**Macedonian Journal of Ecology and Environment**
Vol. 15, issue 2
pp. 81-111
Skopje (2013)
ISSN 1857 - 8330
Original scientific paper
Available online at www.mjee.org.mk

# Regional division of the Republic of Macedonia for the needs of biological databases

## Регионална поделба на Македонија за потребите на биолошките бази на податоци

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The aim of the presented work is elaboration of consistent and geographically defined territorial division of the Republic of Macedonia that will serve to define floral, faunal and fungal distribution ranges. The main reason behind this is the need to harmonize biodiversity distribution data which are inconsistent due to the various understandings of the mountains' and valleys' territories and their borders in Macedonia of historic and current researchers. The regional division in the sense of this work means precise definition of the territories of the mountains, valleys, plateaus, river gorges and traditionally accepted regions (by the local population) in the Republic of Macedonia. Administrative division and other political-economic development regions were not considered. Basic criteria for this division were: geomorphology, traditional view of the spatial units, ecological, land use and biogeographic criteria. The use of toponyms, English quotation and spelling were harmonized as well. Ninety three individual regions were identified. Eight regions comprise additional 21 sub-regions which makes 106 spatial units in total. Out of them, 44 regions are mountainous, nine are hilly, two are plateaus, 22 are valleys or plains, six are river gorges, three are lakes and seven are traditionally known provinces.

**Key words:** regions, mountains, hills, river gorges, valleys, plateaus, lakes

Цел на презентираната студија е изработка на конзистентна и географски определена територијална поделба на Република Македонија која ќе служи како основа за определување на подрачјата на распространување на флората, фауната и фунгите. Главната причина во основа на ова е усогласувањето на недоследностите во податоците за дистрибуција кои се неконзистентни поради различните сфаќања на територијалното протегање на планините и котлините и нивните граници од страна на различни истражувачи во минатото и сега. Под регионална поделба, во смисла на оваа студија, се подразбира точно дефинирање на територијата на планините, котлините, висорамнините, речните клисури и традиционално сфатените области (според тоа како локалното население ги именува) во Македонија. Не се подразбира административна поделба, регионална поделба во смисла на политичко-економски или развојни основи и слично. Основните критериуми за оваа поделба беа: геоморфологијата, традиционалното видување на просторните единици, како и еколошките и биогеографските критериуми. Употребата на топоними, правопис и англиско цитирање беше дополнително усогласена. Беа идентификувани 93 одделни региони. Во осум од регионите беа издвоени уште дополнителни 21 подрегиони, што значи вкупно беа определени 106 просторни единици. Од нив, 44 се планински региони, девет се ридски, две се платоа, 21 се долини, котлини и рамници, шест се речни клисури, три се езера и осум се традиционално познати области.

**Клучни зборови:** региони, планини, ридови, речни клисури, котлини, рамници, езера

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## Introduction

Republic of Macedonia harbors extraordinary rich biodiversity not comparable to its surface. Due to this, coupled with the low level of research ("Terra incognita"), taxonomists from all over Europe used to collect biological materials from mountains, gorges and valleys in the country. During the period of the last two centuries various names, mainly indicated by the local population, were used for localization of the findings. Due to the lack of basic written geographic material, including appropriate maps, the toponyms were regularly wrongly written and/or misspelled. After the World War II the biological research in Macedonia grew considerably but even domestic researchers did not use harmonized toponymy. This especially concerns the names of broader regions like mountains, valleys and other defined territories. There is no unified understanding of the borders of such territories yet.

As a consequence, there is an extensive variation and inconsistency in the data for findings of species (toponyms, localities, wider spatial units) in scientific and other professional literature in the field of biology for the territory of Macedonia. It is common case when the same spatial units are quoted with different names, usually due to the different regional approach (not because of wrong names of localities!). These inconsistencies make work with data difficult and decrease their applicative value. Among other reasons for inconsistent use of names of various spatial units one can mention: (i) wrongly quoted toponyms due to large number of foreign scientists from last two centuries and low science level in Macedonia in that time; (ii) toponyms out of the present territory of the Republic of Macedonia due to its broader geographic boundaries; (iii) insufficiently precise data (the city or municipality has been quoted) due to the lack of knowledge of mostly foreign researchers which was a result of lack of geography background for Macedonia in previous times.

In the meantime building geographic background for the territory of Macedonia started in the beginning of XX-th century. Various divisions of the territory of the country were produced so far and do exist at present but they were elaborated for completely different purposes. Probably the first such division, proposed by Cvijić (1906-1911), was done on the bases of geological and geomorphologic criteria. Jaranov (1945) divided Macedonia (but in it broader, geographical borders) on various territories and catchments. He also used socio-economic criteria. Other authors have also contributed to Macedonia's division (Melić 1952, 1958; Roglić 1954-55; Kirovski 1970). Kirovski (1970) proposed more detailed division on the bases of two main criteria – relief and climate – and two other supportive criteria (soils and vegetation). One of the most elaborated divisions was done by Panov (1976). On the basis of natural characteristics of the country and using complex methodology he divided the Republic of Macedonia on four macro-regions, nine meso-regions and 23 micro-regions – the smallest natural areas. He provided detail description for the ambit and surface of all regions but without cartographic presentation.

Various other targeted divisions do exist as well. These include socio-economic division, tourist regionalization, ethnographic and demographic division, statistic-economic (NUTS regions) etc. (Daskalovski & Markoski 1996; Stojmilov et al. 1998; Stojmilov 2003, 2005; Markoski 2004a, 2005, 2008a, 2008b, Institute of National History 2007) ), as well as other physical geographic divisions (Markoski 2004b) and climate (Ristevski 1982). Agriclimatic division also exists (Filipovski 1955; Lozanovski 1994 and many others). Various vegetational, climate-vegetational and climate-vegetational-soil divisions of Macedonian territory were also performed during last century and they are all dividing Macedonia on altitudinal zones (for more details see Filipovski et al. 1996).

However, above divisions do not meet the needs of biologists and ecologists. This work is meant particularly to serve for the definition of the distribution ranges of species, but also general biogeography, ecology of species, landscape identification etc.

Thus, the aim of the presented work is elaboration of consistent and geographically defined territorial division of Macedonia that will serve to define floral, faunal and fungal distribution ranges. The main reason behind this is the need to harmonize biodiversity distribution data which are inconsistent due to the various understanding of the mountains' and valleys' territories and their borders in Macedonia of historic and current researchers. Collating all existing data into data bases that will enable proper access to biodiversity knowledge in Macedonia will not be possible without this effort.

We consider this work important not only for biologists and ecologists, but also for geographers, planners, tourist workers, foresters, local and central government administration and other interested parties.

### Natural characteristics of Macedonia

Republic of Macedonia is situated in the central part of the Balkan Peninsula (Fig. 1). Its southern-most point lies at Markova Noga (east shore of Prespa Lake) on the border with Greece; the northern-most point is Anishte (north of Kriva Palanka) on the border with Serbia and Bulgaria; the western-most point is Kestenjar (southwest of Debar) on the border with Albania; and the eastern-most point is Chengino Kale (east of Berovo) on the border with Bulgaria. The total surface of Macedonia is 25713 km$^2$ (official figure, based on old calculation).

*Geology and geomorphology*. The geologic evolution of the territory of the Republic of Macedonia is characterized by tectonic movements of great intensity in close past. There are four tectonic zones: Vardar zone, Pelagonian horst-anticlinorium, West-Macedonian zone and Serbian-Macedonian massif (Nestorovski 1968, Arsovski 1997). Macedonian rock masses have diverse composition and age. Parts of the Vardar zone, West-Macedonian zone and Serbian-Macedonian massif were under sea during the Carbon and Perm, while the Pelagonian horst-anticlinorium represented dry land. During Mesozoic most of the territory of Macedonia was covered by sea, only the Serbian-Macedonian massif represented land. Kenozoic is characterized by marine influence during Paleogene and lake-continental development during Neogene and Quaternary. Serbian-Macedonian massif was mostly dry land during Paleogene. Volcanic activity was

*Submitted:* 18.11.2013
*Accepted:* 22.12.2013


Figure 1. Republic of Macedonia in wider context of Balkan Peninsula

evident and deep depressions, filled with sea water, were created in the Vardar zone during Paleogene. Pelagonian massif and West Macedonian zone represented dry land. Paleogene sea retracted during Neogene. Five lake basins existed in Serbo-Macedonian massif, Vardar zone had seven, Pelagonian massif had three and West-Macedonian zone had eight such lake basins. Most of these lakes leaked out by the end of Neogene. Existing large tectonic lakes – Ohrid, Prespa and Dojran – in the Republic of Macedonia represent the remains from that lake phase of the geologic history of this territory.

The main feature of the current Macedonian relief is alteration of mountains (horsts), gorges and valleys and plains (Kolcakovski 2004). Macedonian mountains belong to three groups according to their elevation: high mountains (above 2000 m), medium high mountains (1500-2000 m) and low mountains (below 1500 m). There are five mountains over 2500 m: Korab, Shar Planina, Pelister, Jakupica/Karadzhica and Kajmakchalan. The highest peak is Golem Korab (2753 m a.s.l.) on Korab Mt., followed by Titov Vrv (or Turchin – 2748 m a.s.l.) on Shar Planina, Pelister (2601 m a.s.l.) on Pelister Mt. (or Baba Mt.), Solunska Glava (2540 m a.s.l.) on Mokra Planina Mt. (Jakupica Mt. and Karadzhica Mt. share this summit) and Kajmakchalan (2520 m a.s.l.) on Kajmakchalan Mt. (or Nidzhe Mt.). The group of medium high mountains includes 16 mountains, while low mountains' group is consisted of 10 mountains (see map on Fig. 2).

The largest plain in Macedonia is Pelagonia (1357 km$^2$). Other important plains (valleys) are Ovche Pole, Skopska Kotlina, Radovishko-Strumichko Pole and Polog (see map on Fig. 2).

*Climate*. In general, there are three different climate types in Macedonia: modified Mediterranean, moderate continental climate and mountainous climate. There are other more detailed divisions of Macedonia on the basis of climate (e.g. Filipovski et al. 1996), but for the purpose of this work we present only general climate types.

Modified Mediterranean climate is characterized by warm and dry summers and mild and rainy winters. The autumn is warmer and longer compared to the shorter and colder spring. Most of the precipitation occurs during autumn and winter (mostly rain, snow is quite rare). Such climate is evident in the southern part of river Vardar valley (Dojran, Gevgelija-Valandovo to Demir Kapija). Some influence is detectable in the Skopje plain and river Bregalnica valley to Kochani. This climate spreads in Strumica-Radovish valley through Struma and Strumica (Strumeshnica) rivers. Weak Mediterranean (Adriatic) influence can be noted in Debar and Ohrid-Struga valley (through Devoli and Crn Drim rivers).

The moderate-continental climate is characterized by relatively cold and humid winters and dry and warm summers. The spring is still colder than the autumn. Precipitation is represented by both rain and snow. Such climate is known for Maleshevo, Slavishte, Kumanovo valley, Ovche Pole, Skopje plain, Polog, Kichevo, Prespa and Pelagonia.

The mountainous climate is characteristic for mountains higher than 1000 m. Winters are long, cold and snowy. Summers are short and chilly. Spring is colder than autumn. Most of the precipitation occurs in autumn and winter (mostly snow).

The average annual air temperature in Macedonia is 11.1$^o$C. The warmest month is July (20.3$^o$C) and the coldest is January (0.3$^o$C). Low winter temperature shows the dominance of the continental influence, rather than the Mediterranean one. Spring temperatures are about 10$^o$C in plains and 6-7$^o$C in mountains higher than the winter temperatures (Stojmilov 2003).

Precipitation in Macedonia is quite irregularly distributed throughout the year. The highest annual precipitation of 1400 mm is recorded in the river Radika valley (western Macedonia). The lowest annual precipitation of less than 500 mm is characteristic for central Macedonia (Gradsko, Ovche Pole and Veles area). The regional differences in precipitation are mainly a result of the mountainous relief. Mediterranean rainfall regime is noticeable in the southern and western Macedonia. Central parts have modified Mediterranean regime while eastern Macedonia has modified continental pluviometric regime. Most of the precipitation is represented by rain, while the snow dominates the winter period. Summer drought is specific feature of the Macedonian climate. There is at least 30-days period of drought every year. The maximum length of the drought periods is up to 80 days (Lazarevski 1993).

*Hydrology*. Macedonian rivers belong to the Aegean watershed (87%), Adriatic watershed (13%) and Black sea watershed (only 44 km$^2$). Aegean watershed is represented by the waterseds of rivers Vardar, Strumica and Cironska Reka (or Dvorishka Reka). The Adriatic watershed includes rivers Radika and Crn Drim (Ohrid and Prespa lakes also belong to this watershed). Black sea watershed is represented only by the small river on Skopska Crna Gora Mt., tributary to Binachka Morava.

Macedonia has three large natural lakes of tectonic origin (Ohrid, Prespa and Dojran). There are natural glacial lakes, most of them on Shar Planina (about 40), but also on Korab, Deshat, Jablanica, Pelister and Jakupica.

*Biodiversity*. In spite of the relatively high degradation of nature (biodiversity) in Europe, Macedonia still retains a wealth of wildlife and a variety of natural and semi-natural habitats with favourable conservation status. According to the regional climate, distribution of soils and vegetation, there are eight climate-vegetation-soil zones in Macedonia (Filipovski et al. 1996). These zones represent the diversity of biomes in Macedonia: from the pseudomaquis in the lowest region, through thermophyllous oak belts and mesophyllous oak, beech and conifer belts to arctic tundra-like habitats on the highest parts of the mountains. The total surface area of forests in Macedonia is 947,653 ha or 36.85% of the total land area (MAFWE 2006). Macedonia once was rich in wetlands. Unfortunately, due to the melioration activities after the World War II most of these wetlands were dried out and valuable habitats were lost. Nowadays, the most important wetlands (containing variety of habitats) are Monospitovo, Belchishta, Katlanovo and Studenchishta.

The flora of the higher plants is very rich, possessing diverse floral elements (arctic-alpine, Caucasian, Eurasian, Greek-Anatolian, Illyric, Mediterranean, Middle-Europaean, Tertiary relict and Cosmopolitan) and a large number of endemic species. It is represented by approximately 3700 species. Mycobiota is represented by more than 2000 species (over 200 species of Ascomycota and over 1800 species of Basidiomycota) and additionally 450 lichenoid fungi. Macedonian fauna is also very diverse and so far about 13000 invertebrate and ca 455 vertebrate species (ca 85 fish species, 15 amphibians, 32 reptiles, ca 330 bird and 83 mammal species) have been documented. Centres of endemism in Macedonia are the natural lakes (Ohrid and Prespa lakes in particular) and high-mountain areas (MEPP 2003, 2004; Petkovski 2009; unpublished data).

## Methods

***Definition of the spatial units*.** The regional division in sense of this work means precise definition of the territories of the mountains, hilly regions, plateaus, valleys (including narrow river valleys and broad flatlands), lakes, river gorges and traditionally accepted regions (by the local population) in the Republic of Macedonia. Administrative division and other political-economic development regions were not considered. The division presented here was considered to be the finest one, which in this work represents the third level. However, in some cases further separation of two or more sub-regions in the frame of individual regions appeared to be necessary due to: (i) the specific relief distinctiveness of smaller spatial unites in respective regions; or (ii) because of existence of well established and well known toponyms for some parts of the respective regions.

Basic criteria for this division were:

Geomorphology – the definition of a certain territory according to its natural borders: elevation; mountain crests; divides; river flows, exposure etc. This was the basic criterion, applied to more or less all identified re-

gions to a certain extent. In many cases it was the most important and decisive criterion.

Traditional view of the spatial units – this is the second most important criterion with the similar weight like the previous one. It is related to the regions that cannot be defined easily geomorphologically but they bear common name ever since.

Ecological criterion – it was applied to define the ambit of the gorges, e.g. the altitudinal range of the two sides of the gorge which are part of the mountains or hills that are separated by the considered river. However, the lower part of the slopes of respective mountains is characterized by different ecological conditions due to the different meso-climate situation, modified by the humidity and temperature regime, compared to the higher mountainous part of the same slope. It is to be expected that biodiversity components will be different in the gorge compared to those higher up. Elevation, exposure, relief (rocky habitats), climate and other factors were considered while defining the territory of the gorge.

Land use criterion – it was used for fine-tuning the boundaries of the regions, e.g. some villages on the lowest part of the foothills of the slopes were included in the respective lowland region (with agricultural land and otherwise anthropogenically altered land) rather than to the mountain to which that slope belongs. This implies that the contour which is normally followed to delineate valley, in these cases will be discarded and the boundary will ascend on the slope to include the village or town in the respective valley. This criterion was not applied in case of mountainous villages.

Biogeographic criteria – it has minor role when defining the basic (lowest level) spatial units but it was an important criterion for definition of the large spatial units (e.g. first level).

An effort was made to transcript the toponyms in Latin alphabet and in English spelling (www.alati.org/enmk/) in order to provide for the use of this division by foreign researchers and/or in national works published in English language. Direct translation of existing toponyms was not applied in none of the cases.

It is obvious that in this work the division was done backwards – from the finest scale (third level), though the intermediate scale (second level), towards coarsest scale (the largest regions – first level). The "merging" of the third level regions into second level regions was done on the bases of the geomorphological and ecological criteria, while the grouping of second level regions into first level large regions was done mainly on the basis of the biogeographic criterion.

***Coding.*** Each region was given specific code of 5 characters (or 6 where needed). The first digit denotes level I regions (Tab. 1); next two digits denote level II (continuously from 01 to 24); the last two digits denote level III regions (continuously from 01 to 93); additionally the sub-regions were marked by small letters (sixth digit or character).

