570m), and continues to the southwest to the top Golem Kozjak (1814m) The highest peak of Kozjak Mountain.

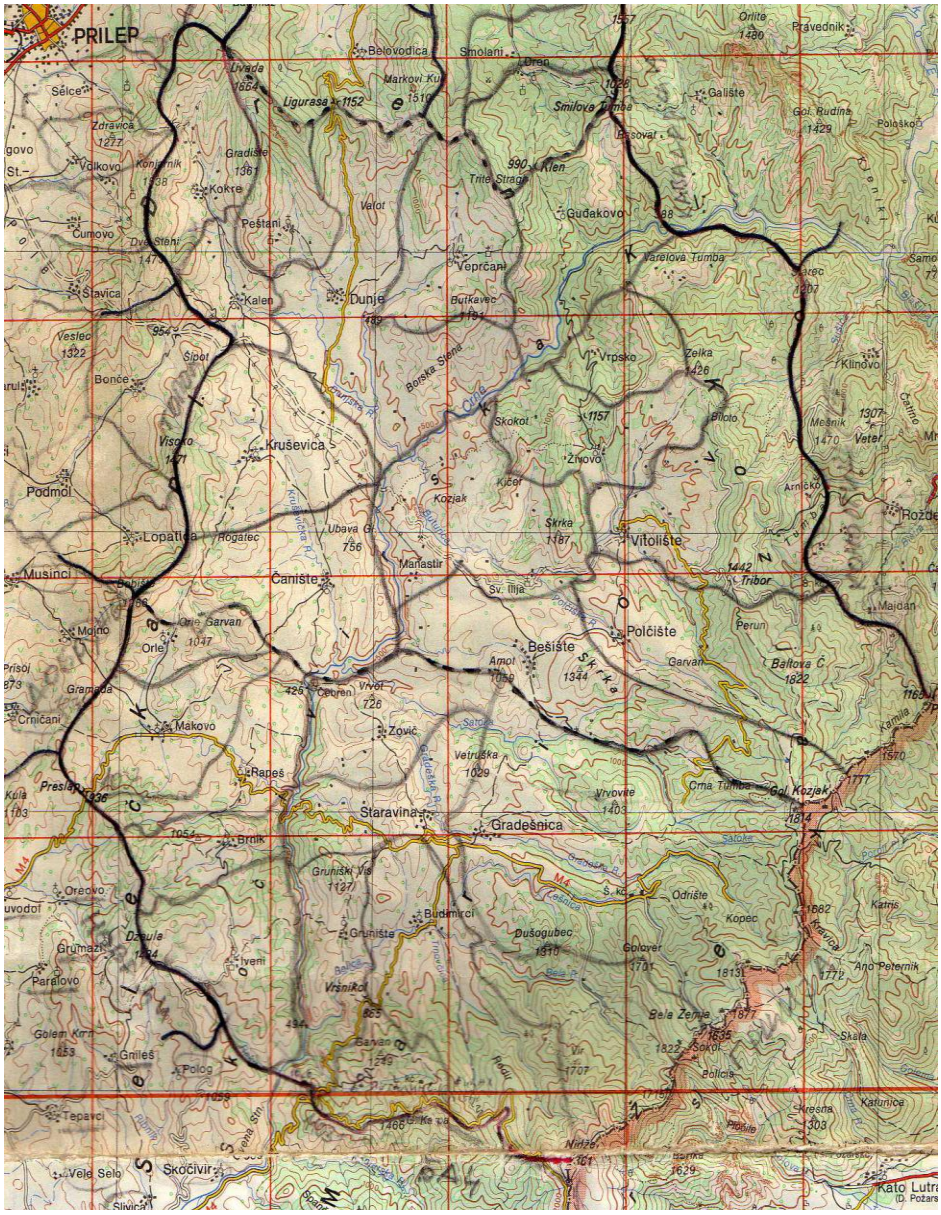
The southern border extends from the top Golem Kozjak along the eel of the Nidze Mountain with the peak Nidje (2362m), and the state border of the Republic of Macedonia with the Republic of Greece the border continues to the southwest to the peak of the Great Rock (1466m), where it runs along the border of the village of Petalino and Bach It cuts the Crna River near the Skochivirska Klisura and continues along the border of the village attic of the village of Iveni and the municipality of Novaci to the top of Jaule (1434m).

