CLIMATE AS A FACTOR OF DEVELOPMENT OF RECREATIONAL TOURISM OF NORTH-EASTERN BOSNIA

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Recreational activities and movements in most regions are characterized by pronounced seasonality, i.e., concentration on the summer and winter season. This primarily refers to the extremely mountainous and coastal regions that are recognizable mainly for ski tourism or bathing tourism. However, the regions without a recognizable "tourist identity" with an attractive natural base and many potentials, especially climate, such as Northeast Bosnia have the opportunity to develop different forms of recreational tourism (sports - recreational, excursion - recreational, health - recreational) in individual parts throughout the year. The favorability of climatic predispositions of Northeast Bosnia is highlighted by the results of analyzes which show that during the year there are neither adverse nor impossible climatic conditions for the development of different forms of recreational tourism. High quality active outdoor activities in the spring and autumn months are usually carried out through hiking, running, mountain-hiking, biking, excursions and the like, and in the summer, apart from mentioned activities, camping, swimming, bathing, rafting, sailing etc. are possible, and in winter months, we have recreation on snow (snow hiking, sledging, skiing, driving with snowmobiles, etc.).
Keywords: climate, recreation, tourism, North-eastern Bosnia

INTRODUCTION

Climate is the most important natural tourism potential and a key predisposition for valorisation of other, both natural and anthropogenic resources, important for the development of tourism in an area. The climate and time relationship with tourism has three main characteristics: 1. climate and time are a limiting factor for the development of tourism in certain parts of the world; 2. climate and weather are not only a significant factor in tourist offer, but also a tourist demand; and 3. climate, time and tourism is reflected strongly on both organizational elements and stay in some area, as well as human health or health risks that can be expected in a tourist region or place (Vojnović, 2017, 33). Tourists generally make decisions about the choice of a tourist destination based on the climatic conditions of the destination, and knowledge of climate benefits or inconveniences is important for decisions about a return visit to the same destination or area (Becken, 2010, 17). In defining the climate as a tourist potential, the average air temperatures and precipitation are usually considered, but important indicators are wind speeds, cloudiness, insolation and the like, as well. In addition to the above mentioned basic climate elements, factors that transform them both quantitatively and qualitatively must be taken into account, and they are particularly important if the climate and climate types are changed from the zonal into the altitude character (Jahić, Mezetović, 2014, 92). Methodological work is based

on the assumption that various forms of recreational tourism can be developed in the region of the Northeast Bosnia, thanks to favorable climatic predispositions complemented by numerous natural potentials (relief, forests, water, biodiversity) that enable tourists to recreate numerous activities and outdoor living. In this area, separate parts of two large and characteristic tourist regions of Bosnia and Herzegovina, North East and East were already identified, which were singled out by the authors using the GIS method for analyzing statistical data on tourist traffic of Bosnia and Herzegovina at the municipal level (Glamuzina, Madžar, Putica, 2017, 66).

The aim of the paper is to analyze the meteorological data collected for the period from 1960 to 1991 on the network of eight meteorological stations in the region of Northeast Bosnia (Tuzla, Kladanj, Gračanica, Zvornik, Bijeljina, Vlasenica, Bratunac and Srebrenica), and according to the methodology of *International Institute for Sustainable Development, The Effects of Climate Change on Recreation and Tourism on the Prairies and Hall, CM, Higham, J. from 2005,* and to point out the possibilities and perspectives of the development of recreational tourism that can provide this region with tourist visits and stay throughout the year, especially in the hottest and coldest months, which are most suitable for both passive activities and for movement activities. The paper analyzes the data and presents the results of average annual air temperatures, average air temperatures during the warmer and colder part of the year, the amount of precipitation during the year, the speed and direction of the wind and the height of the snow cover as key climatic indicators of the benefits of certain regions for the development of different forms of recreational tourism.

Enabled by its geographical position and the population as well as density of population, the region of Northeast Bosnia has potentials, so it leans towards becoming a recognizable tourist region or zone, by developing forms of tourism that provide a natural basis. "The tourist region is a geographical area with the original, well-preserved and protected environment and adaptations in a strictly defined spatial plan where the anthropogenic objects are incorporated into it. According to the physiognomy and purpose, the tourist regions are in contrast with urban settlements, especially industrial ones, and are directed by developing appropriate tourist flows. Certainly, many of those frontier units can not be identified with tourist regions, whose explanation is derived from the definition of a geographical region" (Spahić, Ahmetbegović, Stjepić-Srkalović, 2017). The Region of Northeast Bosnia includes the area of special features, the Protected Landscape "Konjuh" with adopted spatial-planning documentation, but also, in the rest of the area, we can distinguished areas of important natural and tourist features.