E.g. the code for Mokra-Karadzhica is **20619a**. The first digit (2) refers to the level one region - Central Mountains. The next two digits (06) refer to level two region - Mokra Planina Massif; next two digits (19) refer to the basic – level three region – Mokra Planina; the last character (a) refers to sub-region of Mokra Planina – the mountain Karadzhica.

***Mapping.*** Cartographic base for delineation of regions was topography maps of 1:25000 scale (Agency for Real Estate Cadastre of the Republic of Macedonia 2004). Digitalization in accordance with above listed criteria was done with ArcGis 9.3. The topography maps, where necessary, were overlaid with geological maps (1:100000, Federal Geological Institute, Belgrade, 1977). The mean altitude of the terrain was generated from the DEM (ASTER GDEM: http://gdem.ersdac.jspacesystems.or.jp/index.jsp).

Regional division for level two and level one was derived by merging corresponding polygons from regional division of level three.

## Results

The regional division of the Republic of Macedonia for biodiversity databases elaborated on the basis of the methodology described above resulted with identification of 93 regions (Fig. 3, Tab. 1 and GIS vector files in electronic supplement). Eight of these regions were further divided into 21 sub-regions (see text below). Finally 106 spatial units were identified and delineated (Tab. 1).

The size of the regions varies considerably, from the smallest regions (Dojran Lake – 26.03 km$^2$; Dojransko Pole – 26.24 km$^2$; Tikveshko Ezero – 27.26 km$^2$; Radika Gorge – 30.64 km$^2$ etc.) to the largest ones (Pelagonija – 1356.99 km$^2$; Mokra Planina – 1332.88 km$^2$; Osogovski Planini – 1249.75 km$^2$ etc.).

As can be seen on the map (Fig. 2), 44 out of 93 regions are mountainous (they include areas with the highest peak or peaks above 1000 m elevation; it has to be noted that average altitude of the mountains does not reflect their absolute height due to the different altitude of their lowest point and due to the different relief pattern); nine are hilly regions (they include hilly areas with highest peaks below 1000 m elevation), two are plateaus (they include areas that represents more or less flat or undulating land in hilly or mountainous parts of the country, irrespective to their elevation); 21 are valleys or plains (these include more or less narrow river valleys with at least some flat or gently sloping land as well as broad and large valleys - plains); three are lakes (these include surface of the three large natural lakes in Macedonia at their highest water level); six are river gorges (they include territories of the narrow gorges of some rivers with steep and mostly rocky slopes to the elevations where meso-climate conditions of the area are under the impact of the gorge itself). Eight regions are identified as provinces because of their traditional meaning (Fig. 2). They cannot be attributed to any of the above geomorphologic defined entities since they have characteristics of two or more of them.

Twenty four regions of the level II were identified by merging geomorphologically and/or ecologically closely related basic regions (level III regions) (map on Fig. 3). These higher rank regions were classified in seven distinctive macro-regions of the level I (map on Fig. 3). The latest have also clear biogeographic meaning.

A synoptic overview of all regions is presented in the table where the code, English and Macedonian (in Cyrillic alphabet) names are given (Tab. 1). English names are given in Latin alphabet (English transcription, as throughout the whole text below) and in Macedonian language (English translation for toponyms was not provided). Macedonian names were also transliterated (Romanized) into Latin alphabet (BGN/PCGN 1981 Agree-

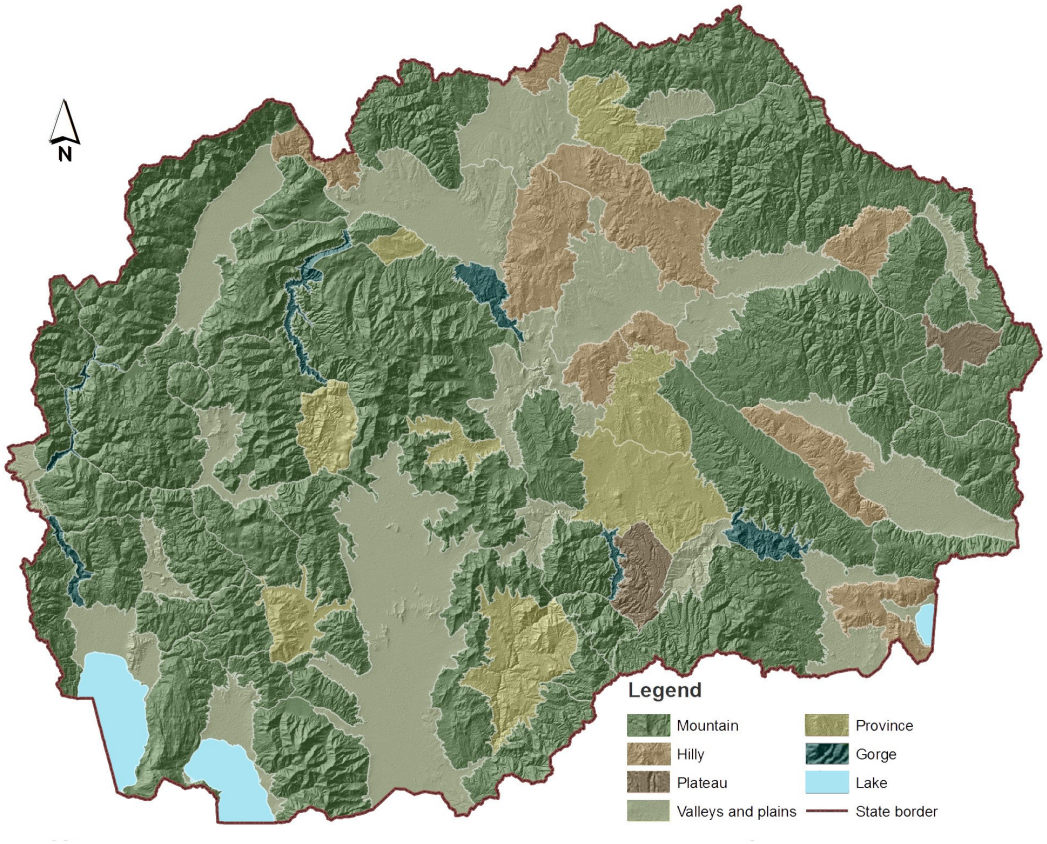


Figure 2. General view of level III regions grouped in various geomorphological and traditional types

ment; ISO R9:1968; Spirovski, M. Zh, unpublished).

Additionally, basic information for each region and sub-region is given below. The description include: (i) general identification of the region and description of the position, where necessary; (ii) very general data about geology; (iii) very general data about climate; (iv) very general data about land use and related human activities; and (v) general biodiversity data where necessary. For each region a short textual description of the boundaries, which follows clockwise pattern is given as well.

## 1 WESTERN MOUNTAINS

### 101 Shara-Korab Masif

### 10101 Radusha

It is named "Radusha" after the chromium mines in this region well known under the name "Radusha" and the village Radusha on Zheden foothills. It is hilly region (841 m the highest altitude) with average elevation of 581 m. Dry climate with high Mediterranean influence prevails. Radusha region is very important from biodiversity point of view because it is the biggest serpentine massif in Macedonia and supports many rare and endemic plant species and communities.

Boundaries. From border-pass Jazhince, along the state border till the river Lepenec, then along the river and along the contour lines at 350 m and 400 m elevation above villages Nikishtane and Gorno Svilare, then the boundary continues upstream along the river Vardar (including the village Radusha) to the inflow point of the river Belovishka Reka, then along the river, above the v. Nerashte, then following the stream Rakovac and below v. Vratnica continuing along the regional road to the border-pass Jazhince. Total area 102.24 km$^2$.

### 10102 Shar Planina

It is the largest and the longest mountain range in Macedonia. It is also the highest mountain after Korab (average altitude 1581 m; the highest peak – Titov Vrv 2748 m a.s.l.). Shar Planina has diverse geology (basically with domination of silicate formations - schist, granites and considerably smaller areas of limestone and other calcareous rocks, mainly in the central parts and Ljuboten massif), very diverse geomorphology and many glacial lakes. Continental, mountainous and alpine climate alternate along the altitudinal gradient. Due to this it supports very rich biodiversity and is very important from the conservation point of view.

Boundaries. From Furna (above Dolno Lukovo Pole), along Macedonia-Kosovo state border till the border cross Jazhince, then follows regional road Jazhince-Tetovo till the v. Vratnica, that downstream along the Rakovac stream till the contour line of 600 m, then to the west till the foothills of Shar Planina and on the south along the contours 550 m or 600 m excluding villages till v. Rechane (Gostivar), then follows a dale to Bunec pass, then along the northeast shore of Mavrovo Reservoir, continues along the right slopes above the stream Mavrovska Reka and the left slopes of the river Radika to v. Nichpur, then upstream along rivers Radika and Crn Kamen to the Kosovo borderline. Total area 830.44 km$^2$.

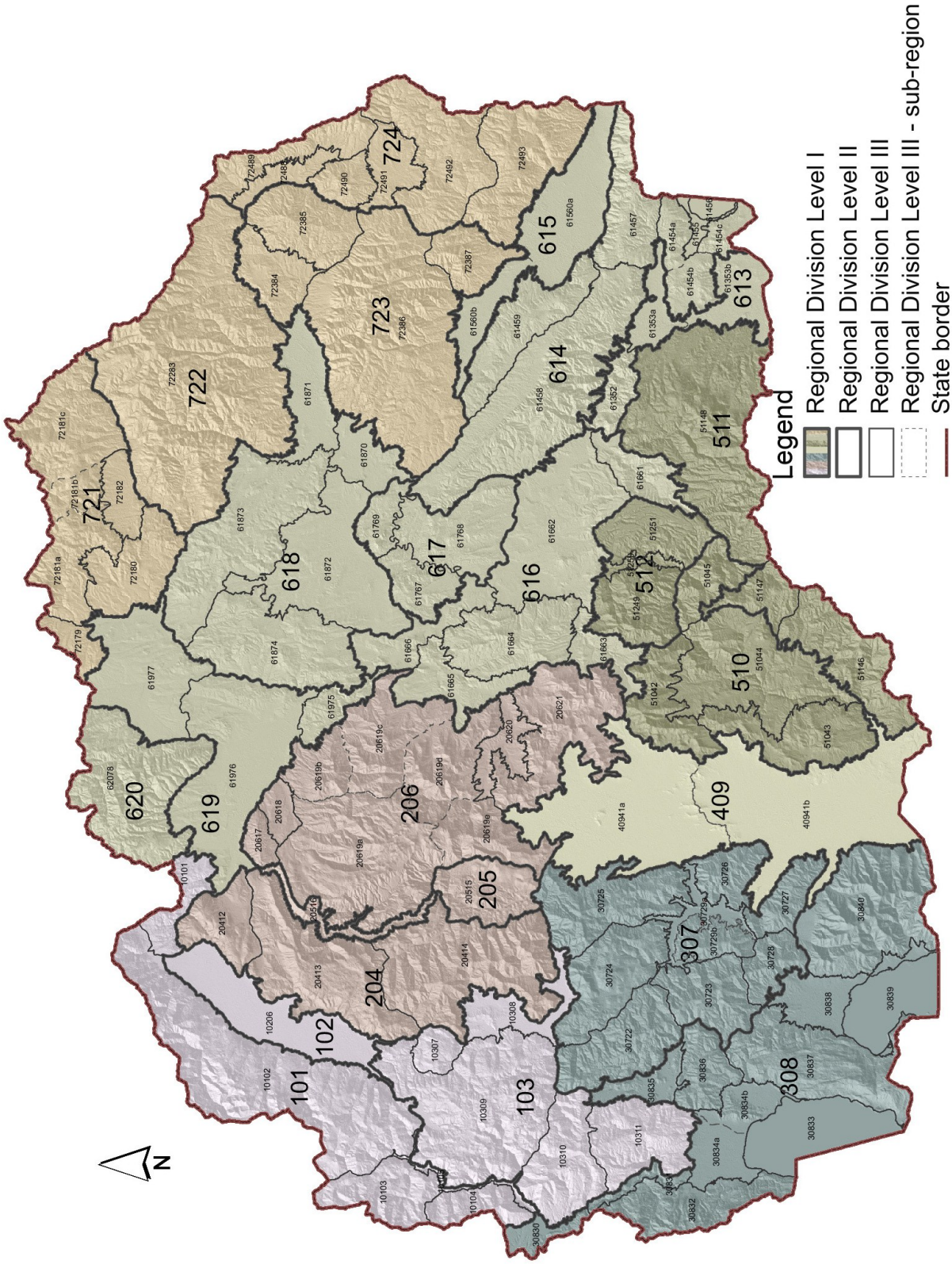


Figure 3. General view of level I regions and subordinate level II and level III regions

**10103 Korab**

Korab is the highest mountain in Macedonia (Golem Korab, 2764 m a.s.l.; average elevation 1671 m) with very similar, even the same geological characteristics like Shar Planina. It is the only mountain in Macedonia with alpine landscape.

Boundaries. From Visoko Brdo peak at the state border, along Macedonia-Albania and Macedonia-Kosovo state border, then downstream along the rivers Crn Kamen and Radika to v. Nichpur, then continues along the slopes above the river Radika, then upstream along Zhirovnichka Reka (Tairovska Reka) to its source at the peak Visoko Brdo - 2245 m. Total area 178.77 km$^2$.

**10104 Deshat**

Deshat is continuation of Korab toward south. It is a high mountain with several peaks above 2200 m a.s.l. (average elevation 1404 m). Although mountain climate is characteristic, its southern and eastern slopes are under the Mediterranean influence penetrating through Crn Drim and Radika valleys. It is basically silicate mountain (flish sediments), but some peaks and other large areas are calcareous masses. One of the largest gypsum formations in Europe is situated in the south-eastern part of the mountain.

Boundaries. From the pick Visoko Brdo downstream along Tairovska Reka (Zhirovnichka Reka), then along the right slopes above Radika river till Debar, at variable elevations (from 800 m to 1000 m) depending on the relief (rocks above Radika are excluded), then along foothills of Krchin Mt. above Debar (at around 700-750 m a.s.l.) till Macedonia-Albania state border, than the boundary follows the borderline to the pick Visoko Brdo. Total area 101.56 km$^2$.

**10105 Radika Gorge**

The river Radika gorge is identified as a separate region due to its different climate (under moderate Mediterranean influence) and other ecological conditions compared to the rest of the mountain slopes of which it is composed (Deshat, Korab, Shar Planina, Bistra and Stogovo). Upper part of the gorge (Mavrovska Reka gorge included) is more under continental climate influence. This region receives the highest amount of precipitation in Macedonia. It is one of the smallest regions identified in this study, with average elevation of 855 m. In broader scope (including villages on the slopes above the rivers) the region is known traditionally as Reka: upper part (Mavrovska Reka gorge and middle and upper flow of Radika) is known as Gorna Reka; lower southern part is known as Dolna Reka (lower flow of Radika) and south-eastern part (along Mala Reka, Tresonechka Reka and Garska Reka, including the village Galichnik) is known as Mala Reka.

Boundaries. It occupies the lower part of the left and right steep and rocky slopes of the gorge of Mavrovska Reka from the dam of the Mavrovo Reservoir downstream, then similar slopes of Radika gorge from v. Nichpur downstream to Radika inflow into Debar Reservoir and finally the slopes along the rivers Mala Reka, lower flow of Rosochka Reka and Garska Reka. Total area 30.64 km$^2$.

**102 Polog**

**10206 Polog**

Polog is broad and flat valley along the river Vardar at an elevation of about 400 m to 500 m a.s.l. (471 m average altitude) with continental climate, hardly modified by the Mediterranean influence. Agriculture is the main land use type and not much of the natural habitats have left (marshes and riparian forest). The valley is filled with alluvial deposits that cover Pliocene lake sediments.

Boundaries. It covers the Polog plain between the foothills (at about 400-600 m a.s.l.) of the mountains Shar Planina, Radusha region, Zheden, Suva Gora, Bukovik and Bistra, including most of the villages on the foothills of these mountains. Total area 322.06 km$^2$.

**103 Bistra-Stogovo massif**

**10307 Bukovik**

It is the small mountain plateau, composed mainly of Devonian marbles, surrounded by forested slopes. Average elevation is 1150 m. Continental climate prevails with some characteristics of mountainous climate in upper part. Carstic relief phenomena are common.

Boundaries. From Strazha pass, along the stream Sretkovska Reka down stream to Padalishka Reka inflow, then upstream till v. Padalishte (Han), then upstream along the dale up to the pass (the old road Gostivar-Kichevo), then downstream Svinski Dol till its inflow in Tajmishka Reka at v. Kolari, then upstream Tajmishka Reka and Gornoselska Reka streams to Strazha pass. Total area 60.99 km$^2$.

**10308 Kichevo valley**

Kichevska Kotlina is medium high valley with average altitude of 681 m, similarly to all other broad valleys in the western Macedonia. It is consisted of the broader parts of the valleys of the rivers Treska and Zajashka (Tajmishka) Reka. It spreads also toward Oslomej valley on the northeast. The climate is moderate continental in the whole region. Agriculture is dominant land use type with more or less intensive practices.

Boundaries. From the foothills of Bukovik Mt. at the v. of Bukojchani towards village Jagol Dolenci, along the contour lines of 850, 900 and 950 m, then along the foothills of Dobra Voda and Pesjak (at about 650 m to800 m a.s.l. elevation) to Kichevo and to the east till the v. Dolni Oreovec, then crosses Treska river and along the foothills of mountains Busheva Planina, Baba Sach and Ilinska Planina at about 650-700 m a.s.l., then crosses Treska river near v. Popolzhani, then along the foothills of Bistra Mt. (at about 750 m a.s.l.; 850 m above v. Zajas) till Tajmishka Reka to the point at v. Kolari. Total area 138.33 km$^2$.