The western border is made up of the Sele Mountain, which naturally separates the area from the Pelagonija valley. From the top Dzhaula (1434) boundary moves beyond the border of the village Atari pomedzhu villages Brnik, Rapes and Walnut to passage Preslap (936m) Hence border continues in rural Atari pomedzhu villages Makovo Orleans Crnichani and Mojno which passes through the area Heap to the top Bobishte (1266), rural Atari villages Chanishte, Krushevica, Lopatica, Podmol and Bonce to the top High (1471), locality Shipot and continues through rural Atari villages Cullen,

Shtavica the top two walls (1473), north To the peak Konjarnik (1538m), continues near the top Meadow (1664m).

The investigated area is surrounded by a large number of municipalities, such as from the east, Kavadarci from the south with the Republic of Greece and Novaci, and from the west by Prilep.

Accordingly, we can conclude that this area is limited by clear natural boundaries. The Mariovo area was territorially belonging to three municipalities: Kavadarci, Prilep and Novaci.



Map. 1. The boundaries of Mariovo at TC 1: 200 000

The Mariovo region was named after the ruler Mara who Sultan Murat I took as a wife in his harem. Cala Mara or Tamar Mara did not want to go, on the proposal of the Sultan Mara returned to her birthplace Mariovo with him to continue to manage. After that the area was called Mariovo, and the Turks called it Mariova, which means Marina land or Marina side ie field. Today Mariovo is divided into several parts ie. Since 2006, the new municipalities have been created: Prilep, Novaci and Kavadarci.

Most of Mariovo today occupies Prilep municipality of 495 km², which represents 47.7% of the total territory of Mariovo. In the municipality of Prilep there are also the largest number of villages 14 in which today live 499 inhabitants.

The municipality of Novaci covers an area of 333 km², which represents 32.0% of the territory of Mariovo. There are 10 village settlements in which in 2002 there were 325 inhabitants.

The Municipality of Novaci and Mariovo with the city of Bitola maintains connections through the crossings near the village of Skocivir above the Skofirovska gorge and Preslap (1037m) above the village of Makovo.

Prilep Mariovo with the city of Prilep communicates through the exalted Pliva (1135m), which is located above the village of Stavica, while in the north Mariovo maintains connections through the two passages: Liguriasa (1171m), located between the village atari of the village of Belovodica and the village of Duvenje, as well as the crossing Maple (990m), located between the villages Dren and Gudjakovo.

With the municipality of Kavadarci Prilep Mariovo communicates through the crossing of Tribor (1397m), on the mountain Kozjak. The territory of Prilep Mariovo and the Mariovo part of M.Novaci is 828 km². The length of the north-south region, from the mountain Dren and Starkov Zab in Mount Niedz, is 39.5 km. The width is different and the highest is on the high line of the Seleka Mountains and the Koprivica on Kozuv mountain in a width of 35 km. The average altitude of Mariovo, ie The Prilep Mariovo and the Mariovo part of the OP. Novaci is 1090m. The highest point is located on Mount Nidze (Kajmakchalan 2521m), and the lowest is in the river bed of the Black River, west of the village Polosko Kot (215m), with a height difference of 2306m.

The regional road Prilep - Skopje to the northeast enables connection with Mariovo ie. Prilep Mariovo in the passage of the Ligurasa where the road from the village of Belovodica crosses the village of Dunje and the mapping Klen (990 m), connecting the villages: Dren, Gudjakovo and Veprcani with Dunje in the M. Prilep. This is a transit area through which the economic regions in the Republic of Macedonia are connected. Macedonia from the north, east and central part of the southern and western part of the country.

2. PHYSICAL GEOGRAPHIC DEPARTMENTS OF MARIOVO

2.1. Geological structure and tectonics

The territory occupying Mariovo has a very complex and diverse geological composition and tectonics. The rocks in Mariovo are composed mostly of **magmatic, metamorphic and sedimentary origin**, while their age is different starting from the front of the Cambrian to Quater. Most of the Mariovo territory morphologically and genetically belongs to the Pelagonia zone, ie the Pelagonija horst - anticlinorium, while a smaller part of the eastern side belongs to the sub Vardar zone. The rocks that form the Mariovo region can be divided into three lithological series:

Gneisses, Shingles and Marbles and Mixed Series.

