

FIELD WORK – JUNIORS

MAXIMUM 40 POINTS

Introduction

The study area is Kopaonik Mountain, with a maximum altitude of 2017 m above sea level, on the Pančić peak, named after the famous biologist Josif Pančić. Kopaonik Mountain is very interesting due to its geological history, its lithological formations, and also because of its mining resources, which are responsible for its name (Kopaonik from the verb kopati = dig). In the Tertiary period, this area was extremely active tectonically, with active volcanism. Today it is one of the most seismically active parts of Serbia, known for a series of strong earthquakes that occurred on its eastern slopes between 1980 and 1984. Numerous spas and thermal and thermo-mineral water springs at the foot of the Kopaonik Mountain and in its surroundings bear witness to tectonic activity in the recent geological past.

Since 1981, this area has been protected as the Kopaonik National Park, which covers an area of 11,810 hectares. Kopaonik's important endemic and rare species include the Kopaonik houseleek (*Sempervivum kopaonikensis*), the Kopaonik violet (*Viola kopaonikensis*), Pančićeva režuha (*Cardamine pancicii*), Serbian flax, Pančićev vijuk and Eidelweiss. Kopaonik's rich variety of animal species deserve special attention, of which the Golden Eagle, Peregrine Falcon, Tawny Owl, Shore Lark, Common Crossbill, Eagle-Owl, Dormouse, Wildcat, Fallow Deer, amongst others, stand out. There are several very interesting waterfalls, gorges, springs, and rocky formations inside National Park. Kopaonik Mountain is especially beautiful for its distinctive landscape of coniferous forests (spruce and fir) at higher elevations and mixed beech and oak forests on its slopes, and also pastures and meadows.

Kopaonik is the largest and best-known Serbian ski centre. The Ravni Kopaonik plateau is centred around tourism, with a wide range of accommodation and a network of ski slopes amongst other facilities. Another tourist hotspot is located near the village of Brzeće, on the eastern slope of Kopaonik. The first class ski slopes lie between 1650 m and 2017 m a.s.l. This tourist resort has a network of 24 ski-lifts connected in one system and 2 children's lifts. The ski-lift system can handle 32,000 skiers an hour. Guests also have the use of a 12 km for Nordic skiing. During the summer season Kopaonik Mountain is also crowded with tourists, to which numerous contents are offered. It is hard not to notice that Kopaonik is threatened by excessive tourist construction and use in recent years, which certainly already has serious consequences for this ecosystem.