**10309 Bistra**

Bistra is high mountain marble-limestone plateau with several peaks above 2000 m a.s.l. (average elevation is 1369 m). Its southern parts are under Mediterranean climate influence but continental and mountainous climate is characteristic for the rest the territory. It is well known because of vast pasturelands and the sheep breeding practices. Carst phenomena dominate in the relief pattern – carst fields particularly are the important part of the landscape. The biggest water sources in Macedonia are situated at Bistra's foothills on its southern and eastern parts.

Boundaries. From Bunec pass, down to v. Orchushe along the intermittent stream, then down the valley till just above Gostivar, then along Bistra Mt. foothills above villages Gorna Banjica and Lakavica, then the

boundary continues along the streams Lakavichka Reka, Djonovichki Potok and Sretkovska Reka upstream to Strazha pass, then along streams Gornoselska Reka and Tajmishka Reka down to v. Kolibari; the boundary continues along Bistra Mt. foothills just above villages of the Kichevo Valley till v. Drugovo, then along the river Treska to v. Izvor and then toward west up to Jama pass, then along the stream Jamska Reka and river Garska Reka, then along the right slopes above Mala Reka valley to the west, then left slopes of Radika gorge to the north and along the left slopes above Mavrovska Reka to the northeast till Mavrovo dam and along the shore of the accumulation Mavrovsko Ezero (including the reservoir) to Bunec pass. Total area 629.39 km$^2$.

**10310 Stogovo**

Stogovo is part of the large western Macedonian mountain chain that includes the largest and the highest mountains in Macedonia. It is composed of different geological substrates. Some of the highest peaks are calcareous (limestone, marbles) and some are silicate (phylites, meta-sandstones). Mountainous climate prevail on the large portion of the territory of this region. Stogovo is important for sheep breeding since large part of the mountain is covered by mountain pastures used for summer grazing. Average altitude is 1353 m.

Boundaries. From Jama pass downstream Suvi Dol to v. Izvor, then along the valley to Preseka pass, then down the valley towards v. Vrbjani, then along the stream Golema Reka toward west up to its source and then crosses the ridge between Ushite and Lisec (1666 m a.s.l.) toward Radomirska Reka and then follows the stream till its source; the boundary line crosses Stogovo-Karaorman ridge between Babin Srt and Lokofska Planina and continues downstream along Chatal stream (Selechka Reka) till the elevation of about 900 m then turns to the north along the foothills of Stogovo at about 900-1000 m a.s.l. slowly descending toward the shore of Debar accumulation, and then along the shore (excluding the reservoir) till just below v. Gorenci; then it continues along the slopes of Stogovo Mt. above rivers Radika, Mala Reka, Garska Reka and stream Jamska Reka till Jama pass. Total area 243.17 km$^2$.

**10311 Karaorman**

This region represents the southern part of Stogovo mountain range traditionally known as Karaorman. It is medium high mountain composed mainly of silicate bedrock – meta-sandstones, schists, diabases. It has moderate continental climate with low Mediterranean influence, but on the upper part mountainous climate prevail. Average altitude is 1274 m. It is fairly forested region important for large mammals.

Boundaries. From the point at about 900 m a.s.l. at Selechka Reka (Chatal) stream, upstream along the stream to the main Stogovo-Karaorman ridge between Lokofska Planina and Babin Srt; the boundary continues dowslope to the source of Radomirska Reka and then downstram along the stream till 1490 m a.s.l. where it turns upwards and crosses the ridge between Ushine and Lisec (1666 m a.s.l.), then downstream Golema Reka to v. Vrbjani; then it turns to the south along the foothills of Karaorman Mt. at about 850 m a.s.l. till v. Botun, then it turns along the river Sateska to v. Klimeshtani, then to the west along the foothills (at about 750 m a.s.l.) till v. Dobovjani and then on the north along the contour lines of about 900-1100 m above Crn Drim river till Selechka Reka and upstream to 900 m a.s.l. Total area 239.80 km$^2$.

**2 CENTRAL MOUNTAINS**

**204 Suva Gora range**

**20412 Zheden**

Zheden is low limestone mountain (Golem Zheden, 1259 m a.s.l.) with average elevation of 652 m. It is characterized by very dry and warm climate under strong Mediterranean influence.

Boundaries. From v. Jegunovce along the river Vardar (excluding v. Radusha) till v. Rashche, then alongside foothills of Zheden mountain till the stream Reka, then through Grupchin pass and along Zheden foothills till v. Jegunovce. Total area 157.93 km$^2$

**20413 Suva Gora**

Predominantly limestone mountain range with north-south direction of the ridge. Its eastern slopes are under moderate Mediterranean climate influence and western slopes are mostly characterized by continental climate. Average elevation is 1006 m.

Boundaries. From Grupchin pass downstream along the stream Reka till the area close to v. Arnakija, then along the foothills of Suva Gora toward Matka gorge (excluding v. Glumovo), then it gradually ascends up to the contour line of 900 m (location Lozno); then it runs along the slope (at about 600-800 m a.s.l.) above reservoirs Matka, Gorna Matka and Kozjak till the locality Manastirishte, then upstream along the dale till the ridge and then downstream to Trebovska Reka stream and along it to its confluence into the stream Volchica, then upstream till the locality Peklishte (1380 m a.s.l.), then downstream along Proi Zagarit, Srbinovska Reka and Lakavichka Reka streams to v. Lakavica; then the boundary continues along the foothills of Suva Gora Mt. at the elevation of about 550 m (excluding most of the villages) till Grupchin pass. Total area 446.27 km$^2$.

**20414 Dobra Voda**

Dobra Voda is the highest peak (2061 m a.s.l.) of the larger mountain range comprised of parts with different names: Cheloica, which is direct continuation of Suva Gora Mt. (code 20413) on the south, than Dobra Voda, Pesjak and Ilinica). The massif has complex geological composition but Lower Paleozoic green schists dominate. The climate is moderate continental at lower elevations and mountainous at higher elevation. Mediterranean climate influence is weak. Average altitude is 1106 m.

Boundaries. From v. Srbinovo along the streams Srbinovska Reka, Proi Zagarit and Proi e Ret till the pass Peklishte (1857 m a.s.l.) then downstream Volchica and upstream Trebovska Reka through the saddle and down the dale till Manastirishte, than along the Shishevska Klisura gorge at about 800 m a.s.l.; then along Treska and Mala Reka till the locality Janevo where it turns toward v. Inche and then down the dale (escluding v. Malo), then along the streams Zapetkojca and Urushka, then downstream Slatinska Reka and upstream Markovska Reka (excluding v. Markovci); then the boundary runs along the slope at 700 and 850-900 m a.s.l. till the river Treska at Makedonski Brod, than the boundary follows Treska upstream till the v. Dolni Oreovec, than it follows contour line of 600 m (excluding v. Rechani and v. Or-

lanci) till Kichevo, than along the contour lines of 700-800 m till v. Jagol Dolenci and further to v. Kolari (at 800-1000 m a.s.l.); then the boundary continues upstream Svinski Dol up to the pass at old road Kichevo-Gostivar, then downstream the dale to Padalishka Reka stream, then downstream Padalishka Reka and Srbinvoska Reka to v. Srbinovo. Total area 520.32 km$^2$.

**205 Treska Valley**

**20515 Poreche**

Poreche is another traditionally used name for a broad and geomorphologically diverse area along the river Treska Valley with average altitude of 782 m. It is low populated and undeveloped area, mostly abandoned during last several decades of 20-th century. Precambrian marbles bedrock predominates and the area is well known because of the presence of numerous large and attractive caves and cave systems. The climate is moderate continental, but in northern part Mediterranean influence is evident. This is an important area in relation to biodiversity values.

Boundaries. From Belichka Reka inflow in Treska upstream the river Treska till v. Gorna Belica, then upstream Shejtanik and Groot streams till the elevation of 900 m a.s.l., then along the slopes of Dautica mountain at an elevation of 1000-1200 m a.s.l. till Garvan peak and then downstream Crvlja Voda and Krapska Reka (including v. Krapa) till Barbaras pass, then along the slopes of Busheva Planina Mt. to Makedonski Brod, then around the town and along the slopes of Dobra Voda Mt. at an elevation of 850-900 m and 700 m a.s.l. till Markovska Reka (including v. Markovci), then along Slatinska Reka, Urushka and Zapetkojca streams till v. Inche, then along Inachka Reka till its inflow in the river Mala Reka; the boundary continues downstream along the rivers Mala Reka and Treska till the confluence of the rivers Belichka Reka and Treska. Total area 183.88 km$^2$.

**20516 Treska Gorge**

The river Treska gorge is identified as a separate region due to its different ecological conditions compared to the rest of the mountain slopes of which it is composed (Suva Gora and Karadzhica). Almost the whole length of the gorge was transformed into reservoirs (Matka on the north, than Matka II and Kozjak on the south) surrounded by steep Precambrian marble cliffs. It posses very rich biodiversity (especially plants and arthropods) and has high conservation value.

Boundaries. The region occupies the gorge part of Treska valley from river Belichka Reka inflow into Treska downstream to the mouth of Matka canyon. The region is restricted to the gorge slopes up to 550-700 m a.s.l. (maximum up to 1100 m a.s.l.). Total area 79.67 km$^2$.

**206 Mokra Planina massif**

**20617 Vodno**

Vodno is small mountain, composed mainly of Upper Cambrian marbles at upper part, cipolin and green schist. It is very important recreation site for the inhabitants of the capital – Skopje. Large part of the mountain was reforested but still there are lots of remains of natural vegetation with high conservation value. Average elevation is 670 m.

Boundaries. Northern boundary stretches along the foothills of Vodno at about 300 m a.s.l. and southern border at about 500-600 (750) m a.s.l. till Matka canyon on the west and Pripor on the east. Total area 48.41 km$^2$.

**20618 Torbeshija**

Torbeshija is a wavy plateau gently sloping toward west up to Suva Planina (Karadzhica) foothills. It represents a landscape with almost completely cultural characteristics. Average elevation is 440 m. From the geological point of view it belongs to Pelagonian formation composed of silicate rocks – gneisses, mica, granites and carbonate rocks as marbles and dolomites.

Boundaries. The regon occupies the hilly area between Karshijak (Vodno) on the north, Suva Planina on the west, Karadzica on the south and Kitka on the south-east down to Skopsko Pole plain, i.e. the area between Drachevo and v. Govrlevo in northeastern-southwestern direction. Total area 54.96 km$^2$.

**20619 Mokra Planina**

In some areas in Macedonia the term "Mokra Planina" comprises several central Macedonian mountains (Jakupica on the east-southeast, Goleshnica on the east-northeast, Kitka on the northeast, Karadzhica on the north, northwest and west and Dautica on the south-west). All these mountains represent ridges starting from the highest central part of the massif – Ubava-Solunska Glava (2540 m a.s.l.). Average altitude is 1057 m. Total area 1332.88 km$^2$.

**20619a Karadzhica (Mokra Planina)**

Karadzhica is high mountain characterized by complex geology. There are large carbonaceous masses (marbles) but silicate rocks (gneisses, mica, granites) represent significant portion. Average altitude is 1202 m, and the highest point is at the summit Solunska Glava (2540 m a.s.l.). Mountainous climate prevails, but there is moderate Mediterranean influence at its western and northern slopes. The region has significant economic value – sheep pastures. It has very high conservation value and a large portion of the mountain is under protection – protected area "Jasen", IUCN category VI.

Boundaries. From just below the v. Govrlevo downstream along Preod (Brezovachka Reka) stream till its inflow in Suva Reka stream, then along the foothills of Kardzhica Mt., excluding hilly valley and villages of the Torbeshija region, to the stream Reka, then upstream along the Reka stream up to the saddle Preslap and down to Kadina Reka river; then the boundary continues upstream Kadina Reka, then upstream Mala Reka to its source, then crosses the saddle on the west of Sipachan and runs downstream along the stream Sipachanska Reka to v. Gorno Jabolchishte, then along the stream Begova Reka till Gorno Begovo plain, then along the ridge thorugh Przhal up to Solunska Glava peak (2540 m a.s.l.) and down along the same ridge till the peak on the south of Marina Rupa (2326 m a.s.l.); then the boundary continues along the ridge on the west and southwest till the stream Krivi Doll, then it follows the stream (ravine) down to ravine Shejtanik and the river Belichka Reka till 480 m a.s.l.; after that, the boundary continues along the rocky foothills of Karadzhica Mt. above Treska river (Shishevska Klisura) at various elevation till the peak Plocha, then on the east along the streams Razol till just below the v. Govrlevo. Total area 562.59 km$^2$.

**20619b Kitka (Mokra Planina)**

Kitka is small but medium high mountain almost exclusively composed of silicate bedrocks. Average altitude of the region is 661 m, since its eastern boundaries

descend down to the river Vardar valley (about 200 m a.s.l.). The climate is moderate continental and mountainous with Mediterranean influence on its eastern and northern slopes.

Boundaries. From Mechkin Dol above v. Dreznica along the foothills of Kitka Mt. at an elevation of about 350-400 m a.s.l., excluding villages of Torbeshija, Skopsko Pole and Taor Gorge and Badar regions, till Kadina Reka river, then upstream along Kadina Reka till Preslap saddle, then downstream along Bri Nerezi (Reka) stream to Mechkin Dol. Total area 119.48 km$^2$.

**20619c Goleshnica (Mokra Planina)**

Goleshnica is medium high mountain composed of silicate bedrock – gneisses, mica and granites with flish formation sediments parts on its eastern slopes. Average altitude for the whole region is 780 m. Climate characteristics are similar as on Kitka (see above).

Boundaries. From the point on Kadina Reka river below Preslap (825 m a.s.l.) downstream the river till 235 m a.s.l., then along the foothills of Goleshnica Mt. at about 300-400 m a.s.l. elevation till Groot hill, then along the ridges above Topolka valley, excluding villages in the hilly region of the valley till Mala Reka stream above v. Banjica, then along Goleshnica Mt. foothills at about 300 m a.s.l. till Topolka river, then upstream the river till the v. Gorno Jabolchishte, then along Sipachanska Reka, Mumdzhica, Mala Reka and Kadina Reka streams till the point below Preslap. Total area 244.31 km$^2$.

**20619d Jakupica (Mokra Planina)**

Jakupica, together with Karadzhica Mt. are the highest mountains in Mokra massif (the highest peak Solunska Glava, 2540 m a.s.l.). However, the average altitude of Jakupica Mt. is 1032 m. It has complex geology; the highest part is composed of Precambrian marbles' bedrock. Climate is moderate continental on lower elevations, mountainous on the most of the territory and alpine at the highest part. Jakupica has very high conservation value although not protected up to date. It is also important for sheep breeding – summer pastures.

Boundaries. From v. Gorno Jabolchishte downstream Topolka river to its confluence with Melnichka Reka stream, then along the foothills of Jakupica Mt. at an elevation of about 450 m a.s.l. and at 550-650 m a.s.l. above Azot region till Babuna river, then upstream along Babuna river and Chepleska Reka stream till its source area and the peak Gorno Kjule, then up to the peak (2326 m a.s.l.) and then along the ridge through Solunska Glava peak (2540 m a.s.l.) till Begova Reka, then continues downstream to v. Gorno Jabolchishte. Total area 225.24 km$^2$.

**20619e Dautica (Mokra Planina)**

Dautica is another high mountain in Mokra Planina massif with average altitude of 1216 m. It is almost exclusively composed of marble bedrock with similar climate characteristics like Karadzhica. Average altitude is 1270 m.

Boundaries. Form the confluence point of Shejtanik and Krivi Dol streams upstream Krivi Dol up to the peak Marina Dupka/Rupa, then along the ridge to Gorno Kjule peak then downstram Chepleska Reka stream and Babuna river till the inflow point of Oreshka Reka, then along the foothills of Dautica Mt. at about 600 m elevation till the stream Sushica, then upstream up to locality Zavoj and across the ridge at the point of 929 m a.s.l., then down the dale and along foothills of the mountain at about 700-750 m a.s.l. above Pelagonija plain till Barbaras pass, then along the karst valley Krapska Reka toward north till v. Krapa, then along the ravine Crvlja Voda toward the ravines and saddles below both Garvan peaks, then along the foothills of Dautica Mt. at about 1050-1150 m a.s.l., then downstream Shejtanik to its confluence with Krivi Dol. Total area 181.26 km$^2$.

**20620 Azot**

Azot is traditional name (toponym) for the broad part of the river Babuna valley and surrounding hills of the foothills of Jakupica, Klepa and Babuna mountains. The main geological composition includes proluvial and alluvial deposits in the lowland and various silicate bedrocks (mainly gneisses, mica and granite) on the hilly part. The climate is moderate continental with weak Mediterranean influence. Agriculture is the main land use type, but abandonment is significant. Average altitude is 455 m.

Boundaries. The boundary of the region stretches along the foothills of the surrounding mountains: Babuna on the south, Dautica on the west and Jakupica on the north, and the valley of the stream Izvorchica on the east. Total area 95.73 km$^2$.

**20621 Babuna (the mountain)**

Babuna is medium high mountain almost exclusively composed of silicate (granitic) rocks. It spreads mainly in west-east direction. It has the same name as the river which flows in the valley between Babuna Mt. and Jakupica Mt. Continental climate with mountainous characteristics at upper part dominates in the region. Average altitude is 877 m.