Gneeves: They form the lower metamorphic part whose thickness reaches up to 1500 m with pre-Cambrian age.

Shale and marbles as well as a mixed series are found as a mining metamorphic complex over gneisses.

The mixed series is represented by: berries of gneiss, cypolinium and marbles.

The tectonics of Mariovo is very complex, its base for its formation is the Alpine Orogen, which is the reason for the entire Pelagonija horst - anticlinorium, and together with it and the territory of Mariovo, to rise. According to M. Arsovski, the Pelagonian horst - anticlinorium went through a complex and different way in its formation. It belongs to the geochemical zone of the Alpine zone. The basic geo-structural units originated at the beginning of the Hertzin geoclinic. Mariovo with hercetic orogenic movements was elevated more than the neighboring areas, which is also spoken of by their higher altitude. Subsequent tectonic elevations and descents at the time of the Alpine orogen phase have resulted in significant changes to the relief. Intensive descent on the bottom of the Mariovo valley occurs on numerous faults, so today it presents a wavelength depression that is filled with a large number of elevations and ravines. **The races** are located on the western sides of the Kozjak and Kozuv mountains and on the north side of the Nidze Mountain with the North East-Southwest direction. The territory of Mariovo is very rich in ores of metals and non-metals.

From non-metals [1]: Diatomaceous earth at the village. Monastery, Lignit at the village. Vitolishte, Felspad near the village. Staravina, granite at the village. Krushevitsa, Onyx near the village. Beshishte et.

The tectonic structure of Mariovo is of great importance for the development of mining in the future period.

2.2. Relief structure

The rocky structure in Mariovo is very interesting and diverse filled with mountains, river valleys and valleys that make these parts look specific. In this space, there are various types of riding forms, from which we will especially separate the mountains: **Nidze[2], Kozjak [3], Dren Mountain [4], Selečka Mountain [5], Mariovo valley [6],** Is the second morphological whole in the Mariovo reel structure, the basin covers a surface (350 km²), which is significantly less in relation to mountain massifs.

The length of the valley from the village. Kallen to the village. Ivenes is about 30 km, the width of the valley is different and ranges from 10 to 15 km. The largest width of the valley is between the sphere of the village. Makovo and the area of the village of Polchishte 18km. During the Neogene, the Kotlina bottom was filled with water and represented a large lake. Towards the end of Pliocene begins the discharge of the lake and the water has expired in the Tikvesh Lake, while on the bottom there are thick deposits of: clay, sands, etc.

Rivers that flowed through the valley plowed their troughs and made great vertical erosion and formed their deep valleys.

The Black River is the largest river in this area, it formed the deepest valley and served as a low erosion base for all other smaller rivers that are its left or right tributaries.

In the Mariovo valley there are also smaller morphological units - **fields. The lake terraces** are located at the foot of the mountains: Nidze, Kozjak, Selecka and Dren mountain. **The Black River Valley** is a larger morphological whole, as well as the mountains and the valley. The valley of the river is a deep depression through the central plain of the Mariovo valley, which occurs in the mimo-miocene, while its formation is in a deluium after the retreat of the lake water from the former Neogene lake.

The tertiary origins show us the remains of the eruptive rocks at the entrance of the Skofirovsk gorge, the appearance of a metabar in the locality Rasim Begov most, etc. Places.

The intense vertical erosion in **post-plyocene** allowed the formation of a ravine or a canyon.The height of the valleys ranges from 300-500 m. In the valley of the river itself, **river terraces** with different altitudes start at 200m, 340-360m, and from 400 to 540m. In addition to the river bed alone, there are river terraces at a height of 10m which are partially flooded during the spring and autumn months when the water is higher. **The structure of the racket** directly affects the spatial location of the rural settlements. Most of the rural settlements are located on the bottom of the Kotlina or on the contact of the valleys with the mountains.

3. Climate in Mariovo

3.1. Climatic elements

The Aegean Sea is located at a distance of 70km, as well as the impact of the Adriatic Sea at a distance of 155km7.