Figure 1: Kopaonik Mountain tourist centre

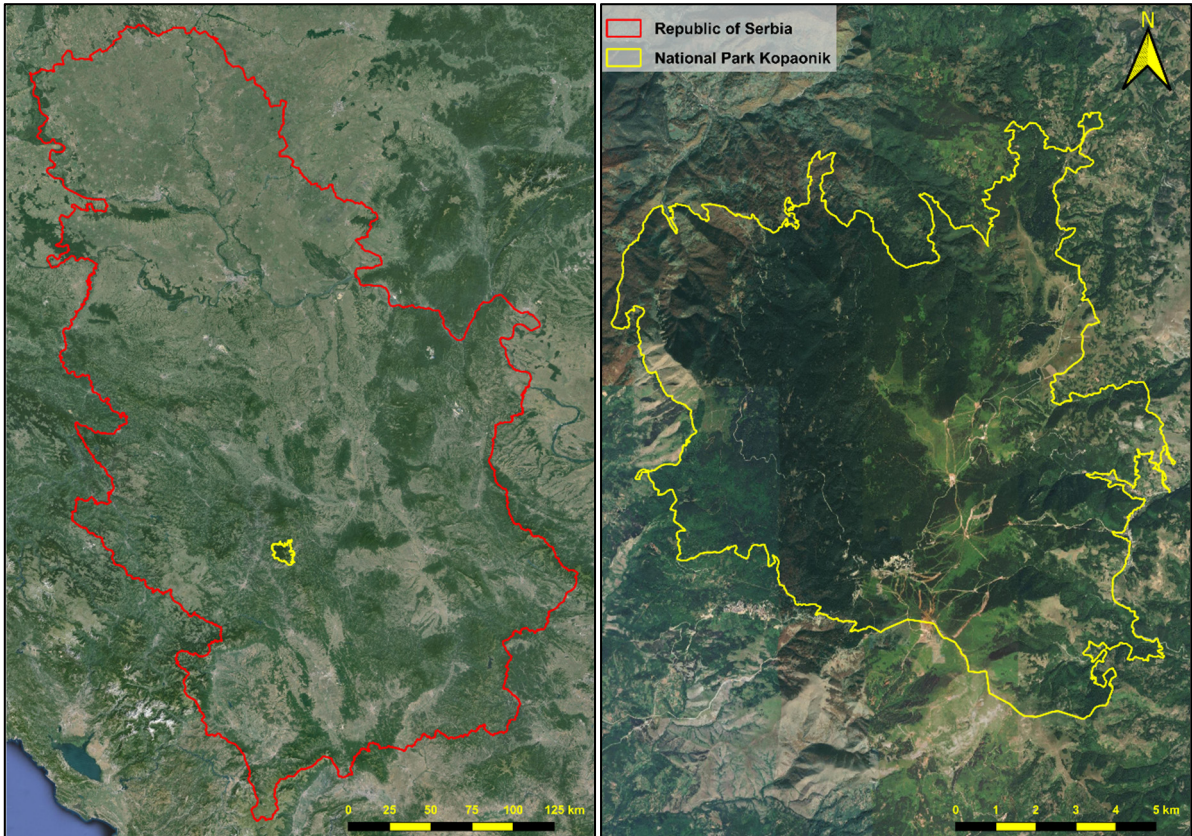


Figure 2: Study area location

Task 1 (4 points)

In the first part of the field assignment, you walked through a spruce and fir forest. You noticed that many of trees are drying out. Name two possible causes.

1. _____ ;
2. _____ .

Task 2 (2 points)

In the aforementioned forest you came across granite rock formations called Markova stena (Marko's Rock). Why do they stand out from the rest of the landscape?

Task 3 (2 points)

Use the map in the following figure to calculate the shortest distance from the starting point to Marko's rock. The starting point is marked on the map with a purple square, and Marko's rock with the triangle on the topographical map. Take the centers of the square and triangle into account when calculating.

_____ meters

Task 4 (3 points)

Below Marko's Rock there is an artificial lake. The next figure shows an old topographical map, from the time when the lake did not yet exist. Your starting point is marked on the map with a purple square. Mark the place where the lake is now located with a circle.