Boundaries. From the saddle below Kale (929 m a.s.l.) downstram Sushica stream to the point of 600 m a.s.l. and along the foothills of Babuna Mt. at 600 m a.s.l. (550-700 m a.s.l.) (in the area of Ruen - t.p. 865 m - the boundary is at about 400-500 m a.s.l.) till the stream Izvor (Izvorchica), then along the stream Izvorchica and Oshli Dol till the saddle below Gola Glava, then downstram Popadijska Reka, then to the west along the foothills at about 500-700 m a.s.l. around Kozjak and Treskavec and above Pelagonija plain till the tunnel at v. Gostirazhni and then up to the saddle below Kale. Total area 384.05 km$^2$.

**3 SOUTHWEST LAKE AREA**

**307 Demir Hisar area**

**30722 Ilinska Planina**

This is comparatively high mountain among the medium high mountains in Macedonia (the peak Liska, 1908 m a.s.l.). It has complex geology, the bedrock is generally composed of Devonian marbles and phylitic schist. Similarly as other medium high mountains in this broader region (Busheva Planina, Baba Sach-Luben, Plakenska Planina and others) Ilinska Planina is characterized by moderate continental climate and mountainous climate on its upper parts. Average altitude is 1159 m. The mountain range composed of Ilinska Planina and Plakenska Planina and Bigla on the south is an important natural corridor for large carnivores connecting three national parks in Macedonia.

Boundaries. From the river Treska and Brzhdanska Reka confluence upstream Brzhdanska Reka (Prostranchica) up to Prostranje pass, then along Zli Dol to v. Zheleznec, then upstream Krushnja and Chavdarica

streams and through the pass near Sv. Ilija monastery (1525 m), then downstream along Ilinska Reka to Brezhanska Reka and then along the foothills of Ilinska Planina Mt. at about 900 m a.s.l. (excluding the hill Gaber) toward v. Slivovo and then up to the pass Preseka, then downwards through the valley till v. Izvor and then along the river Treska downstream to the confluence with Brzhdanska Reka. Total area 252.01 km$^2$.

**30723 Plakenska Planina**

Plakenska Planina represents the middle part of the Ilinska Planina-Plakenska Planina-Bigla range, the important natural corridor for large carnivores that connects the three national parks in Macedonia. Unlike Ilinska Planina on the north, Plakenska Planina is almost exclusively composed of silicate bedrock. Moderate continental climate is dominant in the region, and mountainous climate prevails on higher elevations. Average altitude is 1288 m.

Boundaries. From v. Brezhani upstream along Ilinska Reka to the pass near Sv. Ilija monastery (1525 m), across the saddle and downstream Chavdarica and Krushnja streams to v. Zheleznec, then downstream Crna Reka till Lechka Padina locality and then along the foothills of Plakenska Planina mountain at about 750 m a.s.l. till Boishka Reka stream, then upstream Boishka Reka, Katnushka Reka and Smilevska Reka streams up to the saddle Jaorec, then downstram Biglichka Reka and Leva Reka till tis inflow in Golema Reka, then upstream Golema Reka till Bukovo pass, then downstream Kriva Reka to Prentov Most, than upstream Mokresh, Mala Reka and its right tributrary up to the saddle at Dupen Kamen (1553 m a.s.l.), then downstream Samarica stream till v. Brezhani. Total area 191.57 km$^2$.

**30724 Baba Sach and Luben**

Baba Sach and Luben are two Devonian marbles' massifs connected at their eastern part. They have high conservation value because they support development of dry grassland plant communities with European importance. The climate is mostly moderate continental. Average altitude is 1060 m.

Boundaries. From just above v. Popolzhani along the foothills of Cocan and Baba Sach hills till the vicinity of the v. Plasnica, then upstream the dale Strmoshtica up to the saddle below Studeno peak, then downstream Pustorechka Reka stream and river Zhaba to the point of 699 m a.s.l., then along the foothills of Luben to v. Dolenci, then along Crna Reka river and Zli Dol ravine up to Prostranje pass and downstream Prostranchica and Brzhdansa Reka till v. Popolzhani. Total area 261.29 km$^2$.

**30725 Busheva Planina**

It is one of the medium high western-central Macedonian mountains with average altitude of 1040 m. Silicate bedrock is the main geological composition represented with huge granite formation, metariolites and green schists. The climate is mostly moderate continental with some mountain characteristics at the highest parts.

Borders. From below v. Dolni Oreovec at Treska river, then along the river to Makedonski Brod and then along the foothills of Busheva Planina Mt. at about 600 m a.s.l. till Suvodol and then up to the Barabas pass, than above v. Debreshte and along the foothills of Busheva Planina Mt. at about 650-700 m a.s.l. toward villages Zhitoshe, Krivogashtani, below v. Norovo, then toward villages Buchin, Edinakovci, Zhurche and Rastojca and then along the river Zhaba and the stream Pustorechka Reka till the saddle below Studeno peak, then downstream Strmoshtica to above v. Plasnica and to the river Treska below v. Dolni Oreovec. Total area 293.65 km$^2$.

**30726 Drevenik**

Drevenik or Drevenichka Planina is an isolated small and low mountain (1494 m a.s.l.) with average altitude of 923 m. It is mainly composed of silicate bedrock with continental climate slightly modified toward mountainous climate in upper part. It has diverse forest cover and is important for large mammals.

Boundaries. It is limited by the contour line of about 700 m a.s.l. along the foothills of the mountain. Total area 110.50 km$^2$.

**30727 Oblakovo-Snegovo**

This low mountainous region is more or less isolated hilly region with clear geomorphological boundaries toward Pelister and Bigla mountains. Geologically it is a mixture of alluvial deposits and silicate ground. The climate is moderate continental. Large artificial black pine plantations are characteristic for this region. Average altitude is 940 m.

Boudaries. It is limited by the contour lines of about 700-800 m a.s.l. along its foothills; on the south and southwest the boundary follows the river Dragor than Bratindolska Reka and Borojca streams, then along Srbechka Reka till the Strezhevo reservoir; on the west the boundary follows the shore of the reservoir till below the abandoned v. Metimir, then upstream till the pass (926 m a.s.l.) below Visoka Glava, then around the hills Tri Sinora and Samarnica till above the pass of the Bitola-Demir Hisar road. Total area 107.22 km$^2$.

**30728 Bigla**

Medium high mountain with average altitude of 1121 m composed of predominantly silicate bedrock, with mountainous and moderate continental climate. Bigla is southern part of Ilinska Planina-Plakenska Planina-Bigla range. It connects National Park "Pelister" with other mountain ranges on the north.

Boundaries. From above v. Izhbishta along streams Leva Reka and Biglichka Reka till the ridge (saddle at Jaorec), then downstream along the left branch of Smilevska Reka, then upstream its right branch up to the saddle near Sv. Petar monastery, then downstream Obednichica stream till just above v. Obednik, then the boundary continues along the foothills of Bigla Mt. at the area above v. Obednik and then turns towards the pass (926 m a.s.l.) below Visoka Glava, then downstream till accumulation Strezhevo and along its shore to v. Lera, then continues along the foothills to the Djavato pass and further along the foothills of Bigla Mt. in Prespa Valley at about 1000 m a.s.l. to v. Izhbishta. Total area 101.56 km$^2$.

**30729 Demir Hisar**

This is another medium high valley among many in the western Macedonia. Demir Hisar Valley is composed of alluvial deposits and the climate is moderate continental. The hilly and mountainous area (known as Stavrako and Ilinica) on the west of Demir Hisar town is characteristic for the iron containing rocks and abandoned iron mines – Demir Hisar. The climate of this part of Demir Hisar is moderate continental to moderate mountainous. Average altitude is 822 m.

Boundaries. It covers the Ilinica and Stavrak hilly

and mountainos part on the west of Demir Hisar town and v. Slepche and the plain area of the upper flow of Crna Reka river valley starting from v. Buchin and along the foothills of mountains Drevenik and Oblakovo-Snegovo, then foothills of Bigla Mt., Plakenska Planina, Baba Sach-Luben and Busheva Planina to v. Buchin (contour lines 700-800 m a.s.l). Total area 168.05 km$^2$.

**30729a Demir Hisar valley (Demir Hisar)**

Boundaries. It covers the plain area of the upper flow of Crna Reka river valley starting from v. Buchin and along the foothills of mountains Drevenik and Oblakovo-Snegovo mass, then foothills of Bigla Planina, Plakenska Planina, Baba Sach-Luben and Busheva Planina to v. Buchin (contour lines 700-800 m a.s.l). Average altitude is 671 m.Total area 79.64 km$^2$

**30729b Ilinica (Demir Hisar)**

Boundaries. From v. Mrenoga along the foothills of Stavrako at about 650-700 m a.s.l. above Demir Hisar Valley till just above v. Obednik, then upstream Obednichica stream till the saddle near Sv. Petar monastery, then downstream Smilevska Reka, Katunska Reka and Boishka Reka streams down to v. Mrenoga. Average altitude is 958 m.Total area 88.41 km$^2$

**308 Ohrid-Prespa area**

**30830 Debar Valley**

Debar Valley is small, medium altitude, valley composed of small flat plateaus and gently sloping mountain foothill slopes along Crn Drim valley on the south and Radika valley on the north. Pliocenic and proluvial sediments are the prevailing geological ground. Moderate continental climate is characteristic for the area with significant Mediterranean influence penetrating through Crn Drim Valley from Adriatic Sea. Average altitude is 604 m. The valley has high conservation value due to the presence of several local endemic and relict plant species.

Boundaries. From Macedonia-Albania border at v. Banjishte (800 m a.s.l.) along the foothills of Krchin at about 600-800 m a.s.l. to v. Rajchica, then across the Debar (Shpilje) reservoir and along its shore till Trebishki Most, then across the reservoir and upstream Trebishka Reka up to the Macedonia-Albania border, then along the state border till v. Banjishte. Total area 61.69 km$^2$.

**30831 Drimkol**

The area along Crn Drim gorge was identified as separate region for the similar reasons as the Radika Gorge region. Large part of the gorge is traditionally called Drimkol. Both Jablanica and Stogovo slopes are composed mostly of limestone. Mediterranean climate influence is quite strong. Average altitude is 806 m. Steep rocky cliffs represent habitat for very important flora and fauna species (endemic and relict species).

Boundaries. The region covers the slopes of Jablanica Mt. on the west and Stogovo and Karaorman Mts. On the east above Crn Drim river up to about 900-1100 m a.s.l. from Trebishki most on the north to below v. Tashmarunishta on the south. Total area 41.15 km$^2$.

**30832 Jablanica**

Jablanica is high mountain ridge with north-south direction. The southern part is exclusively of limestone masses and the northern part is of a mixed geological composition. Mountainous climate prevails but Mediterranean climate influence is noticeable at the lower part along Crn Drim valley. Average altitude is 1281 m. It has high conservation value because of its important high mountain biodiversity that has both Alpine-Dinaric (the southernmost segment) and oromediteranean characteristics. Geographical features (geomorphology, glacial lakes etc.) are also unique.

Boundaries. From the point of 1046 m a.s.l. at Albania-Macedonia state border on the northtoward south along the foothills of Jablanica Mt. at an elevation of about 750-1000 m a.s.l. (excluding steep and rocky slopes of the Crn Drim valley) till Elen Kamen tourist settlement at the Ohrid Lake shore (v. Kalishta), then along the shore till Albania-Macedonia state border and then along the border till the point of 1046 m a.s.l. on the north. Total area 221.83 km$^2$.

**30833 Ohridsko Ezero**

Ohridsko Ezero (Ohrid Lake) is the oldest lake in Europe and the deepest lake in Macedonia. It has an extraordinary biodiversity value on a global scale due to the presence of large number of endemic algae and animals, including fishes. The average altitude of the water level is 696 m.

Boundaries. The region includes water basin of Ohrid Lake, including reedbeds along the shore. Total area 247.54 km$^2$ (Macedonian part).

**30834 Ohridska Kotlina**

This valley spreads around Ohrid Lake. The ground is composed of lake sediments which once were mostly covered by wetlands. Its narrowest part is at Podmolje, thus dividing the valley into two geographic units – Ohrid part (with average altitude of 770 m) and Struga part (Strushko Pole) (with average altitude of 705 m). Ohrid Lake water masses and weak Mediterranean influence modifies otherwise moderate continental climate. Currently the area is under strong human impact mostly because of mass tourism and intensive agriculture.

Boundaries. From the exit of Botun throat along the foothills of Mazatar and Galichica till Sv. Stefan locality, then along the Ohrid Lake shore to v. Kalishta (Sv. Bogorodica monastery) and then along the foothills of Jablanica and Karaorman mountains to the Botun throat. Total area 197.39 km$^2$.

**30834a Strushko Pole (Ohridska Kotlina)**

Boundaries. From the exit of Botun throat downstream Sateska river and channel till Ohrid Lake and then along the lake shore to v. Kalishta (Elen Kamen tourist settlement) and then along the foothills of Jablanica Mt. to below v. Tashmarunishta, then along Karaorman Mt. foothills at about 700-750 m a.s.l. to the Botun throat (at v. Klimeshtani). Total area 108.69 km$^2$.

**30834b Ohridsko Pole (Ohridska Kotlina)**

Boundaries. From v. Trebenishta, along the foothills of Mazatar (along the northern edge of Gorno Pole) toward villages Livoishta, Vapila, Kosel and Velgoshti till just above Ohrid town, then down to the Sv. Stefan resort and then along the lake shore till the inflow of Sateska channel, then upstream the channel and the river till the entrance in Botun throat. The region, although called "pole" (means "plain"), includes hilly area on the north of Ohrid town (Bajrak, t.p. 1203 m is the highest peak). Total area 88.70 km$^2$.

**30835 Debarca**

Debarca is broad high valley gently ascending toward north. It is bounded by mountains – Stogovo and

Karaorman from the west and Ilinska Planina from the east. The ground is basically composed of swampy, proluvial and alluvial deposits. Moderate continental climate is typical for this region. Average altitude is 855 m. Presence of several wetlands is an important characteristic for Debarca from biodiversity point of view. Among them Belchishko Blato is the most representative.

Boundaries. From v. Botun along the foothills of Karaorman and Stogovo at about 900-1000 m a.s.l. to v. Vrbjani and then toward east and southeast along the foothills of Ilinska Planina Mt. at about 800-850 m a.s.l. and above villages Slivovo, Ozdoleni and Velmej to the river Brezhanska Reka and then along the foothills of Mazatar at about 850-900 m a.s.l. towards villages Leshani and Zbazhdi and then to v. Botun. Total area 85.22 km$^2$.

**30836 Mazatar**

Mazatar is geomorphologically well defined hilly and mountainous region but the whole region does not bare common name. It is called Mazatar because of the dominant mountain part with same toponym that connects this region to Galichica mountain range. The climate has mild mountainous characteristics. The dominant geological bedrock, typically for this part of the country, is composed of mixed Devonian schists whit Triassic limestone and sandstones followed with diabase and riolits volcanic masses. Average altitude is 1056 m.

Boundaries. From v. Botun along the foothills of the mountain toward v. Leshani, excluding Gradishte (t.p. 1086 m), to Brezhanska Reka river, then upstream along the stream Samarica till its confluence with Chemerski Dol and then along the dale up to the saddle (1553 m a.s.l.), then downstream Mala Reka (Mokresh) and Opejnichka Reka to v. Kosel, then along the foothills toward villages Vapila, Livoishta, Trebenishta and Mesheishta, then along the river Sateska to v. Botun. Total area 129.50 km$^2$.

**30837 Galichica**

Galichica is medium high to high mountain horst with north-south direction. It is almost exclusively composed of limestone. Mountainous climate is modified by the impact of water masses of Ohrid and Prespa lakes. The main feature of Galichica Mt. is its extraordinary rich biodiversity. Lots of endemic plants and animals can be found on Galichica for which it was designated as national park. Average altitude is 1263 m.

Boundaries. From Sv. Stephan resort near Ohrid along the foothills of Galichica Mt., above villages Velgoshti and Kosel, till the stream Opejnchka Reka, then upstream Opejnchka Reka and Kriva Reka streams till Bukovo pass and then downstream Golema Reka river to v. Izbishta, then along the foothills of Galichica Mt. at about 950 to 1000 m a.s.l. to Sir Han at Prespa Lake, then along the shoreline to v. Stenje (excluding Stenje flat area and the matrsh) and then continuing along the shoreline to the state border with Albania; the boundary continues along the state border till Ohrid Lake and than along the shore to Sv. Stefan. Total area 372.47 km$^2$.

**30838 Prespa**

Prespa is high valley around the Prespa Lake. Its broadest and largest part is on the north of the lake – Resensko Pole. The ground is composed of the Pliocene lake sediments. Continental climate is modified by the water masses of the lake. In southern part of Perspa in Greece and Albania Mediterranean climate influence is noticeable. There are several more or less preserved wetlands in the northern, eastern and southern part, next to the lake shore. Average altitude is 892 m.

Boundaries. The area between the shoreline of Prespa Lake and the foothills of mountains Galichica, Bigla and Pelister at about 950-1000 m a.s.l. excluding Stenje Marsh, Ezerani marshy area, and Zverinjec and Metileec marshes and including Stenje plain area. Total area 150.49 km$^2$.

**30839 Prespansko Ezero**

Prespansko Ezero (Prespa Lake) is an old lake, with similar age as Ohrid Lake. However it is significantly shallower and thus the endemism is lower. The average altitude of the water level is 853 m but during last 90-ties of the last century it has dropped significantly (currently about five meters below).

Boundaries. The region includes water basin of Prespa Lake, including Stenje Marsh, Ezerani marshy area, and Zverinjec and Metileec marshes. Total area 191.43 km$^2$.