The territory of Mariovo is located at an average altitude of 1090m.

1Andonovski, T. (1995): Characteristics of the relief in R. Macedonia, Geographic Views. 30, Skopje. Page. 5 - 12.
2Š.S.O. (2001) Nidže 1, 2001-2010, Nidze 2, 2000-2009, p. 4-9.
3SSE (1998): Vitolish Forest, 1998 - 2007, p.
4DNU. (1989): Trojan Valley, Expert - Scientific Approach to Revitalization, Prilep, pg.
5Same page. 20 - 32.
6Gasevski, M. (1984): Hydrographic properties of Mariovo, Skopje, p. 110 - 113.
7 Lazarevski, A.(1993). Climate in Macedonia, Skopje, pg. 20-21.

In Mariovo, the influence of the continental climate with two specific seasons, cold and wet winter, and dry and hot summers on the high mountains, is a mountain with long and cold winters with high snowfall, while the summers are short and fresher.

3.1.1. Air temperature

The climatic elements measured at the meteorological stations in Prilep (673m) and Bitola (587m). Will be considered for a period of 30 years ie. 1971-2001

3.1.1.1. Average monthly and mean annual air temperatures

Table .1. Average monthly and mean annual air temperatures measured at the meteorological stations in Prilep and Bitola for the period of 30 years from 1971-2000.

Place	Month	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	A.a.t
Prilep	a.m.t	0,0	2,2	5,9	10,5	15,5	19,8	21,8	21,5	17,4	11,8	6,0	1,6	11,2
Bitola	a.m.t	-0,7	2,0	6,1	10,8	15,7	20,0	21,9	21,2	17,1	11,2	5,6	0,7	10,9

Source: RZS. Statistical Years from 1972 - 2001, the calculations are from the authors.

3.1.1.2. Maximum, minimum and absolute maximum and minimum air temperatures

For the period from 1971-2000, the maximum and minimum temperatures will be shown only monthly and annual for Mariovo for a period of 30 years.

Table.2. Maximum air temperatures measured at the meteorological station in Prilep for a period of 30 years from 1971-2000.

Months	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	S.y
Sum	224,3	320.4	451.8	579.4	734.1	874.9	936.0	925.2	819.8	654.8	439.4	287.0	
T.a.m	7.5	10.7	15.1	19.3	24.5	29.2	31.2	30.8	27.3	21.8	36.6	24.1	23.2

Source: RZS. Statistical yearbooks from 1972 - 2001, the calculations are from the authors.

The absolute maximum of the air temperature in the municipality of Prilep appeared in 2000 at 39.4ºC. The average annual maximum air temperature in Prilep for the period of 30 years is 23.2ºC.

Table.3. Maximum air temperatures measured at the meteorological station in Bitola for a period of 30 years from 1971-2000.

Months	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	S.y
Sum	219.6	318.4	461.7	588.8	746.9	872.	947.7	930.9	827.3	661.1	453.5	294.2	
T.a.m	7.3	10.6	15.3	19.6	24.8	29.0	31.5	31.0	27.5	22.0	15.1	9.8	20.2

Source: RZS. Statistical yearbooks from 1972 - 2001, the calculations are from the authors.

The absolute maximum air temperature in Mariovo (OP Novaci) in the period of 30 years has appeared in 2000 and amounts to 39.3ºC.

The average annual air temperature in Bitola for the period of 30 years is 20.2ºC.

Table 4. Minimum air temperatures measured at the weather station in Prilep for a period of 30 years from 1971 to 2000.

Months	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	S.y
Sum	-226.7	-142	-44.6	82.6	222.6	312.5	377.8	369.5	265.7	103.9	-47.9	-160.9	
T.a.m	-7.5	4.7	-1.5	2.7	7.4	10.4	12.5	12.3	8.8	3.4	-1.5	-5.3	3.0

Source: RZS. Statistical yearbooks from 1972 - 2001, the calculations are from the authors.

The absolute minimum of air temperature in Prilep appeared in 1993, which is -21.8 ° C. The average annual air temperature in Prilep for the period of 30 years is 3.0 ºC.