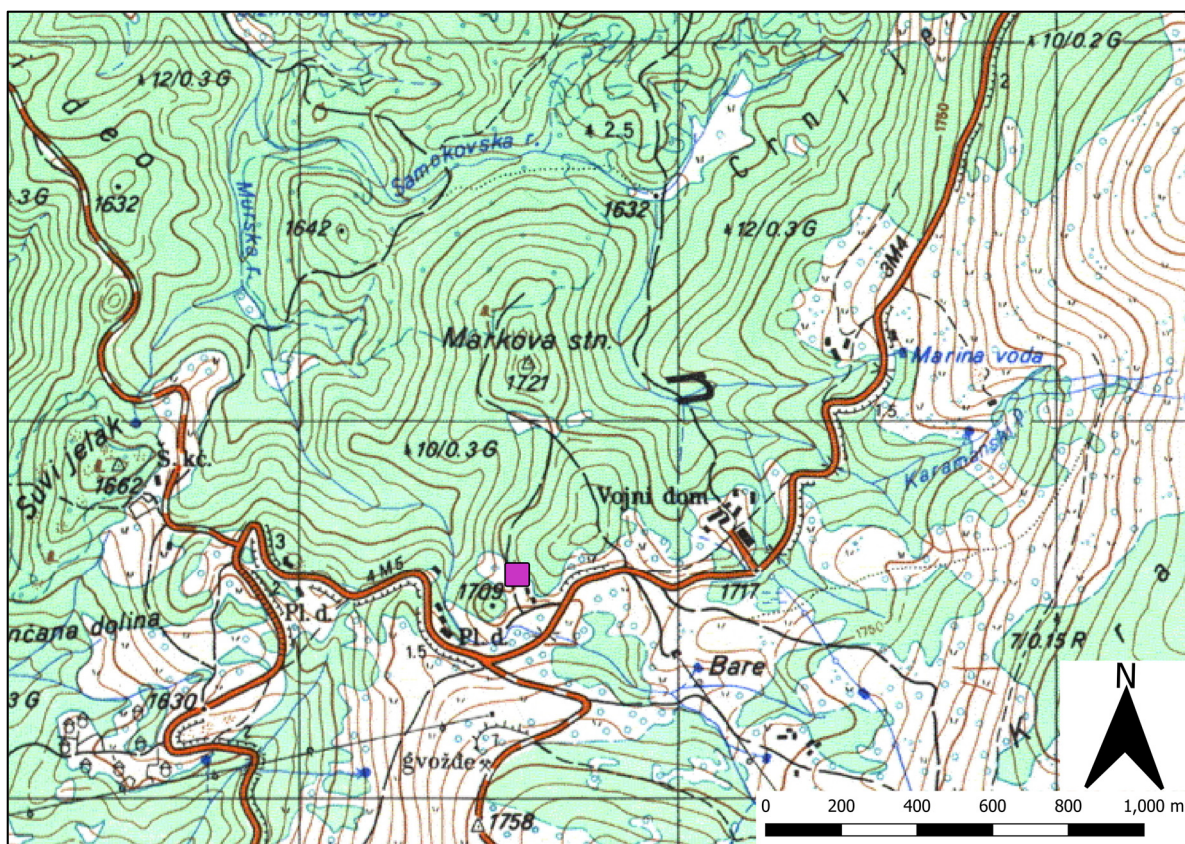


Figure 3: Old topographical map of area

Task 5 (4 points)

The next figure shows the satellite image of the study area with the Kopaonik tourist center from 2004. Mark the locations of 2 distinctive buildings that exist today, but did not exist in 2004, with a square drawn on figure and a number 1 and 2 inside the square.



Figure 4: Satellite image from 2004

Task 6 (6 points)

The next figure shows the topographical map with three ski tracks (A, B and C). Calculate the vertical distance (altitude difference) from the beginning to the end in meters and the length in meters. The vertical distance between the isohypses is 10 meters.