**30840 Pelister**

Pelister is one of the five mountains in Macedonia above 2500 m a.s.l. It is also known as Baba Mountain. Pelister is almost exclusively composed of silicate bedrock dominated by granites and Paleozoic schist. The climate is mountainous with alpine characteristics on the highest parts. Pelister is well known because of well developed Macedonian pine forests for what it was proclaimed as national park back in 1949. Average altitude is 1403 m.

Boundaries. From Djavato pass downstream Utojca stream to v. Lera, then upstream Srbechka Reka till Prevalec pass, then along the foothills of Pelister at about 800-950 m a.s.l. till Bitola city, then along the foothills of Pelister Mt. at about 650-700 m a.s.l. to the state border Macedonia-Greece and then along the border till just above Prespa Lake at Markova Noga; then along the foothills of Pelsiter Mt. at about 900-1000 m a.s.l. to Djavato pass. Total area 451.42 km$^2$.

**4 PELAGONIJA**

**409 Pelagonija**

**40941 Pelagonija**

Pelagonija is the largest plain in Macedonia with average altitude of 636 m. The bedrock is composed of Precambrian and Paleozoic silicate formations covered by thick layer of Pliocene lake deposits. The climate features are typical temperate continental. Agriculture – crop production – is the most important land use type and Pelagonija is Macedonia's largest wheat production region. It is divided by small hills spreading in southwest-northwest direction (Topolchanska Pregrada) into two parts: northern – Prilepsko Pole with average altitude of 636 m and southern – Bitolsko Pole with average altitude of 612 m. They are named after the respective cities in these subregions.

Boundaries. Lowland area limited by the foothills of mountains Dautica (northwest), then Babuna (north), Selechka Planina and Kajmakchalan (east) and Pelister, Oblakovo-Snegovo, Drevenik and Busheva Planina (west) at about 600-700 (800) m a.s.l. The southern border of Pelagonija plain is deliniated by the Macedonia-Greece state border. Total area: 1356.99 km$^2$.

**40941a Prilepsko Pole (Pelagonija)**

Boundaries. The sub-region is limited by the contour line of about 700 m a.s.l. (800 m a.sl. on some places); on the south it is separated from Bitolsko Pole by the hills of Topolchanska Pregrada from below v. Ivanjevci (Ushici) to below v. Malo Ruvci (Prevalec, 776 m a.s.l.). Total area: 637.95 km$^2$.

**40941b Bitolsko Pole (Pelagonija)**

Boundaries. The sub-region is limited by the contour line of about 600-650 m a.s.l.; on the north it is separated from Prilepsko Pole by the hills of Topolchanska Pregrada from below v. Ivanjevci (Ushici) to below v. Malo Ruvci (Prevalec, 776 m a.s.l.). Total area: 719.04 km$^2$.

**5 SOUTHERN MOUNTAINS**

**510 Mariovo area**

Mariovo is large area in south-central part of Macedonia. It occupies territories of the hilly plateau, hills, foothills and parts of surrounding mountains, as well as gorges and valleys of several rivers (including the main river that crosses the whole region – Crna Reka). There is no distinctive border that separates Mariovo from the surrounding mountains. Thus, the boundaries presented here are not natural-geographic but mostly arbitrary. In some cases mountains like Kajmakchalan stretch down to 600 m a.s.l., and in some cases just to 1300 m a.s.l. depending of what is more appropriate – to include particular area in Mariovo plateau or to orient it as a mountain (what in reality is). The main criterion was traditional land use - the mark that people left.

**51042 Selechka Planina**

This medium high mountain is exclusively composed of silicate rocks, mainly gneisses, granites and mica. Selechka Planina is recognizable because of very interesting geomorphological forms. It is characterized by modified continental climate and mild mountainous climate on upper elevation. Average altitude is 897 m.

Boundaries. From v. Bonche upstream Pisokalska Reka stream to Garvan pass, then along the foothills of Selechka Planina Mt. at an elevation of 750-800 m a.s.l. till the source of Topli Dol stream, then accros the peak Golem Garvan (851 m a.s.l.), then along the foothills of the mountain at an elevation of 800 m a.s.l. till just after Mazni Plochi locality, then downstream the ravine to 600 m a.s.l. and along Skochivirska Klisura and Crna Reka up to v. Skochivir, then along the foothills of the mountain at 600-700 m a.s.l. along Pelagonija plain to v. Bonche. Total area: 249.48 km$^2$.

**51043 Dren**

Dren is medium high mountain composed of silicate rocks - mainly gneisses, granites and mica - on its southern part while on the northern part Precambrian marble and dolomite formations dominate. The climate is similar as for the Selechka Planina, but weak Mediterranean influence on the northern slopes is evident. Average altitude is 1011 m.

Boundaries. From Pletvar pass, then along the foothills of mountain Dren at about 750-800 m a.s.l. to v. Dren, then along the no name dale up to the Klen pass (t.p. 990 m), then downstream Koritata ravine thorugh v. Gugjakovo (including the village) to Crna Reka river, then upstream Crna Reka till the inflow of Nakrevci intermittent stream, then uphill the ridge through Gorni Garvan and Samiot Kichar to hight point 948 m, and then along the foothills of Dren Mt. at an elevation of about 750-900 m a.s.l. till Garvan Pass, then downstream Pisokalska Reka stream through v. Bonche (including the village) to 700 m a.s.l. and then along the foothills of the mountain above Pelagonija plain (contour line interval 700-800 m a.s.l.) to Pletvar pass. Total area: 196.05 km$^2$.

**51044 Mariovo**

Mariovo is large hilly plateau cut by the river Crna Reka valley into two parts. Average altitude is 758 m. Despite this geomorphological division, traditionally it is divided into three parts, not well delineated by the relief: Bitola part – the southern part which was economically connected to Bitola city in the past; Prilep part – the northern part which was economically connected to Prilep town in the past and Kavadarci part – the smallest part, economically connected to Kavadarci town. The latest part in this study is presented as separate region (see 51046 Rozhden below). The silicate bedrock is presented by gneisses, granites, mica, amphibolites, but there is large marble Precambrian formation in the central part of the region. Mariovo is well known because of its biodiversity value, vulture colonies in particular. It is the region which is almost abandoned for many decades back.

Boundaries. From the point on Crna Reka just below Gradishka Tumba peak uphill the ridge through Mashkovec, Mangova Chuka, Vragovec (1107 m a.s.l.) to Lisichka Tumba, then along the Kozjak Mt. slopes at an elevation of 1150 m a.s.l. till Neshkiot Prisoj locality, then the boundary crosses the Kravashtinska Reka stream to to Vitolishki Rid at 1131 m a.s.l., then uphill the ridge till the hight point 1242 m, then along the slope and downstream Bukov Dol and Potokot streams and the river Satoka till its confluence with Bela Reka river, then upstream Bela Reka till its confluence with Porenica stream, then along the slopes at an elevation of 1000 m a.s.l. (crosses Gradeshka Reka and Leshnica rivers) till Zmijarski Dol and then downstream Belica till the locality Boba, then along the slopes at 950 m a.s.l. till Dupen Kamen locality and then down the ravine to Konjarska Reka and Crna Reka, then along Skochivirsk Klisura about 2.3 km and then upstream the ravine up to 800 m a.s.l., then along the foothills of Selechka Planina Mt. (800 m contur line) till the locality Skala, then along the foothills of Dren Mt. at an elevation of 750-900 m a.s.l. till the ridge at Gorni Garvan and down the ridge to Crna Reka. Total area 430.50 km$^2$.

**51045 Rozhden**

Rozhden is hilly and mountainous region (Meshnik peak is dominant) that is traditionally known as Mariovo – Kavadarci part. It was named after the village Rozhden situated on Kozjak Mt. northern foothills. The region has diverse geology including Mesozoic limestone formations and tertiary volcanic deposits. It is well known because of various minerals excavated from the mines. The climate is continental with mild mountainous characteristics. Average altitude is 811 m.

Boundaries. From the point on Crna Reka just below Gradishka Tumba peak downstream Crna Reka river and Tikvesh reservoir till the inflow of Blashtica river, then upstream Blashtica till the confluence with the stream Umelina, then uphill the ridge till Mushov Grob, then downstream the ravine and across Mrezhichka Reka stream, then thorugh the hills to Sveti Petar, then

through the ridge up to Cucul and then along the slopes of Kozhuf Mt. at an elevation of 950 m a.s.l. till Majdan mines, then along the foothills of Kozjak Mt. at an elevation of 850-950 m a.s.l. till Krushka stream, then upstream till Meloshev Rid, then the boundary ascends up to 1200 m a.s.l., then along the same contour line till Kula after which the boundary follows 1100 and 1150 m contour lines till Lisichka Tumba and then down the ridge to Crna Reka River. Total area 118.98 km$^2$.

**511 Kajmakchalan-Kozhuf**

**51146 Kajmakchalan**

Kajmakchalan or Nidzhe Mountain is one of the five Macedonian very high mountains (peak Kajmakchalan, 2521 m a.s.l.). It is mostly silicate mountain, but its eastern parts (Belo Grotlo – Bela Zemja – Zmeica) are composed of Precambrian dolomites. Mountainous climate is dominant climate type. Kajmakchalan is characterized by rich biodiversity; especially the forests are diverse and well preserved. Average altitude is 1260 m.

Boundaries. From the saddle Buka, below Golem Kozjak (1814 m a.s.l.) along the Macedonia-Greece state border down to Pelagonia plain, then along the foothills of Kajmakchalan Mt. at about 650-700 m a.s.l. to entrance into Skochivirska Klisura gorge, then along the ravine up to Dupen Kamen peak, then along the foothills of the mountan at an elevation of about 900-1000 m a.s.l. (crossing the streams Petalishka Reka, Garvanski Dol, Nedelkov Dol, Kobilski Dol, Trnovchica and Golema Reka) till Belica river and then upstream to Zmijarski Dol, then again along the slopes (at 1000 m a.s.l.), then the boundary crosses Leshnica stream, Gradeshka Reka river and Porenica stream, then downstream Bela Reka till its inflow in Satoka, then upstream Satoka and Kozjachka Reka up to its source and up to the saddle Buka at Macedonia-Greece state border. Total area 267.45 km$^2$.

**51147 Kozjak-Mariovo**

Kozjak in Mariovo is medium-high mountain with south-north direction of the ridge that divides two large mountain ranges in south Macedonia: Nidzhe-Kajmakchalan on the west and Kozhuf on the east. Kozjak is composed mainly of silicate rocks – gneisses and granites and young eruptives on the southern part near Greek border. The climate is with mountainous characteristics. It is well forested mountain, with high proportion of conifers. Natural black pine forests are an important characteristic of the region. Average altitude is 1322 m.

Boundaries. From the saddle Buka at Macedonia-Greece state border downstream Kozjachka Reka and Satoka till Sv. Petka, then upstream Potokot and Bukov Dol up to 1200 m a.s.l., then around Crvena Blan and across Grola stream, then along the ridge (Vitolishki Rid) till hight point 1131 m, then across Kravashtinska Reka stream uphill trhe ridge up to 1150 m a.s.l., then along the slopoes of the mountain at an elevation of about 1100-1200 m a.s.l. till Meloshev Rid, then downstream Krushka stream, then to the south along the dales and ravines till just above Majdan, then along the contour line of 850 m to the steram Provalska Reka, then upstream to Pulevec pass (1165 m a.s.l., Macedonia-Greece state border), then along the border to Buka saddle. Total area 101.65 km$^2$.

**51148 Kozhuf**

Kozhuf is large and high mountain although its average altitude is 853 m. It is very diverse mountain from the point of view of both biodiversity and geomorphology. Lots of hydrological phenomena (particularly very interesting river flows) are important as well. Geology is very complex – silicate rocks dominated by large formation of gabbro and diabases on the north-eastern part and also huge volcanic deposites in the south-southwestern part. There are large carbonate massifs of marbles and limestone in the central area (Dvete Ushi, Mala Rupa, Uma and the peak Dudica). Mediterranean climate influence is very high due to the position (on the south of the country) and the low elevation of the foothills. Low elevations at Gevgelija area and along Demir Kapija Gorge have typical sub-Mediterranean climate. Mild to harsh mountainous climate is characteristic for higher elevations.

Boundaries. Form Pulevec pass (1165 m a.s.l.) at the Macedonia-Greece state border downstream Provalska Reka till Momkova Livada locality, then along the slopes at an elevation of about 950 m a.s.l. till Cucul peak, then down the ridge to the river Bistra, then uphill and through Davkov Krst down to Topli Dol, then along the dales and ravines, across Mrezhichka Reka stream to Mushov Grob, then down the valley (Lisach) to v. Konopishte, then across Boshava River along the slopes at an elevation of about 800 m a.s.l. till trigonometric point (t.p.) 832 m, then down the ridge till Zoliot Dol, then uphill to t.p. 841 m and 675 m till v. Gorna Boshava, then uphill the ridge up to Glogovo and then along the slopes at an elevation of 800 m a.s.l. till the locality Krusha (above v. Bohula), then along the ridge through the peaks Zajchar and Kalabudova Cheshma down to Doshnica Electric Power Plant, then along the foothills till Zajchov Kamen on Gorni Krastovec, then along the ridge, thorugh Vrvot (806 m a.s.l.), Elovi Chuki (618 m a.s.l.), Stefan and Davidovski Rid till the monastery Sv. Ilija above v. Davidovo, then along the foothills of Kozhuf Mt. at an elevation of 100-150 m a.s.l. next to Valandovo and Gevgelija valleys till Macedonia-Greece state border; then along the border till Pulevec pass. Total area 740.48 km$^2$.

**512 Tikvesh mountainous area**

**51249 Galchin-Orle**

The region Galchin-Orle encompasses several small mountains and hills which do not have general name. The most dominant peaks are Galchin (1472 m a.s.l.) and Orle (1480 m a.s.l.). It is mainly composed of Devonian marble and dolomites, but silicate rocks are also present as larger layers of schist and serpentine. Continental and mild mountainous climate are dominant, but Mediterranean influence from the north and east is noticeable. Average altitude is 772 m.

Boundaries. From v. Dren along the slopes of the mountain at an elevation of 600 m a.s.l. (excluding villages Mal Radobil and Golem Radobil) till Golesh peak, then down to 400 m a.s.l. elevation, then along the foothills at about 300-400 m a.s.l. to Goliot Rid, then down the ridge to Crna Reka river, then upstream to the Tikvesh dam, then along the slopes of Tikvesh Gorge at an elevation of 400 m a.s.l. (except above rocks and cliffs) till Shkorubica, then along the Tikvesh reservoir and Crna Reka up to the inflow point of the steram Koritata, then upstrim Koritatata, excluding v. Gugjakovo till the Klen saddle, then downstream Rakovo til v. Dren. Total area 200.76 km$^2$.

**51250 Tikveshko Ezero**

Tikveshko Ezero (Tikvesh reservoir) is large and long accumulation (for Macedonian circumstances). It was constructed in the gorge of the lower flow of Crna Reka river. The slopes along the accumulatin are mostly composed of limestone and at some points they have cliff -like appearance. Mediterranean climate influence is quite strong. The area is important for biodiversity (plant diversity, vulture birds) and was proclaimed as Strict Nature Reserve. Average altitude is 310 m and the lake level is on 210 m a.s.l. on average.

Boundaries. The region is restricted on the Tikvesh lake reservoir with the immediate hills and rocky slopes of Tikvesh lake gorge and to the river Blashtica inflow on the south. Total area 27.26 km$^2$.

**51251 Vitachevo**

Vitachevo is medium-high plateau descending toward Boshava Valley on east and toward Tikvesh lake on the west. The geological bedrock is represented by thick deposits of silicate volcanic sediment rocks and tuff. The climate is moderate continental. Average altitude is 695 m.

Boundaries. From v. Resava upstream the ravine up to the peak (614 m a.s.l.), then along the ridge, then downstream Babin Dol and across the river Luda Mara, then uphill to Cuculka peak (612 m a.s.l.), then along the ridge through Sedjavechkiot Rid till t.p. 852 m, then along the ridge on the south till Venec (t.p. 860 m), then along the slope at an elevation of 850 m a.s.l. till the hight point 877 m, then across the stream Rakovec, then along the ridge till the hight point 907 m and then along the conture line of 850 m till v. Konopishte, then upstream the valley (Lisach) to Mushov Grob, then along the ridge through Elata peak till the confluence of Blashtica river and the stream Umelina, then downstream Blashtica till its inflow in Tikvesh reservoir, then along the slops of Tikvesh Gorge at an elevation of 400 m a.s.l. till v. Resava. Total area 180.06 km$^2$.

**6 VARDAR ZONE**

**613 Dolno Povardarie (Lower Vardar Valley)**

**61352 Demirkapiska Klisura**

Demir Kapija Gorge is the narrowest part of the lower Vardar flow. The hill slopes are composed of silicate rocks (diabases and partly spilites), but the upper part at Demir Kapija town is composed of limestone and has canyon-like appearance. The climate is modified sub-Mediterranean. Average altitude is 300 m.

Boundaries. The region comprises the foothill slopes along Vardar river of Serta Mt. (Gradeshka Planina) up to 200 m a.s.l. on the northeast (including middle and lower parts of valleys and ravines of the streams flowing into Vardar) and of Kozhuf Mt. (in broader sense) on the southwest up to the ridge (including all Vardar tributaries up to their sources); the ridge stretches from Zajchov Kamen on Gorni Krastovec, thorugh Vrvot (806 m a.s.l.), Elovi Chuki (618 m a.s.l.), Stefan and Davidovski Rid till the monastery Sv. Ilija above v. Davidovo. Northwestern border is at the town Demir Kapija and southeastern at v. Udovo. Total area 90.07 km$^2$.