Table 5. Minimum air temperatures measured at the weather station in Bitola for a period of 30 years from 1971-2000.

Months	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	S.y
Sum	-269,9	-147.7	-50.5	-66.7	185.7	276.8	323.8	323.9	222.1	69.3	-77.9	-203.5	
T.a.m	-8.9	-4.9	-1.6	2.2	6.1	9.2	10.7	10.7	7.4	2.3	-2.5	-607	2

Source: RZS. Statistical yearbooks from 1972 - 2001, the calculations are from the authors.

The minimum air temperature in Bitola for the period of 30 years from 1971 to 2000 is 2ºC. The absolute minimum of air temperature in Bitola emerged in 1993. And is -30.4ºC.

3.2. Relative air humidity

Table 6. A representation of the mean relative humidity of the air from the weather station in Prilep for a period of 30 years from 1971-2000 years expressed as a percentage (%).

Months	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	A.a.h
Sum	2455	2280	2058	1909	1925	1740	1683	1698	1915	2134	2371	2441	2051.1
A.m.h	81.8	76.0	68.6	63.6	64.2	58.0	56.1	56.6	63.8	71.1	79.0	81.4	68.4

Source: RZS. Statistical years from 1972 - 2001, the calculations are from the authors.

Table 7. A representation of the mean relative humidity of the air from the Meteorological Station in Bitola for the period of 30 years from 1971-2000 expressed in percent (%).

Months	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	A.a.h
Sum	2455	2305	2091	1941	1952	1759	1670	1752	1961	2179	2378	2463	2075.2
A.m.h	81.8	76.8	69.7	64.7	65.1	58.6	55.7	58.4	65.4	72.6	79.3	82.1	69.2

Source: RZS Statistical Yearbook from 1972 - 2001, calculations by the authors.

Relative humidity is slightly higher in the Bitola part of Prilep section. It has its own annual turnover and from January to August it shrinks, and after that it increases from December to December, with a maximum in January and a minimum in August.

3.3. Winds: direction, frequency and types of winds

The most frequent winds in Mariovo are the winds of: north, northeast, northwest, south, southeast and southwest direction,

Table 8. An overview of the frequencies of the routes and the silences of the winds in Prilep expressed in promile (‰) for a period of 30 years from 1971-2000.

Directions	N	NE	E	SE	S	SW	W	NW	Silence
Σ‰	2138	1093	141	401	863	781	316	315	5937
σ‰	178.0	91.0	12.0	33.4	72.0	65.0	26.3	26.2	495

Source: RZS. Statistical Yearbooks from 1972-2001, calculations by the authors.

The north and northeast wind blow alternately throughout the year. During the winter season they are dry and cold while in the summer they bring freshness. The south and southwest wind blows like hot and wet and carry a large amount of precipitation. The most common are in the spring and autumn months.

These winds also appear in the winter months of the year and melts the snow on the surrounding mountains and cause high water levels on the rivers.

Table 9. A glimpse of the frequencies of the winds and the silence of the winds in Bitola expressed in promile (‰) for a period of 30 years from 1971-2000.

Directions	N	NE	E	SE	S	SW	W	NW	Silence
Σ‰	2312	1103	592	1079	1706	512	866	938	2861
σ‰	193	92	49	90	142	43	72	78	238

Source: RZS. Statistical Yearbooks from 1972-2001, calculations by the authors.

Local winds also appear as a consequence of the unequal warming of the valleys and surrounding mountains. These are winds with circadian periods that daybreak from the valleys to the mountains and at night to the other.

3.4. Cloudiness

The average annual cloudiness in the Prilep part is 4.86 tenths and 5.21 tenths in the Bitola part. It shrinks from January to August, then increases to December. The highest average monthly value is distinguished by January and by the lowest of August.

Table.10. A view of the mean cloudiness measured at the weather station in Prilep for a period of 30 years from 1971 to 2000.

Months	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	Aa.c
Sum	186	177.1	167	104.4	154.5	117.7	90.5	89.8	106.2	137.2	173	185.3	145.87
A.m.c	6.2	5.9o	5.56	3.48	5.15	3.92	3.01	2.99	3.54	4.57	5.76	6.17	4.86

Source: RZS. Statistical Yearbook from 1972 - 2001, calculations by the authors.