Ski track	Vertical distance [m]	Length [m]
A		
B		
C		

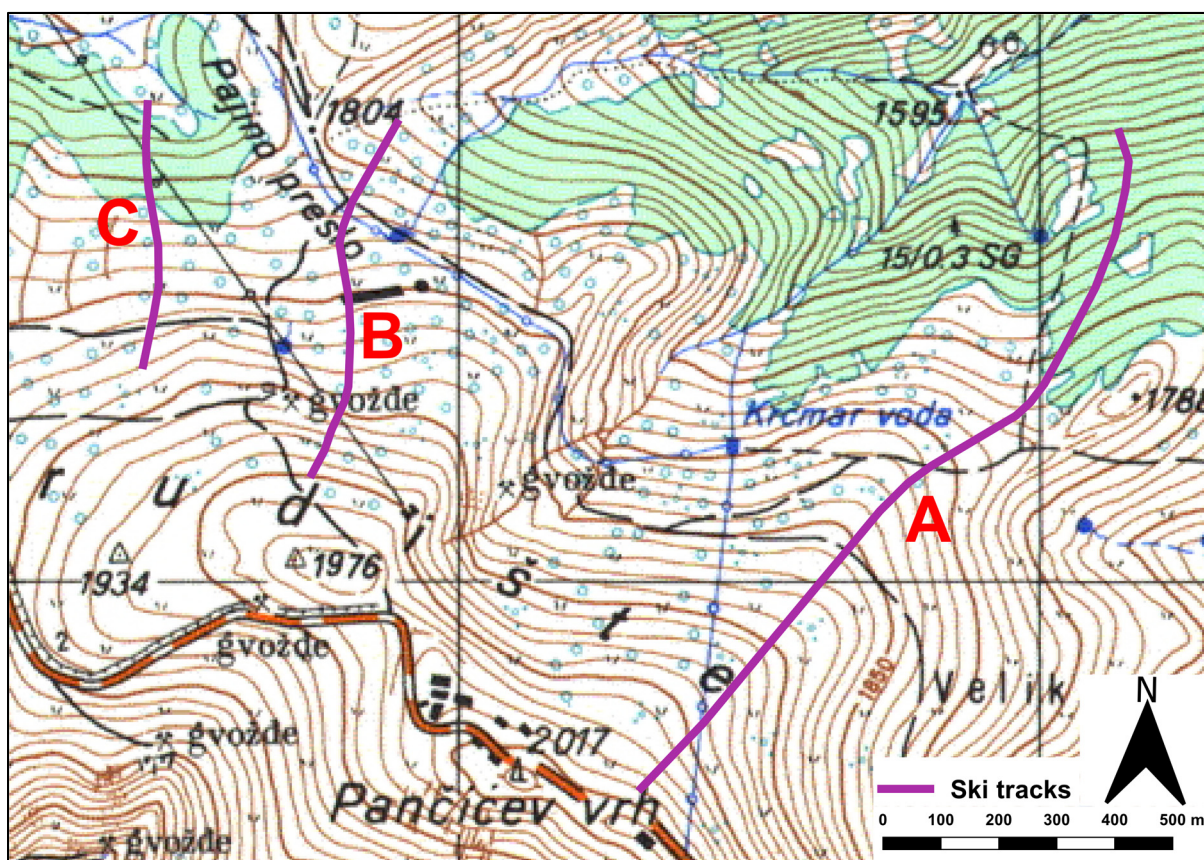


Figure 5: Topographical map with ski tracks

Task 7 (3 points)

The next figure shows the satellite images of a place located 6 km west of the Kopaonik tourist center. The images are from 2004, 2012 and 2021. Name and describe the anthropogenic process that can be seen in the time series of the satellite images, and that also can be seen in the center of Kopaonik?



Figure 6: Satellite images from a location 6 km from the Kopaonik center

Task 8 (6 points)

List 3 negative consequences of the process described in the previous task:

1. _____;
2. _____;
3. _____.

Task 9 (5 points)

The next figure shows a map of the land use/land cover of the Kopaonik tourist center. Fill in the legend of the map with the correct land use types, from the following: 1. forest; 2. bush/shrubland; 3. grassland; 4. artificial areas; 5. bare land.