**61353 Gevgelija-Valandovo Valley**

Gevgelija-Valandovo Valley occupies the lowest part of the river Vardar valley till its exit from Macedonia. It is the lowest part of the country with average altitude of 87 m. Geomorphologically it is divided in two parts by the narrow section at the vicinity of the v. Smokvica (Tufkata, 101 m a.s.l.). The northern part is Valandovo Plain and the southern part is Gevgelija Plain. The ground is composed of alluvial sediments. The climate is sub-Mediterranean. Intensive agriculture is the most important type of land use.

Boundaries. The region represents the lowland area bounded by the foothills of mountains and hills Gradeshka Planina (Serta), Belasica, Boska, Pogana, Kara Balija (Dub) and Kozhuf. The valley expands to v. Udovo on the north and to the state bourder Macedonia-Greece on the south. Total area 230.03 km$^2$.

**61353a Valandovsko Pole (Gegelija-Valandovo Valley)**

Boundaries. From v. Udovo alonge the foothills of the mountains and hills Gradeshka Planina (Serta), Belasica, Boska and Pogana, at about 100-150 m a.s.l., to the narrowest part of the valley at Vardar river, then across the river to v. Smokvica, and then along the foothills of Kozhuf Mt. at about 100 m a.s.l., to the point above v. Davidovo and then across Vardar to v. Udovo. Total area 88.03 km$^2$.

**61353b Gevgelisko Pole (Gevgelija-Valandovo Valley)**

Boundaries. From the narrowest part of the valley at v. Grchishte along the foothills of hills Pogana and Kara Balija (Dub) at about 150 m a.s.l. to the state border Macedonia-Greece and along the border to v. Moin and then along the foothills of Kozhuf Mt. at about 100 m a.s.l. to v. Smokvica. Total area 142.00 km$^2$.

**614 Southeastern mountains**

**61454 Bogdanci-Dojran hills**

The area around Bogdanci and Dojran towns is hilly region without general name. It encompasses several geomorphologically well defined hills: Boska, on the north of Dojran Lake (average altitude 403 m), Dub, on the west of Dojran Lake, also known as Kara Balija because of its western part (average altitude 320 m) and Pogana, on the north of Bogdanci town (average altitude – 237 m). Average altitude of the whole region is 309 m. All parts of the region have similar geology (silicate bedrock) except Boska where marbles appear, and similar climate (modified sub-Mediterranean).

Boundaries. The regon occupies tall hills above Dojran, Gevgelija and Bogdanci from Valandovsko Pole till Macedonia-Greece border. Total area 199.97 km$^2$.

**61454a Boska (Bogdanci-Dojran hills)**

Boundaries. From v. Dedeli along the foothlls of Boska hills at about 150 m a.s.l. till the stream Kodzha Dere, then upstream Elez Dere and downstream Domuz Dere to the Macedonia-Greece state border, then along the border till t.p. 224 m, then along the foothills of Boska at about 200-250 m a.s.l. till Anska Reka river, then downstream to v. Dedeli. Total area 60.41 km$^2$.

**61454b Pogana (Bogdanci-Dojran hills)**

Boundaries. From v. Dedeli upstream along Anska Reka river and then downstream the Luda Mara stream to its inflow into Paljurci reservoir, and then along the foothills of Pogana at about 70-150 m a.s.l. to v. Dedeli. Total area 87.18 km$^2$.

**61454c Dub (Bogdanci-Dojran hills)**

Boundaries. From the border pass Dojran along the state border Macedonia-Greece to just above v.

Selemli, then along the foothills of Kara Balija at about 150-250 m a.s.l. till the stream Luda Mara entrance into Paljurci reservoir, then upstream till its confluence with Kamilska Reka, and then along the foothills of Kara Balija at Dojran area to the border pass Dojran at about 200 m a.s.l. Total area 52.38 km$^2$.

**61455 Dojransko Pole**

The more or less flat area around Dojran Lake with intensive agriculture was identified as separate region. Its average altitude is 183 m. The lowest parts of the valley around the lake are composed of the lake sediments and surrounding slopes have same geology as the surrounding hills. The climate is modified Mediterranean.

Boundaries. From the border pass Dojran along the foothills of Kara Balija/Dub at about 200 m a.s.l. to the stream Luda Mara (on the west), then along foothills of Pogana and Boska (on the north) at about 200 m a.s.l. to the state border with Greece and then along Dojran Lake shoreline to the border pass Dojran. Total area 26.24 km$^2$.

**61456 Dojransko Ezero**

Dojransko Ezero (Dojran Lake) is Macedonian smallest natural lake (excluding very small stagnant water bodies). It is eutrophic lake with very high fish production. Its level dropped significantly during 90-ties of the last century.

Boundaries. The region represents Dojran Lake water basin and the shoreline reedbeds (148 m a.s.l.). Total area 26.03 km$^2$.

**61457 Belasica**

Belasica is mountain horst with east-west direction. It is high mountain although in Macedonia it does not rises above 2000 m altitude. Geological bedrock is composed of silicate masses with granites, gneisses and gabbro. Strong Mediterranean climate influence through Struma Valley in Strumica plain and in Dojran Valley provides for the modified sub-Mediterranean climate at lower elevations of the mountain. Mountainous climate is typical for the upper part. Average elevation is 762 m.

Boundaries. From the state border Macedonia-Bulgaria at v. Staro Konjarevo along the border up to the peak Tumba, then along the state border Macedonia-Greece, along the ridge of Bealsica Mt., till Jolburun (the point where the border line meet the stream Domuz Dere), then upstream Domuz Dere and downstream Elez Dere and Kodzha Dere, then along the foothills of Belasica Mt. at 200 m a.s.l. and then up to Kosturino pass, excluding v. Kosturino, and then downstream Trkaljavishte (river Trkanja) till the elevation of 275 m a.s.l., then along the foothills of Belasica Mt. above Strumica Valley at about 250 m a.s.l. (excluding villages) to the state border with Bulgaria at v. Staro Konjarevo. Total area 198.21 km$^2$.

**61458 Serta**

Serta is low mountain with northwest-southeast direction, well defined geomorphologically, but the range is known locally by several names (Plavush, Konechka Planina, Gradeshka Planina and Serta). It is silicate mountain with small marble area, with moderate continental climate with strong Mediterranean influence at lower elevations. Average altitude is 508 m.

Boundaries. From the river Bregalnica (below the peak Jako, 318 m a.s.l.) upsteam along the river till Kriva Lakavica inflow, then upstream the river (including accumulation Mantovo) to v. Dolni Lipovikj, including the village), then upstream Strugalnica stream, then across the saddle to the source of the stream Bela Reka, then downstream (excluding Vodocha accumulation) to v. Raborci, then downstream Trkanja river, then upstream Trkaljavishte up to Kosturino pass (Kosturinsko Pole plateau), then down the valley (Dervenska Reka, Suva Reka) towards Valandovsko Pole, then along the foothills of Serta Mt. at about 150-200 m a.s.l. (excluding the valleys and ravines of the Vardar river tributaries in Demir-Kapija Gorge), then along the foothills of Konechka Planina/ Serta Mt. till east of v. Pepelishte and then along the slopes of Orlov Bair, Jokush, Orta Malska Korija, Hisar and Ramadanica (at an elevation of about 350-400 m a.s.l.), then the boundary descends to river Bregalnica (below the peak Jako, 318 m a.s.l.). Total area 690.54 km$^2$.

**61459 Smrdesh**

Although traditionally considered as mountain, Smrdesh does not rise above 1000 m a.s.l. and is hilly region. Average altitude is 571 m. It has similar geographical characteristics as Serta (see above).

Boundaries. From inflow of Madenska Reka stream into Kriva Lakavica upstream Madenska Reka till the plain below Damjan mine, then along the foothills at about 400 -500 m a.sl. till v. Radichevo, then along the foothills of Smrdesh Mt. at about 300-350 a.s.l. till Strumica town, then upstream Trkanja river till v. Raborci, then toward Vodocha Reservoir (including the reservoir), then upstream Bela Reka stream and across the saddle, then downstream Strugalnica to v. Dolni Lipovikj (excluding the village), then downstream Kriva Lakiavica river to its confluence with Madenska Reka. Total area 247.97 km$^2$.

**615 Strumica river Valley**

**61560 Strumica-Radovish Valley**

In the river Strumica Valley two spatial units can be distinguished – Strumica plain (average altitude 235 m) on southeast (lowland on about 210 m a.s.l.) and Radovish plain on the northwest which is slightly higher (average altitude 341 m). Alluvial sediments in the valley are covered by a very fertile soil providing for intensive agriculture – production of early vegetable. Mild modified sub-Mediterranean climate contribute to this. In the lower part of the valley the famous Monospitovsko Blato (swampy area) is situated.

Boundaries. The valley is encircled by the foothills of mountains Belasica (on the south), Plavush and Smrdesh (on the southwest and west), Plachkovica and Goten (on the northwest) and Ograzhden (on the north) at about 250-400 m a.s.l.; the eastern boundary is along the state border with Bulgarija between villages Novo Konjarevo and Staro Konjarevo. Total area 427.95 km$^2$.

**61560a Strumichko Pole (Strumica-Radovish Valley)**

Boundaries. The sub-region represents the southeastern part of Strumica-Radovish valley surrounded by Ograzhden Mt. on the north, Belasica Mt. on the south and Smrdesh hills on the west; it is separated from Radovish Valley by the throught at v. Sushevo. Total area 312.91 km$^2$.

**61560b Radovishko Pole (Strumica-Radovish Valley)**

Boundaries. The sub-region represents the northestern part of Strumica-Radovish valley surrounded by

Plachkovica Mt. on the north, Goten Mt. on the northeast and east and Smrdesh hills on the soth and sothwest; it is separated from Strumica Valley by the throught at v. Sushevo.Total area 115.04 km$^2$.

### 616 Sredno povardarie (Middle Vardar Valley)

#### 61661 Boshvija

Boshavija is a small region along the middle and lower flow of the river Boshava. Moderate continental climate is highly modified by the Mediterranean influence. Silicate bedrock dominates represented by gabbro-diabases, quartzite, flish sandstone and volcanic deposits, as well as alluvial sediments along the river. Average altitude is 528 m.

Boundaries. From Demir Kapija town along foothills of the Kozhuf Mt. (in broad sense) (Gorni Krasotvec) toward villages Dren and Chiflik, then along the slopes of Kozhuf Mt. in the river Boshava valley (including villages Bohula and Chemersko) to v. Konopishte, then along the ridges and slopes of eastern part of Vitachevo regon till Baldavec (t.p. 852 m), then down along the ridge, though Chukata (t.p. 485 m) and Krdzhevo Ravno (394 m a.s.l.), to Demir Kapija town. Total area 121.64 km$^2$.

#### 61662 Tikvesh

Tikvesh is well known vine region. It is consisted of the immediate Vardar valley plain (lower-middle flow) and gently sloping surrounding terrain and associated hills. Mild continental climate characteristic for the region is highly modified by the Mediterranean influence. The geological composition is represented by alluvial deposits and Eocene flish sediment and Pliocene lake sediments. Average altitude is 252 m but the elevation range varies from about 70 to 870 m a.s.l.

Boundaries. From Gradsko village (Begova Laka) along Vardar river to v. Krivolak, then along the foothills of Serta Mt. (Konechka Planina) at about 200-250 m a.s.l. to Demir Kapija town, then upstream Vardar river to 99 m a.s.l. altitudinal point, and then uphill along the ridge thorough Golemo Brdo (289 m a.s.l.), Krdzhevo Ravno (394 m a.s.l.), Chukata (t.p. 485 m) and Baldavec (t.p. 852 m), then along the ridge through Boshkova Padina, and Sedjavechkiot Rid to Cuculka (612 m a.s.l.), then down the ravine and across Luda Mara river, then upstream Babin Dol stream till Amazovec (t.p. 609 m), then down the ravine till v. Resava at Tikvesh reservoir, then along the shore of the accumulation till below Golema Strana hill, then along the ridge and foothills at about 350 m a.s.l. till Rascepenec (405 m a.s.l.), then along the Devol ridge to Drenovska Klisura, then along the foothills of Klepa Mt. (at 200-300 m a.s.l.) to locality Jazvinje, then along the ravine to Begova Laka at Gradsko. Total area 490.94 km$^2$.

#### 61663 Raec Valley

Raec valley represents the broader region around the valley along the small river Raec. It is consisted of lowland part at Vardar Valley which gradually ascends toward mountains Dren and Kozjak (part of Babuna Mt.). The region has complex geology, but marble bedrock is very characteristic for its upper part (the region is known because of marble quarries). Mild continental climate is characteristic for Raec Valley, but it is strongly modified by the Mediterranean influence. Average altitude is 527 m.

Boundaries. From the exit of Drenovska Klisura gorge along the ridge to Devol (t.p. 442 m), then along Galchin-Orle foothills (contour lines 400-600 m a.s.l.) to v. Dren, then along the foothills of Dren Mt. (contour line 650-750 m a.s.l.) to Pletvar pass (999.3 m a.s.l.), then along the foothills of Kozjak (Babuna Mt.) at 800 m a.s.l., then 600 m a.s.l. elevation till the locality Gabosovo, then the boundary descends to 500 m a.s.l. and continues along the foothills of Kozjak (Babuna) Mt. to the v. Farish, then descends to about 350 m a.s.l. and continues along the foothills of Klepa Mt. to Drenovska Klisura. Total area 102.64 km$^2$.

#### 61664 Klepa

Klepa is low limestone mountain, but the highest part is composed of silicate (diabase) rocks. It is characterized by mild continental climate with strong Mediterranean influence. Average altitude is 570 m.

Boundaries. From the peak Ushi (t.p. 383 m) at v. Crkvino along the foothills of Klepa Mt. at 250-400 m a.s.l. till Drenovska Klisura, then along the foothills above Raec Valley at 300-400 m a.s.l. till the locality Zheleskovo (536 m a.s.l.), then up along the ravine and across the saddle below Gradishte (858 m a.s.l.), then downstream along the stram Izvor to v. Vladilovci, then along the foothills of Klepa Mt. at about 250-450 m a.s.l. till Ushi peak (t.p. 383 m). Total area 269.22 km$^2$.

#### 61665 Babuna and Topolka

The lower flows of the rivers Babuna and Topolka are mainly slow flowing flatland parts of these rivers. The ground is composed of alluvial deposits with fertile soil, but there are several small limestone hills that create small gorges with extraordinary appearance. These gorges host rocky and grassland habitats with several endemic plant species. The warm continental climate is under the strong Mediterranean influence. Average altitude is 332 m.

Boundaries. From Prevalec (t.p. 258 m) at Veles along the ridge to Kameno Brdo (t.p. 444 m), then down to the river Topolka inflow point and then downstream Vardar river to the river Babuna confluence, then along the ridge through Rashje till Ushi peak (t.p. 383 m), then along the foothills of Klepa Mt. at about 250-450 m a.s.l.) till v. Vladilovci, then along the foothills of Babuna Mt. at 300-400 m a.s.l. till Babuna river, then it crosses the river at Stara Crkva locality, then along the foothills of Jakupica Mt. at about 350-450 m a.s.l. till Melnichka Reka at the v. Melnica, then downstream the river till its inflow in Topolka river, then along the foothills of Goleshnica Mt. at an elevation of about 300 m a.s.l. till v. Banjica, then along the ridge above v. Slivnik to Ramnishta (t.p. 681 m), then along the ridge above v. Buzalkovo to Groot hill (t.p. 675 m), then along the hill slopes at 400-500 m a.s.l. till Drenovski Kolibi locality (t.p. 295 m), then to the south to Prevalec (t.p. 258 m). Total area 159.46 km$^2$.

#### 61666 Veles-Gradsko

The Middle Vardar region (Veles-Gradsko) occupies low elevation terrain along the river Vardar valley in Veles area. The ground is mostly composed of alluvial and Eocene flish sediments, than mixed silicate and carbonate (limestones and marble) rocks. Mediterranean climate influence is very strong and this region is among the driest areas in Macedonia. Natural vegetation is much degraded or absent. Agriculture is the main land use type with extensive practices. Average altitude is 259 m.

Boundaries. From Prevalec pass at Veles town along the

foothills of Groot hill (t.p. 675 m) at 450 m a.s.l., then down the ridge to Vardar river on the west-northwest of v. Bashino Selo, then along the ridge of Kanara (t.p. 271 m) to Gaber (t.p. 381 m), then toward the ridge of the hill Radichica (t.p. 385), and then toward east along the slopes at 300 m and along the ridge and dalestillthe saddle (378 m a.s.l.), then along the contour line 350 m elevation till Vakufska Reka stream, then down the ravine to Ivankovska Reka stream, then downstream to v. Kumarino, then along the slopes at 350-400 m a.s.l. to Dervenski Potok, then along the stream to Joldzhik locality, then along the foothills of Kuchukol hilly area at 200-300 m a.s.l. to Bregalnica river, then downstream Bregalnica and Vardar to Begova Laka locality, then along the dales and ravines to Popov Rid (t.p. 393 m), then along the foothills of Klepa Mt. at 250-400 m a.s.l. to Ushi peak (t.p. 383 m), then down the ridge till Babuna river inflow into Vardar, then upstream Vardar till the confluence with Topolka river, then along the ridge, through Kameno Brdo to Prevalec pass (t.p. 642 m). Total area 151.38 km$^2$.

**617 Dolna Bregalnica (Lower Bregalnica)**

**61767 Kuchukol**

Kuchukol is one of the three remaining "steppe" ("pseudo-steppe") regions in Macedonia together with 61668 Slan Dol and 61669 Bogoslovec. These regions, particularly Slan Dol, are the driest areas in Macedonia with semi-desert climate (in the triangle between Veles, Shtip and Krivolak). The geological ground is composed of predominantly Pliocene and Eocene sediments. An important characteristic for this region is presence of saline soils and halophytic vegetation with many steppe elements and endemic species. Average altitude is 324 m. The region is almost completely abandoned and uninhabited.