Table.11. A view of the mean cloudiness measured at the weather station in Bitola for a period of 30 years from 1971-2000.

Months	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	A.a.c
Sum	194.9	184.5	175.2	179.4	165.7	127.4	102.5	100.4	117.0	148.7	174.8	194.0	156.19
A.m.c	6.49	6.15	5.84	5.98	5.52	4.25	3.42	3.35	3.90	4.96	5.83	6.47	5.21

Source: RZS. Statistical Yearbook from 1972 - 2001, calculations by the authors.

3.5. Precipitation

3.5.1. Average monthly and average annual amount of precipitation

Table.12. Presentation of monthly and annual rainfall amounts expressed in (mm) measured at the weather station in Prilep for a period of 30 years from 1971-2000.

Months	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	A.a
Sum	893.1	1045.2	1105.3	1428.4	1669.6	1288.4	1232	927.8	1236.7	1653.9	1827.7	1219.9	15486
S.m.mm	29.7	34.8	36.8	47.6	55.6	42.9	41.0	30.9	41.2	55.1	60.9	40.6	516

Source: RZS. Statistical Yearbook from 1972 - 2001, calculations by the authors.

The average annual amount of precipitation in the period of 30 years is 516 mm.

Table.13. Presentation of monthly and annual rainfall amounts expressed in (mm) measured at the weather station in Bitola for a period of 30 years from 1971-2000.

Months	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	A.a
Sum	1398.7	1570.2	1396.6	1514.2	1688.1	1115.3	1150.7	1098.7	1209.7	1856.5	2244.4	1946.6	18189.3
A.m.mm	46.6	52.3	46.5	50.5	56.3	37.2	38.4	36.6	40.3	61.9	74.8	64.9	606.3

Source: RZS. Statistical Yearbooks from 1972-2001, calculations by the authors.

The average annual amount of precipitation in the period of 30 years is 606.3 mm. The greatest amount of precipitation occurs in: autumn, winter and spring. The driest months are August, June, July and September. The greatest amount of rainfall is in the months: November 131.0mm, December 121.1mm, October 118.1mm, April 106.7mm and May 112.5mm at 2271m.

3.6. Other types of precipitation and occurrence: rain, snow and fog

3.6.1. Rain

Table.14. Days of rain from the weather station in Prilep for a period of 30 years from 1971-2000

Months	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	A.sum
Sum	132	160	219	336	349	235	192	179	198	237	256	219	2719
S.m	4.4	5.3	7.3	11.2	11.6	7.8	6.4	5.9	6.6	7.9	8.5	7.3	90.6

Source: RZS. Statistical Yearbooks from 1972-20001, calculations by the authors.

Table 15. Days with rainfall from the meteorological station in Bitola for a period of 30 years from 1971-2000.

Months	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	A.sum
Sum	188	244	278	378	399	257	216	195	219	263	309	265	3219
S.m	6.3	8.1	9.3	12.6	13.3	8.6	7.2	6.5	7.3	8.8	10.3	8.8	107.3

Source: RZS. Statistical Yearbooks from 1972-20001, calculations by the authors.

In the period of 30 years from 1971-2000, the average monthly amount of rainfall in Prilep is 90.6 mm while in Bitola 107.3 mm.

3.6.2. Snow

Table 16. Snow days measured at the meteorological station in Prilep for a period of 30 years from 1971-2000.

Months	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	A.sum
Sum	195	168	137	22	2	0	0	0	0	7	69	171	771
S.m	6.5	5.6	4.6	0.7	0.06	0	0	0	0	0.2	2.3	5.7	25.7

Source: RZS. Statistical Yearbooks from 1972-20001, calculations by the authors.

Table 17. Snow days measured at the meteorological station in Bitola for a period of 30 years 1971-2000.

Months	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	A.sum
Sum	205	174	129	23	1	0	0	0	0	9	66	158	774
S.m	6.8	5.8	4.3	0.8	0.0	0	0	0	0	0.3	2.2	5.3	25.8

Source: RZS. Statistical Yearbooks from 1972-20001, calculations by the authors.

The snow cover occurs as early as April, but is mainly limited to winter months. Average annual occur 34-36 days with snow cover.