CLIMATE FACTORS AND GENERAL CLIMATE CHARACTERISTICS OF NORTH-EASTERN BOSNIA

The general climatic characteristics of the region of Northeast Bosnia were determined primarily by the geographical position, then by the circulation of air masses, relief, and the hydrogeographic and biogeographical characteristics of the area. The region's position under the coordinates of 43˚55'19 " to 45˚05'40 " N and from 18˚11'14 " to 19˚37'41 " E, which is determined by the astronomical and geographical position of the territory, shows that Northeastern Bosnia is located in the zone a moderate - continental climate with two clearly defined seasons (summer and winter) and two transitional periods (spring and autumn). The main features of this climate are fresh to cold winters and moderately dry and warm to hot

summers, and depending on the subtypes and variations of the moderate - continental climate in this area, various outdoor activities are possible in the open air. In the relief sense, Northeast Bosnia is located in a transitional zone between the Pannonian (lowland) and high-dinarides (mountainous) areas, which means it is exposed to the more powerful effects of continental climate impacts from the north and highland structures from the south. During the colder part of the year (from December to March), anti-cyclone activity from the northeast dominates the area of Northeastern Bosnia, which brings cold and stable weather to most of the territory, while during the warmer part of the year (from June to October) significant influence of air masses from the south, which cross the Mediterranean and the Adriatic Sea, are highly moist and bring abundant precipitation to the southern mountainous part of the region, while the interior remains relatively dry and warm.

The influence of the forest cover on the Northeastern climate is significant, especially in its southern, southeastern and southwestern hilly and mountainous forests (Ozren, Konjuh, Javor, Birač, Osat, Ludmer). Wide areas under the forests relieve extremely high temperatures in the hot summer season, while in the winter they act in reverse. Hydrological conditions do not modify the significant general climate conditions of this area, but they certainly have a recognizable local influence. This is especially pronounced in Posavina and Podrinje, subregions in which, along the middle parts of the Sava River and the lower part of the Drina River, during the summer months, recreational tourist activities on water and in water can be observed. Specific geographical position, air mass circulation, and pronounced hypsometric variations (Posavina 80m, Konjuh 1.327m or Maple 1.405 m above sea level) have conditioned the existence of different variants of moderate warm and humid climates over much of the region, and a humid boreal climate on the highest mountain regions Šegota, Filipčić, 2003).

Table 1. Average annual air temperature (° C), precipitation (l / m^2), air humidity (%), cloudiness (1/10) and snow cover height (cm) in the area of Northeast Bosnia (1961-1990)

Meteo. station	Air. temp. (°C)	Precipitation (l/m^2)	Air hummidity (%)	Cloudiness (1/10)	Snow coverage height (cm)
Tuzla	10,0	894	78	5,9	97
Kladanj	9,2	1106	77	5,4	129
Gračanica	10,0	829	82	6,8	66
Zvornik	10,7	920	78	5,6	-
Bijeljina	10,9	735	80	5,5	68
Vlasenica	9,5	1120	79	5,3	120
Bratunac	10,4	848	81	6,6	55
Srebrenica	9,7	980	85	5,3	55
North-Eastern Bosnia	10,1	928	80	5,8	84

Source: Federalni hidrometeorološki zavod Sarajevo, 2010.

The average annual air temperature over Northeastern Bosnia is 10.1 ° C, and the average annual rainfall is 928 l / m2. The coldest month is January (average -0.8 ° C), and the hottest July (an average of 19.4 ° C), which indicates a relatively high annual amplitude (around 20.2 ° C), or a pronounced continentality of the region. Precipitation levels fall from the south to the north. The highest quantity was recorded in Kladanj 1.106 l/m^2 and Vlasenica 1.120 l / m^2 (Konjuh and Javor), and the lowest in Bijeljina (Semberija) is 735 l/m^2. The winds are a significant climatic element, and are especially pronounced in the