Boundaries. From the inflow point of Djuzumliska Reka into Svetinikolska Reka downstream the river tillo its inflow in Bregalnica river, then downstream along Bregalnica till the foothill of Koladzhik peak (t.p. 209 m), then along the 200 m contour line, bordering with Veles-Gradsko region, till the v. Dolno Karaslari, then along 250 and contour line, then across Karaslarski Potok stream up to 350 m contour line, then along it to Joldzhik, then along the dale up to Dzhamaldzhi (t.p. 373 m), and then along the slopes at 350 m a.s.l. (then at 250 m a.s.l.) till Svetinikolska Reka. Total area 122.50 km$^2$.

**61768 Slan Dol**

This region has similar characteristics as Kuchukol (see above) and even more pronounced (the name Slan Dol means "salty dale" in English). It was identified as individual region since it is separated from Kuchukol by the river Bregalnica water course. Average altitude is 274 m.

Boundaries. From Bregalnica river inflow into Vardar upstream along Bregalnica till the hill Jako (t.p. 318 m), then along ravines and dales, west of Ramadanica and Hisar to Orta Malska Korija, then along the foothills of Serta Mt. at 450 and 400 m a.s.l. till the locality Karash Tarla, then downstream Ordzhba Deresi, Sheobski Potok and Veshitni streams till Shtipsko Ramnishte locality where the boundary joins the river Vardar, then upstream Vardar till the confluence with Bregalnica river. Total area 269.76 km$^2$.

**61769 Bogoslovec**

Bogoslovec is large and relatively high hill (Sv. Jovanski Vrv, 755 m a.s.l.) in central Macedonia on the south of Ovche Pole plain. It is composed of serpentines, gabbro and schist with marble layers. The climate is very dry, under strong Mediterranean influence. Average altitude is 347 m.

Boundaries. From Svetinikolska Reka inflow into Bregalnica upstream the river till the inflow point of Djuzumliska Reka into Svetinikolska Reka, then along the foothills of Bogoslovec at about 250-400 m a.s.l. above Ovche Pole plain and Shtip Valley till Kriva Lakavica river inflow at v. Sofilari and then along Bregalnica river downstream to the confluence with Svetinikolska Reka river. Total area 82.17 km$^2$.

**618 Ovche Pole area**

**61870 Shtipsko Pole**

This region represents the area along the middle flow of the river Bregalnica, in the area of Shtip city. It is lowland hilly region with slopes from Bregalnica toward neighboring hills and mountains. The ground is composed of alluvial deposits along the river, but dominant bedrock is Eocene flish sediments and granites on the southeast of Shtip. The climate is warm continental, dry, with strong Mediterranean influence. Agriculture is the main land use type. Average altitude is 317 m.

Boundaries. From Bregalnica river at the point on the east-southeast of the v. Krupishte along the channel and stream up to Solca hill (t.p. 489 m), then along the foothills of Plachkovica Mt. at 400 m a.s.l. elevation (excluding v. Novo Selo at Shtip), then along the contour line of 300 m elevation till the stream Kuzov Dol, then down to Kriva Lakavica river, then upstream the river till the locality Lozishte, then along the dales and ridges of east Bogoslovec hills till v. Sushevo, then along the foothills at 400 m a.s.l. to the plantations at v. Tri Cheshmi, then across the valley to Golemi Ushi hill (399 m a.s.l.), then along the ridge (thorugh Elezhov Rid and Levkov Rid) to Kievo hill, then along the foothills of Mangovica hilly area at about 400 m a.s.l. to Bogoslov Kamen locality (439 m a.s.l.), then to the south thorugh t.p. 304 m till Bregalnica river. Total area 119.67 km$^2$.

**61871 Kochansko Pole**

Kochansko Pole is the continuation of Ovche Pole (61872) and Shtipsko Pole (61870) toward east. However, its geological composition is mostly of alluvial sediments and the climate is more humid, although the Mediterranean influence is still strong. The main occupation of the population is agriculture, but Kochansko Pole is specific in this respect since large portion of the land is used for rice crops. These "wetlalnds" give an important feature to the region concerning biodiversity in anthropogenic habitats. Average altitude is 334 m.

Boundaries. From Bregalnica river at the point on the east-southeast of the v. Krupishte downstream Bregalnica to the point on the north of v. Karbinci, then up to the foothills of Mangovica hilly region at Bogoslov Kamen hill through t.p. 304 m, then along the foothills at about 350-400 m a.s.l. till the locality Globica, then along the foothills of Osogovski Planini Mts. at an elevation of about 400 m a.s.l. (including villages) and Kochani town till v. Istibanja, then along the slopes of Kalimanci region at 350-450 m a.s.l. till Vinica town (including the town), then along the foothills of Plachkovica Mt. till the hill Solce (t.p. 489 m), then down the ridge to Bregalnica river. Total area 189.64 km$^2$.

**61872 Ovche Pole**

Ovche Pole is large plain in north-central Macedonia characteristic for its intensive agriculture, mainly cereal crops (wheat). It is dry region with warm continental climate and strong Mediterranean climate influence. The ground is composed of Quaternary sediments – clays, sands. The most representative sites with saline habitats, including salt marshes, in Macedonia can be found in this region. Average altitude is 347 m.

Boundaries. From the inflow point of Djuzumliska Reka into Svetinikolska Reka along the slopes of Kuchukol hilly region at about 250-350 m a.s.l. to Dzhamaldzhi locality (t.p. 373 m), then down the dale to Dervenski Potok stream, then uphill along the ridge till v. Kumarino, then upstream Ivankovska Reka and Suva Reka streams till Seter Bair (t.p. 515 m), then along the foothills of Gradishtanska Planina hills at 400-500 m a.s.l. till the locality Karula (t.p. 541 m), then along the foothills of Mangovica hilly region at about 350-450 m a.s.l. till v. Gorno Trogerci, then along the ridges Levkov Rid and Ezhevo Brdo to v. Tri Cheshmi, then along the foothills of Bogoslovec hills at about 250-350 m a.s.l. till the inflow point of Djuzumliska Reka into Svetinikolska Reka. Total area 444.79 km$^2$.

**61873 Mangovica**

Mangovica is extensive hilly region mainly covered by dry grasslands (winter hill pastures). The hills are composed of volcanic deposits. Warm continental climate is modified by the Mediterranean influence. Average altitude is 544 m. The area is largely abandoned at present.

Boundaries. From the inflow point of Kriva Reka river into Pchinja upstream along Kriva Reka till Kratovska Reka inflow (near v. Kjetenovo), then upstream Kratovska Reka to v. Turalevo, then upstream Povishnica and Bela Voda streams till foothills of Crven Rid (t.p. 782 m), then along the foothills of Osogovski Planini Mts. at 700 m a.s.l. till Probishtip (including the town), then along the foothills to v. Zletovo, then downstream Zletovska Reka to Globica locality, then along the foothills of Mangovica hills at about 350-450 m a.s.l. till v. Mustafino, then on the north along Stanulovska Reka stream to v. Stanulovci, then along the foothills of Mangovica at 400-500 m a.s.l. till the stream Boshkov Dol, then along the stream till below the v. Kokoshinje, then along the foothills of Mangovica at 550 m a.s.l. till Asanica stream, then downstream Asanica and upstream Kashanjski Dol till the saddle on the south of Golem Rid (t.p. 471 m), then downstream to Pchinja River. Total area 487.12 km$^2$.

**61874 Gradishtanska Planina**

This region, although named "Planina" which means "mountain", is hilly region. Its average altitude is 494 m. It has similar geographic characteristics as Mangovica (see above). Dominant bedrock is Eocene flish sediments mainly of silicate composition, then Miocene and Pliocene lake sediments and young basalt on the tops of the hills.

Boundaries. From the inflow of Kumanovska Reka river into Pchinja river upstream Pchinja to 283 m a.s.l. point, then upstream the ravine till the saddle on the south of Golem Rid (t.p. 471 m), then downstream Kashanjski Dol and upstream Asanica stream till below v. Kokoshinje, then across the saddle Zhelkovec (t.p. 577 m), and then along the foothills of Gradishtanska Planina hills at about 400 m a.s.l. till v. Sopot, then along the slopes of Gradishtanska Planina hills at 400 m a s.l. till Kamenica hill (t.p. 479 m), then downhill to Pchinja river at v. Badar, then along the foothills at 250 m a.s.l., then at 300 m a.s.l. till the river Pchinja, then upstream Pchinja till the confluence with Kumanovska Reka. Total area 394.80 km$^2$.

**619 Skopje-Kumanovo Valley**

**61975 Taorksa Klisura and Badar**

These two gorges occupy the narrow territory along Vardar flow between Skopje Valley and Veles Valley as well as along the lowermost flow of the river Pchinja. They are characterized by complex geology with mixed Paleozoic and Mesozoic rocks of the characteristic Veles series: marble, limestone, quartzite and serpentine. The valleys are mostly covered with thermophilous oak forest and scrub. Mediterranean climate influence is very strong. Average altitude is 320 m.

Boundaries. From v. Oreshani across Vardar river to v. Taor, then along the foothills just next to Katlanovo plain area at 300 m a.s.l. till v. Katlanovo, then along 250 m contour line till v. Badar (including the village), then across Pchinja river and uphill the ridge at Kamenica locality, then along the slopes of Gradishtanska Planina at (350 m a.s.l.) 400 m a.s.l. (including v. Sopot) till Gaber hill (t.p. 381 m), then along the ridge at Kanara hill (t.p. 271 m) down to Vardar river, then across the river trough t.p. 392 m to Groot (t.p. 675 m) foothills, then along the foothills of Groot and Goleshnica Mt. at about 300-400 m a.s.l. till Kadina Reka river, then along the foothills of Kitka Mt. at about 400 m till Dzhambovica hill (t.p. 344 m), then down the ridge to v. Oreshani. Total area 83.57 km$^2$.

**61976 Skopsko Pole**

Skopje Valley is the most urbanized region in Macedonia, spread on alluvial sediments of the upper part of the Vardar middle flow valley. Moderate continental climate characteristic for the region is strongly modified by the Mediterranean climate influence. Intensive agriculture activities in the past have resulted in loss of all wetlands characteristic for the area until the World War II. Average altitude is 322 m.

Boundaries. From the river Vardar above v. Rashche (at t.p. 323 m) along the foothills of Radusha regon at about 400 (including villages) m a.s.l. to Lepenec river, then along the foothills of Skopska Crna Gora Mt. at about 400-600 m a.s.l. (including villages) to v. Nikushtak, then along the hills between the valleys of Skopsko Pole and Kumanovska Kotlina (Zhegligovo) till v. Romanovce (excluding the village), then through hilltops of Jabuchica (t.p. 449 m ) and Krst (385 m a.s.l.) to Pchinja river, then downstream the river till v. Katlanovo, then along the foothills of Gradishtanska Planina hills at about 300 m a.s.l. to v. Badar, then along the foothills just above Katlanovo plain to v. Taor, and then across Vardar to v. Oreshani (including the village), then along the foothills of Kitka Mt. and Vodno Mt. at about 250-300 m a.s.l. to Matka canyon at v. Dolna Matka, then along the foothills of Osoj Mt. at 300 m a.s.l. till v. Arnakija, then along the foothills of Zheden Mt. at about 350 m a.s.l. to Vardar river above v. Rashche. Total area 552.39 km$^2$.

**61977 Zhegligovo**

Zhegligovo is wavy plateau occupying the area along the valleys of the rivers Kumanovska Reka and

Pchinja. It is natural continuation of Skopska Kotlina (Pole) toward north. The main bedrock in the region is Paleozoic rock formation composed by both, silicate and carbonate rock masses. Pliocene lake sediments cover large area in the southern part. Basalt massifs appearing in Pliocene formation are considered a special phenomenon of this region. Typical climate is moderate continental, slightly modified by the low Mediterranean influence. The valley is highly populated and urbanized to a large extend. Agriculture is the main land use type. Average altitude is 406 m.

Boundaries. From the state border Macedonia-Serbia on the north of v. Lojane along the border till t.p. 439 m, then along the foothills of Ruen hills at about 500-600 m a.s.l. till the confluence of Serava and Mutalovski Dol streams, then upstream Mutalovski Dol till the saddle between Shumati Rid and Deje (529 m a.s.l.), then downstream Selski Dol to above v. Pashinci, then along the foothills of Ruen at 400 m a.s.l. till Pchinja river below Adzhinci locality, then along the slopes of Kzjak Mt. at 400 m a.s.l. till Gladnichki Dol stream, then along the hilly slopes of Sredorek at 350 m a.s.l. till Kriva Reka river below Erebicharnik hill (t.p. 428 m), then downstream Kriva Reka and Pchinja rivers till just below v. Pchinja, then along the the ridge, through Krst hill (395 m a.s.l.), Jabuchica (t.p. 449 m), Stari Lozja (t.p. 494 m) and Selimesh (533 m a.s.l.) till v. Nikushtak (including the new part of the village), then along the foothills of Skopska Crna Gora Mt. at about 500-600 m a.s.l. till Macedonia-Serbia state border at v. Lojane. Total area 351.00 km$^2$.

### 620 Skopska Crna Gora

### 62078 Skopska Cena Gora

This is middle altitude mountain range on the northern Macedonian border. Skopska Crna Gora Mt. has very complex geological structure represented by silicate rocks (schist, green schist, quartzite and huge formation of flish sediments). On the south-western, lower part of the massif, there are large marble layers within the silicate formation. The region is mostly covered by grasslands, oak and beech forests. The climate is moderate continental on lower elevations and mountainous on upper part, both slightly modified by the Mediterranean climate influence. Average altitude is 949 m.

Boundaries. From the border pass Blace (at General Jankovikj) downstream Lepenec river till just below the hill Przhnik, then along the foothills of Skopska Crna Gora Mt. at about 400-600 m a.s.l. (excluding villages) till v. Lojane (including the old part of the v. Nikushtak), then along the state border line with Serbia and Kosovo to border pass Blace. Total area 463.48 km$^2$.

## 7 Eastern Mountains

### 721 Northeastern mountains

### 72179 Ruen

Ruen is small hilly region in the northern part of Zhegligovo (61977), separated from it by its individual relief characteristics. Average altitude is 542 m. Otherwise, its geographic characteristics are similar to Zhegligovo (see above).

Boundaries. From Macedonia-Serbia state border at t.p. 439 m along the border line till Pchinja river, then downstream the river till v. Koince at 356 m a.s.l., then along the foothills of Ruen hills till Selski Dol stream at v. Chelopek, then upstream till the saddle between Shumati Rid and Deje hills, then down to Mutalovski Dol stream, then downstream till the confluence with Serava Stream, then upstream to v. Zhabarovci, and then along the foothills of Ruen at 500-600 m a. s.l. till v. Sopot, then along the foothills at about 450-500 m a.s.l. to Macedonia-Serbia border at t.p. 439 m. Total area 66.69 km$^2$.

### 72180 Sredorek

Sredorek is hilly area which actually represents the southern low slopes of the mountain Kozjak (Kumanovo area - 72181a). It is almost exclusively composed of silicate bedrock (mainly volcanic rocks) with mostly degraded oak forest vegetation. The climate is moderate continental with low Mediterranean influence. Average altitude is 553 m.

Boundaries. From the inflow point of Vetunica stream into Kriva Reka river downstram the river till below the hill Erebicharnik at 319 m a.s.l., then along the slopes of Sredorek hills at about 300-350 m a.s.l. till the locality Garvanov Kamen at v. Dragomance, then along the contour line of 400 m till Sredni Rid ravine, then upstream to v. Stepance, then upstream Gradnichki Dol till below Golema Chumica hill, then along the foothills of Vranica (t.p. 768 m) and Kozjak Mt. at 700-750 m a.s.l. till the foothills of Golem Lisec (t.p. 886 m), then downstream Beli Vodi stream till Vrazhja Chuka locality, then along the slopes above Slavishte at about 600-700 m a.s.l. till Gola Chuka foothills (t.p. 623 m), then downstream Vetunica stream till its inflow in Kriva Reka. Total area 218.45 km$^2$.

### 72181 German

German is low to medium altitude mountain range on the northern and north-eastern border of Macedonia. It is geomorphologically well defined spatial unit, but traditionally three mountains are known: Kozjak (average altitude 868 m) on the west, German (average altitude 1089 m) in the middle and Bilina Planina (average altitude 1065 m) on the east. Average altitude of the whole range is 999 m. All these mountains are composed of silicate bedrock (volcanic rocks). Common characteristic for all three mountains is typical continental climate (the most representative in the whole Macedonia), only slightly modified on lower parts of Kozjak by the Mediterranean influence.

Boundaries. From Macedonia-Serbia border at the river Pchinja along the border line till the border with Bulagaria, then along the border till Deve Bair, then downstream Kriva Reka river till v. Psacha, then above Slavishte valley and along the foothills of German and Kozjak till Pchinja river, then upstream to the Macedonia-Serba state border. Total area 553.57 km$^2$.

### 72181a Kozjak-Kumanovo (German)

Boundaries. From Macedonia-Serbia border at the river Pchinja along the border line till the point close to Chuka (t.p. 1320 m), then to the south down to Mala Reka stream, then upstream Shtiljovo Vodishte stream till the saddle Rid (t.p. 1303 m), then downstream Romenica, Stanchin Potok and Radibushka Reka streams to v. Radibush and then on the west along the foothills of Kozjak Mt. at about 700-750 m a.s.l. till Beli Vodi stream, then upstream to v. Ratunda, then along the foothills of Kozjak Mt. at 700-800 m a.s.l. till Golema Chumica hill

(t.p. 723 m), then downstream Gladnichki Dol and Sredni Rid ravine just above v. Stepance till v. Dragomance, then along the foothills at 400 m a.s.l. till Pchinja river above v. Koince, then along the river up to the Macedonia-Serbia state border. Total area 193.49 km$^2$.