And the maximum is in the months: December, January and February. The maximum height of the snow cover is 60 to 65 cm. The average date of appearance of the first snow cover is December 4-6 and the last snow cover from 15-18 March.

3.6.3. Fog

Table.18. Days with fog measured at the meteorological station in Prilep for a period of 30 years from 1971-2000.

Months	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	A.sum
Sum	112	27	10	2	2	5	2	1	7	15	61	112	356
S.m	3.7	0.9	0.3	0.06	0.06	0.2	0.06	0.03	0.23	0.5	2.0	3.7	11.9

Source: RZS. Statistical Yearbooks from 1972-20001, calculations by the authors.

Table 19. Days with a haze of fog measured at the weather station in Bitola for a period of 30 years from 1971-2000.

Months	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	A.sum
Sum	197	59	9	4	11	8	4	3	8	48	133	166	665
S.m	6.6	2.0	0.3	0.1	0.4	0.3	0.1	0.1	0.3	1.6	4.4	5.5	22.2

Source: RZS. Statistical Yearbooks from 1972-20001, calculations by the authors.

In the Prilep station there are registered 11,9 days with fog for 30 years, while in Bitola 22,2 days with fog. In the northern part of the investigated period, fog is of significantly lower frequency and intensity, and for an average of 30 years, 11.9 days have been observed in fog, and in some years the number of fog days ranges from 4-26 days.

3.7. Hydrography in Mariovo

In the territory of Mariovo, depending on the amount of atmospheric precipitation, the geological and petrographic composition of the maps, the reel, the slope of the terrain and the human

action, we come across various types of water such as: spring, spring, river and mineral water. Mariovo is relatively rich in water.

3.7.1. Rivers: the river network in Mariovo

The largest river in the researched region is the Black River which runs through Mariovo. The Black River flows from the black hole at the village. Zhelezhnets O.P. Demir Hisar. In Mariovo he enters the village of Skocivir where he forms the Skocivir gorge. The total drainage area of the Crna River is 5890 km², while in Mariovo it is 2002 km², the length of the river Crna is 200 km, while around Mariovo about 40 km. The average fall of the riverbed is 3 ‰, while in Mariovo it is 6.6 ‰. The Crna River in its course through Mariovo receives a large number of tributaries from which are larger on the right: Konjarka, Trnovcica, Gradeschicka Reka, Bela Reka, Satoka, Buturica and Blasica, and on the left are: Makovska, Krushevichka and Lisichka Reka.

Table 20. Basic hydrographic characteristics for the larger tributaries of the Crna river in Mariovo.

S.N	Name of tributary	Kota(m), length (km)	Source	Inflation	Area total (m)	Relativ‰	Waterfall (км²)	(km)	Middle height (m)
1	Konjarka	15	2260	550.0	1710	114.0	63	32	1460
2	Bela river	16	2010	500.0	1510	94.4	119	46	1250
3	Krusevicka	12	1100	410.0	689.5	57.5	44	27	830
4	Gradesnicka	26	1600	410.0	1190	45.8	116	51	1080
5	Dunjska	19	1440	345.0	1095	57.6	137	47	880
6	Buturica	20	1600	344.0	1256	62.8	102	50	1070
7	Blasica	21	1700	241.0	1459.0	69.5	210	63	980

Source: Gashovski, M. (1984): Hydrographic properties of Mariovo, Skopje.

3.8. Types of soils and their distribution in Mariovo

In Mariovo, several types of soils are found, with the largest areas occupying the following areas: Brown forest soils, Rankers, Deliuvial (Koluvial, soils), Alluvial, Lithosols, Regosols (Sirosemes on crushed substrates), Varinovichki - Dolomites, Rendzini, Soils and Rigged (Rigonoli).

Conclusion:

Mariovo has favorable geographical position, from physical geographical features, Mariovo has a good geological structure and favorable relief structure, Mariovo has favorable climatic elements for air temperature, relative humidity, favorable winds, cloudiness and precipitation, the hydrographic state of Mariovo is a secondary good, Mariovo has a rare density of the river network and periodic flow of the river network and in economic terms, the water use in the Region of Mariovo is very small, in Mariovo there are many types of soils.

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