edge northern (Posavina) and the southern (Konjuh and Javor) parts of Northeast Bosnia. Air humidity is closely connected and dependent on all climatic elements, especially with air temperature and precipitation. Air humidity affects the overall biogeographical characteristics of areas that are important tourism potential and reflect regional landscape diversity. The average relative air humidity of the Northeastern Bosnia region is 80%. The lowest values are in April and July (75%), and the highest in December and January (87% and 85%). Air humidity and other climatic elements are regionally diversified, so they have the highest occurence in the wooded areas of Srebrenica (85%), Gracanica (82%), Bratunac (81%), and the lowest in Kladanj (77%), Tuzla and Zvornik area (78%). The annual flow of cloudiness is closely related to the annual flow of relative humidity, or insolation. Average annual cloudiness over the region amounts to 5.8 tenths and is the most pronounced during the winter period (7.3), while the insolation is completely opposite, ie the number of sunny hours increases from winter to summer. The most sunny hours are in the Tuzla and Bijeljina areas during the month of July (247 hours) (Kudumović Dostović, Tuzla, 2017, 31-38).

Climate predispositions of North-eastern Bosnia for development of recreational tourism in warmer part of the year

From these general climatic characteristics of Northeast Bosnia it is evident that various recreational tourism activities in this area are possible throughout the year (map 1). The prevalence of moderately warm and humid climate with moderately dry and hot to warm summers is an extremely suitable type for various forms of recreational tourism. Table 2 shows the ideal weather and other conditions for summer recreational activities on water and land. The values in the table shown should be considered conditionally because in the

Table 2. Ideal weather and other conditions for summer recreational activities on the land and water

Activities on the water	**Sailing**	**Water skiing**	**Yachting**	**Fishing**	**Swimming and bathing**
Air temperatures (°C)	15 - 35	18 - 35	10 - 35	15 - 30	15 - 30
Water temperatures (°C)	2 - 20	10 - 20	10 - 18	< 18	15 - 20
Wind speed (km/h)	< 50	< 15	15 - 50	< 15	< 15
Precipitation	0	0	0	0	0
Water area (ha)	80 - 400	100 - 800	100 - 800	20 - 400	20 - 800
Depth of water (m)	1,5 – 2,5	> 2,0	1,5 - 2,0	0,5 - 1,0	0,5 - 2,0
Activities on the land	**Activities on the move**	**Passive activities**	**Camping**	**Picnic**	**Golf**
Air temperatures (°C)	12,8 do 31,7	> 12,2	> 10	10 - 25	10 - 30
Wind speed (km/h)	< 33,8	< 33,8	< 10	< 20	< 20
Precipitation	A little rainfall or no rainfall				

Izvor: International Institute for Sustainable Development, The Effects of Climate Change on Recreation and Tourism on the Prairies, A Status Report (https://www.iisd.org/pdf/recreation_climate.pdf); Hall, C. M., Higham, J., 2005: Introduction: Tourism, Recreation and Climate Change, u: Tourism, Recreation and Climate Change, (ur. Hall, C. M., Higham, J.), Channel view publications, Clevedon, 3-28.; Vojnović, N. (2017)., Prirodna osnova i turizam, Sveučilište Jurja Dobrile, Pula.; (prilagodili autori).

area of Northeast Bosnia it is often possible to continue certain tourist activities in the late spring or early autumn. This is best seen on the example of rainfall, which, according to the

standards set in Table 2, is not an ideal weather condition for staying and open-air activities, yet they are not an obstacle in the implementation of various forms of recreational tourism.

The most favorable period for the largest number of both, movement activities and passive recreational activities in the area of Northeastern Bosnia are summer months. The ideal air temperature for summer movements on land (walking, running, hiking, cycling, etc.) ranges from 12.8 to 31.7 ° C, and for passive activities (picnics, camping) should be greater than 12,2 ° C (Table 2). The data in Table 3 show that the average summer air temperature over Northeastern Bosnia is very favorable 18°C. The lowest average summer air temperature is in the southern forest mountainous regions (Kladanj 17 ° C, Vlasenica 17.2°C and Srebrenica 17.3°C), and highest in the northeastern and northern lowland - hilly regions of the wider area of Posavina and lower Podrinje (Bijeljina 19.3 ° C, Zvornik 18.9 ° C).