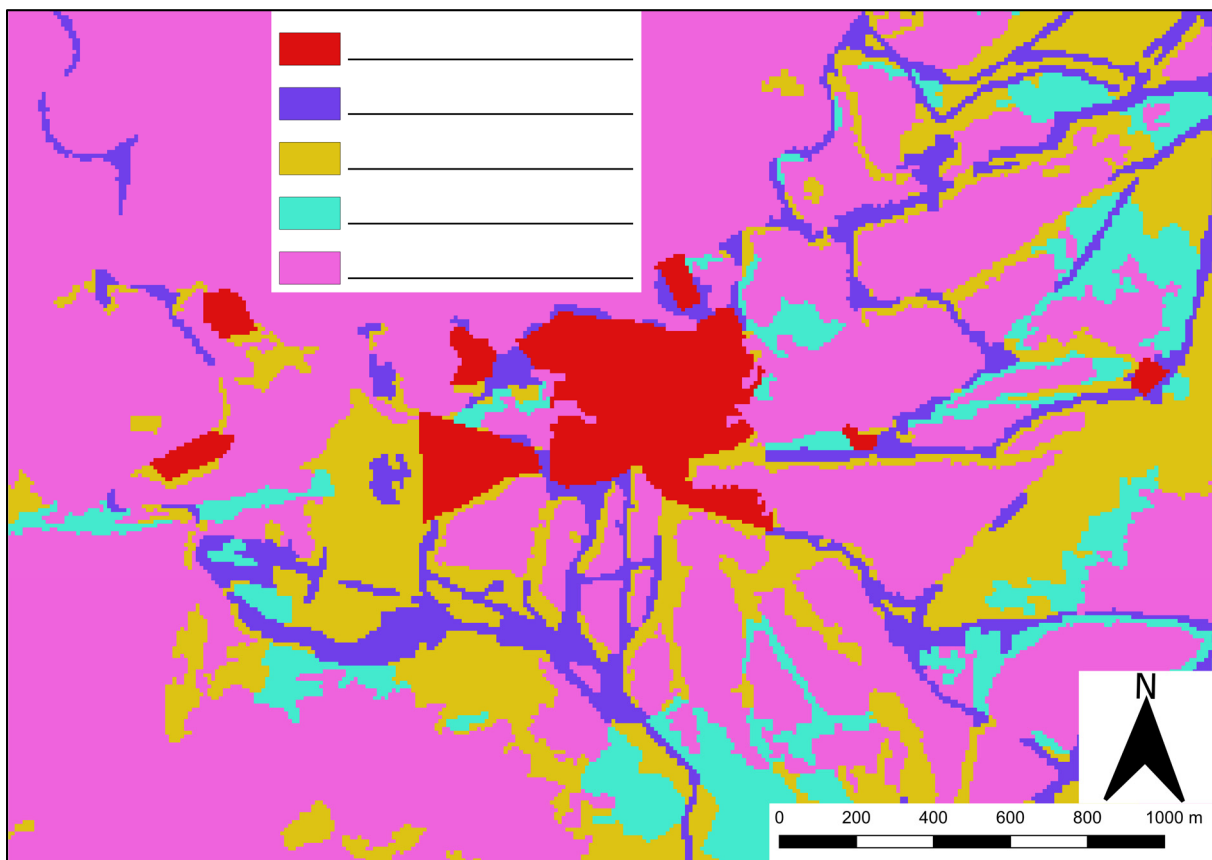


Figure 5: Land use/land cover map

Task 10 (5 points)

The meteorological station on Kopaonik mountain is located at 1710 meters above sea level, coordinates 43°17' N, 20°48' E. The following table shows the monthly average values of temperature, precipitation, number of days with snowfall, number of days with snow cover and number of frost days for the period 1991-2020. Based on the monthly values, calculate the annual average values for the above climate parameters. **Round the results to one decimal place.**

Parameters	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	Year
Temperature [°C]	-4.5	-4.3	-1.8	2.6	7.4	11.3	13.2	13.6	9.0	5.3	1.1	-3.2	
Precipitation [mm]	67.1	65.2	84.6	94.1	120.9	108.6	97.6	76.7	90.2	82.0	75.1	78.0	
Days with snowfall	16.3	15.3	16.3	11.5	3.8	0.4	0.1	0.1	1.0	3.7	8.4	14.7	
Days with snow cover	30.3	27.9	29.9	19.0	2.6	0.2	0.0	0.0	0.3	3.7	10.9	27.1	
Frost days	29.9	26.9	26.5	16.3	4.9	0.5	0.0	0.0	2.2	9.6	17.8	27.8	