Another important segment for tourism is precipitation. It has an important impact on the climate comfort of tourists, whether it is an average annual amount of rainfall or amount of rainfall by individual seasons. Long-term moderate rainfall, although in the total annual amount of precipitation participate in a smaller amount, from a tourist aspect, they are less favorable than the short-term period with intense precipitation. This is especially important when calculating the tourism climatic index (TCI)[1]. However, they do not have a significant negative impact on the development of summer recreational tourism in the Northeastern Bosnia due to their even distribution during the year, ie the fact that during the summer there are no long periods with more pronounced rainfall. The lowest average monthly precipitation is in September (70 l/m^2) and August (81 l/m^2), and the highest in June (112 l/ m^2). The lowest values of daily precipitation in the warmer part of the year are registered in the wider area of Posavina and Semberija (Bijeljina 2.4 l/m^2, Gracanica 2.6 l/m^2), and mostly in the southern mountain range (Vlasenica 3.5 l/m^2, Kladanj 3.4 l/m^2, Srebrenica 3.2 l/m^2).

Table 3. Average summer air temperature (°C) and average precipitations (l/m^2) in North-eastern Bosnia

Meteo. station	Average summer air temperature (°C)					Average summer precipitation (l/m^2)					
	VI	VII	VIII	IX	Average	VI	VII	VIII	IX	Monthly average	Daily average
Tuzla	17,7	19,3	18,9	15,4	17,8	111	94	84	64	88,3	2,9
Kladanj	16,6	18,4	18,2	14,9	17,0	127	102	94	80	100,8	3,4
Gračanica	18,0	19,6	19,0	15,5	18,0	91	76	76	70	78,3	2,6
Zvornik	18,6	20,3	20,0	16,6	18,9	106	92	88	69	88,8	3,0
Bijeljina	19,2	20,8	20,4	16,8	19,3	98	70	66	52	71,5	2,4
Vlasenica	16,7	18,6	18,3	15,2	17,2	134	104	95	84	104,3	3,5
Bratunac	18,0	19,7	19,3	16,1	18,3	107	90	69	66	83,0	2,8
Srebrenica	17,1	18,7	18,3	15,0	17,3	126	106	74	78	96,0	3,2

[1]For the purposes of calculating the Tourism Climate Index - TCI, it is necessary to consider seven climate variables, each of which represents the average monthly value: 1. maximum daily air temperature (° C), 2. average daily air temperature (° C), 3. minimum daily relative air humidity (%), 4. average daily relative air humidity (%), 5. amount of precipitation (mm), 6. average daily insolation duration (h) and 7. wind speed (m / s) (About this more in: Jahić, Mezetović, 2014)

Northeastern Bosnia	17,7	19,4	19,1	15,7	18,0	112	91	81	70	88,5	3,0

Source: Federalni hidrometeorološki zavod Sarajevo, 2010.

Lower summer air temperatures in the peripheral forests, predominantly mountainous (Birač, Ludmer and Osat) and mountain areas (Konjuh 1.327 m, Maple 1.405 m and Sušice 1.125 m) provide good conditions for the development of excursion as well as sports and recreational tourism and health activities. For these mountain activities, ideal conditions are provided in the warmest days of summer, July and August, when the air temperatures over the central and northern parts of the region reach over 35°C. On the other hand, the rivers Sava and Drina, as well as artificial lakes (Panonska, Zvornik, Hazna, Vidara, Snjeznica and others) during the summer, especially during the months of July and August, due to the high average air temperatures (Bijeljina 20.8°C and 20.4°C, Zvornik 20.3°C and 20°C) provide intensive summer recreational activities in the water, including swimming and bathing, and for recreation on the water (yachting, sailing, sport fishing, etc.), the Modra lake is very convenient. The average daily amount of precipitation during the summer of 3.0 l/m^2 over the region does not significantly affect the conduct of summer recreational activities either on land or on water.

Table 4. Directions and average speed of winds (km/h) in North-eastern Bosnia (1961-1990)

Wind speed	Meteorological station / N	NE	E	SE	S	SW	W	NW
				Tuzla (305 m.n.v.)				
	5,76	5,04	5,40	5,40	6,12	6,48	5,40	5,40
				Kladanj (520 m.n.v.)				
	5,40	6,48	5,40	6,12	6,12	6,12	5,04	6,12
				Gračanica (160 m.n.v.)				
	4,68	5,04	4,68	7,56	5,76	6,84	4,68	5,40
				Zvornik (142 m.n.v.)				
	5,04	6,48	5,04	6,12	5,76	8,64	5,76	4,32
				Bijeljina (90 m.n.v.)				
	4,68	5,04	4,68	5,40	4,68	4,68	5,40	6,12
				Vlasenica (680 m.n.v.)				
	8,64	9,00	7,20	8,28	7,56	10,44	9,72	10,44
				Bratunac (180 m.n.v.)				
	5,76	5,76	5,04	5,04	4,68	6,48	4,68	5,40
				Srebrenica (400 m.n.v.)				
	9,72	9,36	6,84	9,00	8,64	9,00	6,84	9,72
				Sjeveroistočna Bosna				
Wind speed (km/h)	6,12	6,48	5,40	6,48	6,12	7,20	6,12	6,48

Source: Federalni hidrometeorološki zavod Sarajevo, 2010.

The third important factor for conducting recreational activities in the open is wind speed. The winds are in a tourist-recreational aspect significant from the aspect of the influence on local weather conditions, i.e. on the concrete performance of both passive and movement activities. According to the standards set out in Table 2 for these activities on land, the allowed wind speed should be less than 33.8 km/h. However, for some activities the predicted wind speeds are much less due to the specificity of certain forms of recreation. Such a form is, for example, camping, an activity that can be performed with a wind speed

of less than 10 km/h or for example a picnic with a wind speed not exceeding 20 km/h. On the other hand, recreational water activities in the summer period such as sailing, water skiing, yachting and the like require a wind speed of 15 to 35 km/h, and fishing, swimming and bathing are possible with wind speeds between 15 and 30 km/h (Table 2). In terms of development of recreational tourism in the open, wind speed is especially important because with its increase the temperature of the air decreases, that is, the loss of heat from the human skin (a feeling of heat) is growing, which is often an obstacle to outdoor recreation. One of the examples of a successful form of recreational tourism in the area of Northeast Bosnia, in recent times, is mountain biking. The most marked and used cycling routes are on Konjuh and Ozren and around the lake Snježnica.

Data on directions and average wind speeds in the area of Northeast Bosnia shown in Table 4 show that this is an area with ideal predispositions for the development of recreational tourism on land. The average wind speeds of the region range from 5.40 km/h (east) to 7.20 km/h (south-west). Western wind of the regional character has the highest average frequency (13.7%), which is a consequence of the mainly Dinaric direction of marginal mountain structures, while the lowest average frequency has a wind from the northeast (4.7%) (Kudumović Dostović, Tuzla, 2017, 33) . The highest speeds are reached by the northern, north-west and northeastern winds, which are particularly pronounced in the Srebrenica area (9.72 km / h) and Vlasnice (10.44 km / h). Given that wind speeds rarely exceed 10 km/h, there are fewer predispositions for the development of sailing, and they are suitable for fishing, swimming and swimming.

Climate predispositions of North-eastern Bosnia for development of recreational tourism in colder part of the year

Boreal climate types with snow and cold winters and more pronounced seasonal changes, due to low temperatures, prevent a wide range of recreational activities that are possible during the warmer part of the year. On the other hand, these climate types are ideal for the development of winter recreational tourism, which is most often carried out in mountain areas and in winter tourist centers, but it is also common during the coldest months possible in low-altitude regions as well as on rivers, lakes etc. Here, primarily, it refers to winter sports and recreational tourism, which includes various recreational

Table 5. Ideal weather conditions for winter recreational activities

Weather conditions	Nordic skiing	Alpine skiing	Snowhiking	Motor sledges
Snow depth (cm)	20 - 60	20 - 60	20 - 60	30 - 60
Air temperatures (°C)	-2 do -15	5 do -20	10 do -40	10 do -30
Slackening the track (°C)	-3 do -15	-3 do -15	-	-3 do -15
Wind speed (km/h)	< 20	< 15	< 45	< 45

Source: International Institute for Sustainable Development, The Effects of Climate Change on Recreation and Tourism on the Prairies, A Status Report (https://www.iisd.org/pdf/recreation_climate.pdf) Hall, C. M., Higham, J., 2005: Introduction: Tourism , Recreation and Climate Change, u: Tourism, Recreation and Climate Change, (ur. Hall, C. M., Higham, J.), Channel view publications, Clevedon, 3-28.; Vojnović, N. (2017)., Prirodna osnova i turizam, Sveučilište Jurja Dobrile, Pula.; (prilagodili autori)

activities on snow and on the move, such as skiing, cross-country skiing, ice skating, snow and ice sports etc. (Bartoluci, 2003) The set standards for weather conditions for winter

ecreational activities in Table 5 relate to activities that generally require low temperatures and plenty of snow such as alpine and Nordic skiing, snowhiking and motor-sledge driving, but the list of activities can expand to various sports recreational games in winter days with little snow or in days that are completely free of snowfall.

Table 6. Average winter air temperature (°C) and average winter precipitations (l/m^2) in North-eastern Bosnia (1961-1990.)

Meteo. station	Average winter air temperature (°C)					Average winter precipitation (l/m^2)					
	XII	I	II	III	Monthly average	XII	I	II	III	Monthly average	Winter average
Tuzla	0,9	-0,8	1,7	5,7	1,9	72	59	55	61	61,8	2,1
Kladanj	0,6	-1,6	0,7	4,5	1,1	93	74	71	73	77,8	2,6
Gračanica	0,8	-0,9	1,7	5,7	1,8	63	57	54	55	57,3	1,9
Zvornik	1,4	-0,5	2,0	6,1	2,3	75	60	59	65	64,8	2,2
Bijeljina	1,4	-0,6	1,9	6,3	2,3	60	48	46	54	52,0	1,7
Vlasenica	0,8	-0,8	1,1	4,7	1,5	89	77	72	82	80,0	2,7
Bratunac	1,1	-0,6	2,1	6,2	2,2	68	53	54	60	58,8	2,0
Srebrenica	0,8	-0,7	1,7	5,3	1,8	79	64	62	62	66,8	2,2
North-eastern Bosnia	1,0	-0,8	1,6	5,6	1,9	75	61	59	64	64,8	2,2

Source: Federalni hidrometeorološki zavod Sarajevo, 2010.

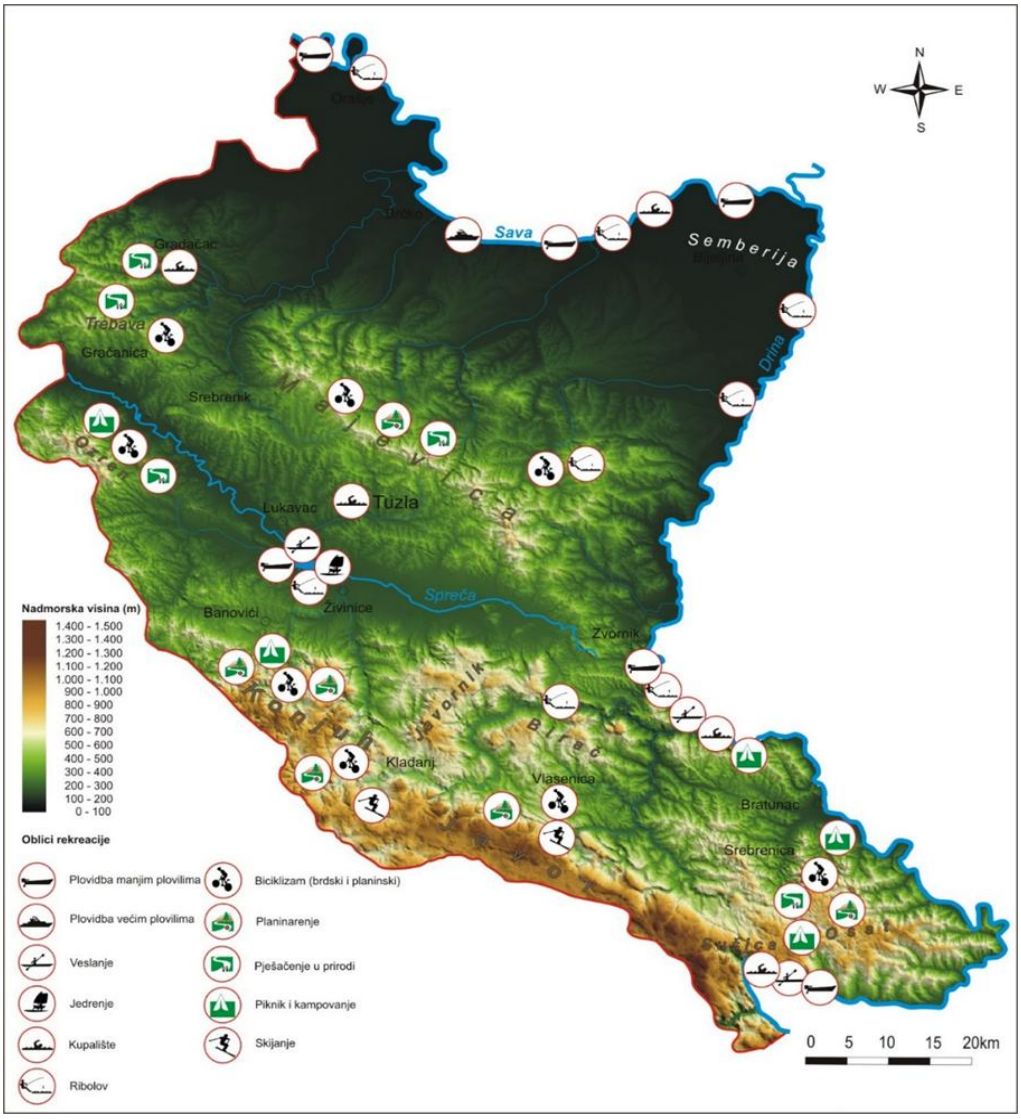
Due to its borderline position towards the high-ranking zone of the Inner Dinarides of Bosnia and Herzegovina, the northeastern Bosnia in a relief view, in the south, is distinguished by the mountain character of the relief in which moderate warm and humid climate prevails with fresh summer and cold winters (bases of Konjuh, Javor, Javornik and Sušice) and snow-forested humid boreal climate, with cold winters and plenty of snowfall in the highest mountain areas. The average winter temperature above Northeastern Bosnia is 1.9°C, and the lowest is registered in Kladanj (base of Konjuh) 1.1°C and Vlasenica (bottom of Maple) 1.5°C. The coldest month is January with an average air temperature of -8°C. The lowest average January air temperature was measured in Kladanj (-1.6°C), and the highest in Zvornik (-0.5°C). At the same time during the winter months, the average precipitation of the region is 64.8 l/m^2 (Vlasenica 80 l/m^2, Kladanj 77.8 l/m^2) and 2.2 l/m^2 per day (Table 6).

Table 7. Maximum depth of snow (in cm) in North-eastern Bosnia (1961-1990.)

Meteorological station/Month	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	Av. winter	Av. yearly
Tuzla	62	97	48	25						4	34	65	68	47,9
Kladanj	97	129	46	45	3					18	61	92	91	61,4
Gračanica	22	66	20	6							13	20	32	24,5
Bijeljina	48	68	37	4							16	55	52	38,0
Vlasenica	84	120	66	50						16	65	62	83	66,1
Bratunac	52	49	45	10						1	22	55	50,3	33,4
Srebrenica	55	55	12	10							30	42	41	34
Northeastern Bosnia	60	83	39	21	3					10	34	56	59,5	38,3

Source: Federalni hidrometeorološki zavod Sarajevo, 2010.

Of particular importance for the development of winter tourism in Northeastern Bosnia is the snowfall that is more or less present for six to seven months a year. The average annual maximum height of the snow cover in the region is 38.3 cm. Expectedly, most snow falls during the winter months (December 56 cm, January 60 cm, February 83 cm, March 39 cm), and the average winter height of the snow cover is 59.5 cm.



Map 1. Possible recreational activities in North-eastern Bosnia
Source: Topografska karta Bosne i Hercegovine 1: 200.000, Vojnogeografski institut, Prvo izdanje, Sarajevo, 1976.

The highest average annual maximum amount of snow cover was measured in Kladanj (129 cm) and Vlasenica (120 cm) and is characteristic for the month of February, when a maximum of 97 cm snow was measured in Tuzla. Slight amounts of snow fall in May (Kladanj 3 cm) and October (10 cm), (Table 7).

According to the standards set in Table 5, which refer to the ideal weather and other conditions for winter recreational activities, the depth of snow for Nordic and Alpine skiing is foreseen; for snowhiking it is 20 to 60 cm, and for driving with sleds 30 to 60 cm. In that, Nordic skiing requires the lowest air temperatures (-2 to -15°C), they are slightly more suitable for alpine skiing (5 to -20°C), and the widest temperature ranges are set for snow walking (10 to 40°C) and snowmobile driving (10 to 30°C). By comparing the winter air temperatures and the height of the snow cover in the area of Northeast Bosnia and set standards for winter recreational activities, we conclude that the height and distribution of snowfall during the winter months allows winter recreational activities in the snow not only to the southern mountainous regions, but also in the northern and central parts of the region. Nevertheless, the greatest advantages for the development of winter recreational tourism on the snow are the area of the Konjuh and Javor Mountains, which thanks to suitable altitudes and slopes with relatively high snow and low air temperatures in the winter, allow for alpine skiing as the most attractive recreation and sledging, snowboarding, telemark and other similar activities (tables 6 and 7, chart 1). Thanks to numerous benefits, these areas have been recognized and activated in order to develop winter sports and recreational tourism in the area of Northeast Bosnia and today the ski center "Karaula" is the only one in the region that has a functional ski lift. This winter center is managed by the Public Company "Karaula" d.o.o Kladanj which was established in 2006 for the development of tourism in this area. Due to the sufficient amount of snowfall, the ski resort is always well visited during the winter, especially in January and February. Kladanj ski lift is 800 m away from the city center, with a suitable track with moderate slopes for different types of skiing with a length of 1,700 m, while the length of the climbing track is 1,110 m. The ski lift capacity is 1,200 skiers per hour (http://www.jpkaraula.com/#). In addition to this, on the Javor Mountain there is a ski center "Igrišta", which was built during the Olympic Games in Sarajevo in 1984 as an auxiliary ski center, and has been in use since 1985. Currently it has about 6 km of arranged ski trails which during the winter are a place for winter recreational activities for both, inhabitants of Northeast Bosnia and neighboring regions *(http: // www. Rekreacija.ba/index.php/portal/mjesto_za_rekreaciju/ski-centar-igrista-vlasenica).*

CONCLUSION

The favorable climate of the region of Northeast Bosnia is the most important natural prerequisite for the development of various forms of tourism in this region. This is unequivocally confirmed by the complex analyzes of climatic elements that have shown that the climate base together with the vast natural resources of certain parts of the region is very suitable for the development of various forms of recreational tourism. The importance of excursion, sports, health and other recreational activities and movements for Northeast Bosnia is multiple because the region, both in Bosnia and Herzegovina and in the region, is recognized as a mining and industrial area with no significant tourism trends. The affirmation of recreational tourism in the wide forested areas of the mountainous south and southwest, as well as the larger part of the wider area of the lower Podrinje and Posavina

would enable the recreational needs of both domestic and foreign guests in the natural and clean environment. In addition, recreational tourism can be an important factor and an incentive for the development of rural and ethno tourism in these dominantly rural and agrarian areas.

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SUMMARY

CLIMATE AS A DEVELOPMENT FACTOR OF RECREATIONAL TOURISM IN NORTH-EASTERN BOSNIA

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The recreational activities and trends in most regions are characterized by exceptional seasonality, i.e. the summer and winter seasons. This primarily applies to extremely mountain and coastal regions mainly recognizable by ski tourism or bathing tourism. However, regions without a recognizable "tourist identity" and with an attractive natural resources and a multitude of potentials, especially climatic ones, such as in North-eastern

Bosnia, have the potential to develop different forms of recreational tourism (sport - recreational, sightseeing - recreational, health - recreational) in different areas throughout the year.

The favourable climate of the North-eastern Bosnia region is the most important natural prerequisite for the development of various tourism forms in this area. This is also confirmed by the complex analysis of climatic elements which imply that the climate basis together with the abundant natural resources in some areas of the researched region is very suitable for development of various forms of recreational tourism. The favourable climate predispositions of North-eastern Bosnia is highlighted by the results of analyzes that show that during the year there are no unfavourable or impossible climatic conditions for the development of various forms of recreational tourism during the year. Qualitative active outdoor vacations in the spring and fall months are usually done by hiking, running, mountaineering, cycling, field trips etc., in the summer, besides mentioned, it is possible to go on camping, swimming, sunbathing, rafting, sailing etc., and in winter months recreation on the snow (snow hiking, sledding, alpine skiing, snowmobile tours etc.).

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