**72181b German (German)**

Boundaries. From Macedonia-Serbia state border close to Chuka (t.p. 1320 m) along the border line till Neravska Reka (the source area of Pchinja river), then upstream Neravska Reka to its source and then across the saddle between Golem Chukar and Porta (1413 m a.s.l.), then toward Orloshtichki Rid (t.p. 1467 m) saddle, and then downstream Poljanska Reka and Rashka Reka streams till 747 m a.s.l., then the boundary continues along the foothills of German Mt. at 800 m a.s.l. till Golem Dol stream, then downstream to v. Radibush, then upstream Radibushka Reka and its tributary Stanchin Potok stream, then Romenica stream up to the saddle (1277 m a.s.l.), then downstream Shtiljovo Vodishte and Mala Reka streams to Chuka (t.p. 1320 m). Total area 69.73 km$^2$.

**72181c Bilina Planina (German)**

Boundaries. From the Macedonia-Serbia stata border at Neravska Reka stream along the state border line till the border with Buglaria, then along the border line to Deve Bair pass, then downstream Starchev Potok stream and Krive Reka river to the gorge near v. Psacha at the confluence with Rashka Reka, then upstream Rashka Reka and Poljanska Reka till Orloshtichki Rid (t.p. 1467 m) saddle (1413 m a.s.l.) and Golemi Chukar (t.p. 1491 m) saddle (1473 m a.s.l.), then downstream Neravska Reka to Macedonia-Serbia state border. Total area 290.35 km$^2$.

**72182 Slavishte**

Slavishte is a middle elevation valley along the upper-middle flow of the river Kriva Reka. The largest part of it spreads on the gentle slopes of German and Bilina Planina, the rest is flat area along the river. Average altitude is 587 m. Pliocene lake sediments dominate – huge clayey deposits, than alluvial and deluvial sediments, all with silicate composition and covered by with fertile soil. Main land use type is agriculture. Climate is moderate continental.

Boundaries. From v. Stracin toward north and east along the foothills of Kozjak and German (at about 700-800 m a.s.l.) till Rashka Reka at 747 m a.s.l., then downstream Rashka Reka to its inflow in Kriva Reka and downstream till the confluence with Vetunica stream, then upstream to Sv. Shipkovci, then along the ravines and dales to v. Stracin (Chivlevci). Total area 90.66 km$^2$.

**722 Osogovo**

**72183 Osogovoski Planini**

Osogovo is common name for the region of the lower and higher parts of the mountain range Osogovski Planini. It is almost exclusively built of silicate bedrock (of the gneiss base). The climate is typically moderate continental on the northern slopes (toward Slavishte) and modified continental on the southern slopes (toward Kochansko Pole) due to Mediterranean climate influence. On the upper parts of the mountain mountainous climate is typical. Average altitude is 975 m. Osogovo is known by the typical mountainous rural landscape where people live more or less in harmony with the mountain.

Boundaries. From the border pass Deve Bair at Macedonia-Bulgaria state border along the border line till Petrovac peak (t.p. 986 m), then downstream Bela Reka from its source below Petrovac saddle and Crkvinska Reka stream till just above Bregalnica river at Duovksa Maala, then downstream Bregalncia river till its inflow into Kalaimanci reservoir, then along the shore of the reseorvoir, including the whole reservoir, then again along the river Bregalnica till v. Istibanja, then along the foothills of Osogovo Mts. at about 350-400 m a.s.l. (excluding Kochani town and villages) tIll Zletovska Reka river at the locality Globica, then upstream Zletovska Reka till v. Zletovo, then along the foothills at 600-700 m a.s.l. till above v. Gorni Stubol, then downstream Bela Voda and Povishnica streams till its inflow in Kriva Reka, then upstream Kriva Reka till v. Uzem, then upstream Stanchev Dol up to Deve Bair pass. Total area 1249.75 km$^2$.

**723 Plachkovica-Golak**

**72384 Kalimanci**

Kalimanci is high hilly region which cannot be attributed to any mountain in the broader region. There is no common name for this area, thus the name of the region was given because of the village Kalimanci which spreads along the most of this territory with its scattered clumps of houses, which are mostly abandoned. The geological bedrock is composed of silicate rocks and the climate is moderate continental. Average altitude is 650 m.

Boundaries. Fom v. Istibanja upstream along Bregalnica river till the Kalimanci reservoir, then along its shore (excluding the reservoir), then again upstream Bregalnica till the inflow of Zhuzhela stream, then along the stream till Boricheto hill (t.p. 856 m), then along the foothills of Golak Mt. at aobut 750-800 m a.s.l. till the stream Zheleznichka Reka, then shortly downstream and again along the foothills and ravines till the stream Osojnica at v. Delovo, then downstream the valley of Osojnica stream till Vinica town, then along the slopes of the hills above v. Jakimovo till v. Istibanja. Total area 149.71 km$^2$.

**72385 Golak**

Golak, including Obozna Mt., is low to middle mountain well defined geomorphologically. However, it is known traditionally by two names – Golak, the higher part on the north and Obozna, the lower part on the south. It is silicate mountain with continental and mild mountainous climate. Average altitude is 947 m.

Boundaries. From the river Zhuzhela inflow into Bregalnica river along the foothills of Golak Mt. at about 600-700 m a.s.l. (along the slopes of Pijanec valley) till the gorge of Bregalnica between Bejaz Tepe and Golak below Vendina Trebenica, then upstream Bregalnica river and Obozinski Dol till Obozna pass, then downstream Maleshevska Reka and Osojnica streams til contour line of 550 m a.s.l., then along the foothills of Golak at 550-600 m a.s.l. till v. Maksimci, then along 800 m contour line till the stream Zhuzhela and then donwtstream to Breglanica river. Total area 216.94 km$^2$.

**72386 Plachkovica**

Plachkovica is large and medium-high mountain composed mostly of silicate bedrock, excluding marble formation between v. Vidoviste on the northwest and Radovish town on the southeast, as well as small area

near v. Gaber where Cretaceous sand-limestone represents the local bedrock. Moderate continental climate is typical for the region, but it is modified by the Mediterranean climate influence from Strumica Valley on the southern slopes. Mountainous climate prevails on upper parts. Northern part is well forested, but on southern slopes more or less degraded oak forests dominate. Average altitude is 861 m.

Boundareis. From the point close the confluence of Bregalnica and Kriva Lakavica rivers along the foothills of Plachkovica Mt. (above Shtip city and villages in Shtip and Kochani valleys) at about 350-450 m a.s.l. till the stream Osojnica near Vinica town, then upstream along the valley of Osojnica till Obozna pass, then downstream Oboziski Dol till v. Mitrashinci (on the north of the village), then along the hills of Plachkovica Mt. at about 800 -850 m a.s.l. till the stream Sleposhnica, then upstream till the saddle (953 m a.s.l.), then down to Kamenica stream, then upstream Kamenica and Desna Reka till the saddle Valmato (1036 m a.s.l.), then downstream Ognjanska Reka stream till its confluence with Shiroki Dol, then upstream Shiroki Dol, then across the saddle and downstream Leva Reka stream and Plavaja river till the inflow of Sirava stream (405 m a.s.l.), then along the foothills of Plachkovica Mt. at 400-500 m a s.l. (excluding Radovish town and villages) till Madenska Reka stream, then downstream Madenska Reka and Kriva Lakavica river, then downstream till its inflow in Bregalnica river. Total area 933.76 km$^2$.

**72387 Goten**

Goten is a small mountain which geomorphologically belongs to Plachkovica massif. Its geographical characteristics are similar to Plachkovica, but without carbonate formations. Average altitude is 723 m.

Boundaries. From the confluence point of Sirava steream with Plavaja river (405 m a.s.l.) upstream Plavaja river till the inflow of Leva Reka stream, then upstream Leva Reka stram till the saddle, then downstream Shiroki Dol, Ognjanska Reka, Bariichka Reka and Bezgashtevska Reka streams till the reservoir Turija, then along its shore (including the reservoir) till the dam, then downstream Turija stream till the locality Turija, then along the foothills of Goten Mt. at about 300-350 m as.s.l. till the river Plavaja. Total area 133.60 km$^2$.

**724 Maleshevija**

**72488 Pijanec**

Pijanec represents the region along the upper flow of the river Bregalnica between towns Pehchevo and Delchevo. The geological bedrock is mainly composed of alluvial sediments along the valley and silicate rocks on the upper parts of the slopes along the valley. In the area between villages Stamer and Gabrovo along the border zone with Bulgaria there are few small masses of Triassic limestone. The climate is moderate continental. Average altitude is 699 m.

Boundaries. The region occupies the valley of Bregalnica river bounded by the slopes of Osogovski Planini Mts. on the northeast, Vlaina Planina Mt. on the north and east, Bejaz Tepe on the south and southwest and Golak Mt. on the west at about 600-800 m a.s.l. Total area 70.66 km$^2$.

**72489 Vlaina Planina**

Vlaina Planina is medium high mountain which represents natural connection between Osogovo and Maleshevski Planini and Ograzhden, which means that the whole border line with Bulgaria is one mountain range. It is silicate mountain (except small mass of Triassic limestone in Delcevo area) with continental climate at lower elevations and typical mountainous climate on upper part. Average altitude is 1025 m.

Boundaries. From the Macedonia-Bulgaria state border at the point below Petrovac peak (t.p. 986 m) along the border line till the saddle (1746 m a.s.l.) between Kadiica peak (t.p. 1932 m) and Kadan Bunar peak (t.p. 1793 m), then downstream Pehchevska Reka till above Pehchevo town, then along the foothills of Vlaina Planina Mt. at about 1000 m a.s.l. till Rechinovo stream and across the saddle (1019 m a.s.l.), then downstream Svrdli and Machkatica streams till below Pilovio Rid hill (t.p. 867 m), then along Garvanica till v. Crnik (including the village), then along the foothills at about 800-850 m a.s.l. till v. Grad, then along the foothills at 700 m a.s.l. till Bela Reka stream near v. Goleshevo, then upstream Bela Reka till Macedonia-Bulgaria state border. Total area 163.11 km$^2$.

**72490 Bejaz Tepe**

Small and low mountain representing a hilly region that is geomorphologically well separated from surrounding mountains and valleys with average altitude of about 961 m. It is composed of silicate bedrock. The climate is continental. Bejaz Tepe is forested region with black pine forests.

Boundaries. From Bregalnica river at the point below Ovcha Glava hill (t.p. 817 m) along the foothills of Bejaz Tepe hills at 700-800 m a.s.l. till the steram Machkatica, then upstream Machkatica and Svrdli (along the regional road Delchevo-Pehchevo), then across the saddle (1019 m a.s.l.) and along the foothills of Bejaz Tepe hills at 850-950 m a.s.l. till v. Budinarci and further till Bregalnica River bilow Ovcha Glava hill (t.p. 817 m). Total area 82.95 km$^2$.

**72491 Maleshevo**

Maleshevo region is high elevation plateau (compared to middle elevation valleys which are the most common in the rest of Macedonia). The relief is hilly with smaller or larger flat areas where agriculture is an important occupation of the inhabitants. The geologic substrate is mainly alluvial sediment along the valley and silicate bedrock in upper parts. Climate is continental. Average altitude is 907 m.

Boundaries. The region represents the undulating plateau up to 800-1000 m a.s.l. surrounded by Vlaina Planina Mt. on the northeast, Maleshevski Planini Mts. on the east, south and west, Plachkovica Mt. on the west and with Bejaz Tepe on the north. Total area 110.96 km$^2$.

**72492 Maleshevski Planini**

Maleshevski Planini Mts. is vast mountainous range shared between Macedonia and Bulgaria. The most prominent and easternmost peak is Chengino Kale (1745 m a.s.l.). The geologic substrate is predominantly silicate. The climate is continental and mountainous on higher elevations. Most of the mountain is forested with oak, beech and coniferous forests (Black pine and Scots pine). Traditional forestry has long history on Maleshevski Planini. The source area of Bregalnica river is situated below

the ridge of this mountain. Average altitude is 1166 m.

Boundaries. From the saddle (1746 m a.s.l.) between Kadiica peak (t.p. 1932 m) and Kadan Bunar peak (t.p. 1793 m) at the Macedonia-Bulgaria state border along the border till Crkvica locality at Dvorishka Reka stream, then upstream Dvorishka Reka and Prevedenska Reka till the saddle Prevedena, then downstream Suvi Laki and Bezgashtevska Reka streams till the inflow of Bariichka Reka, then upstream Bariichka Reka, Shiroki Dol, Ognjanska Reka streams till Valmato saddle (1036 m a.s.l.), then downstream Desna Reka and Kamenica streams till the confluence with Kamenichka Reka stream, then along the foothills of Maleshevski Planini Mts. at about 800-900 m a.s.l. till Bregalnica river at Berovo town, then along the valley of Bregalnica river and upstream Bregalnica and Spikovski Andak till Skalite peak (1363 m a.s.l.), then upstream Pehchevska Reka to its source and up to the state border with Bulgaria. Total area 356.43 km$^2$.

**72493 Ograzhden**

Ograzhden is medium high mountain, the last of the Macedonian group of mountains at the eastern border. It is exclusively silicate mountain with continental climate on the northern slopes and well pronounced Mediterranean climate influence on the southern slopes – toward Strumica Valley. Mild mountainous climate is characteristic for the higher parts. Upper part of the mountain and northern slopes are well forested (Black pine forests along with beech), while southern slopes are covered by degraded oak forests and shrubs. Average altitude is 904 m.

Boundaries. From the accumulation Turija dam along the reservoir shore (excluding the reservoir) till the inflow of Bezgashtevska Reka stream, then upstream Bezgashtevska Reka and Suvi Laki streams till Prevedena saddle, then donwsteram Prevedenska Reka and Dvorishka Reka till Crkvica at Macedonia-Bulgaria state border, then along the border line till above border pass in Strumica Valley, then along the foothills of Ograzhden Mt. at about 250-300 m a.s.l. till v. Ilovica, then along the foothills at 350 m a.s.l. till the accumulation Turija. Total area 339.25 km$^2$.

## Discussion

The fact that the Republic of Macedonia is mountainous country is clearly reflected in presented division – almost half of the level III regions are mountains (44). Nine other regions represent hilly areas to which two plateaus can be added. That makes significant domination of mountainous landscape in the country. According to Filipovski et al. (1996), 37.7 % of the country is mountainous (above 900 m elevation) and only 34,9 % is lowland (below 600 m a.s.l.). The rest are hilly regions.

There is a big diversity of Macedonian mountains in relation to their absolute height (from low mountains to very high mountains for Balkan conditions). Apart from their elevation, Macedonian mountains vary considerably in relation to geological ground and climate characteristics (from purely continental to almost Mediterranean). This implies significant differences in biodiversity richness reflected not only in the total number of species present, but also to the number of endemic and relict species. However, more research is needed to explain this variability in more details – there is a considerable gap concerning detailed and thematic floristic and faunistic studies for particular mountains. The existing differences cannot be fully explained individually for the level III regions but are visible when regions of the level II and particularly level I are taken into consideration. One should bear in mind that the differences between mountains are also due to the different relative height of the mountains. For example, the mountain Kozhuf rises from about 100 m a.s.l. to more than 2200 m a.s.l. while Pelister from 700 m a.s.l. to 2600 m a.s.l. which makes Kozhuf "higher" than Pelister. This also means that the diversity of habitats is grater in the case of Kozhuf.

Presence of deep valleys and gorges (six of which are typical enough to be identified as separate level III regions) makes biogeography of Macedonia more complicated.

This work presents the first attempt to divide the territory of the country for biodiversity purposes in more details. Existing divisions of the Republic of Macedonia do not reflect biogeographic differences at all or they only correspond to some regions of our division by chance (except those divisions, discussed below, worked out intentionally for biogeographic purposes). For example, Cvijić (1906-1911) divided Macedonia into large regions: Skopska Kotlina; Kumanovo-Preshevo meridional depression; Pchinja and Kriva Reka; Ovche Pole, Shtip region and Lakavica; Kochani valley and Maleshevo-Osogovo mountains. Some of these regions correspond to our regions of various levels. The divisions of Jaranov (1945), Melić (1952) and Roglić (1954-55) are similar, based on various geographic criteria. The regionalisation of Kirovski (1969) is probably the closest to usual biogeographic divisions (and to our division) but only in its coarsest stage (three regions were identified: Eastern nature-geographic region, Vardar region and Western region). However, further division into meso and microregions does not correspond with our division in many segments. The division of Panov (1976) is similar in scope and criteria with that of Kirovski (1969). He divides Macedonia into four macro-regions (Upper Vardar, Middle Vardar – Strumica, Osogovo-Maleshevo and Shar-Ohrid-Pelagonja regions). He further divides these regions into nine meso regions and 23 micro-regions.

The differences among the various regions in Macedonia are dominantly based and are caused by the biogeographic circumstances. However, attempts for biogeographic division on global or European level have paid little attention to the division within Balkan Peninsula and even less to the division of Macedonia due to the small area or the level of knowledge in the case of older publications. According to Udvardy (1975) the whole territory of Macedonia belongs to the province of Balkan highlands within the Palearctic biogeographic realm. Illies ed. (1978) placed Macedonia into two of the 25 European biogeographic (eco)regions delineated on the bases of fresh-water fauna. The whole of the west Macedonia (west of the river Vardar and Pchinja) belongs to *ecoregion 6 Hellenic West Balkan* (Hellenischer Westbalkan); the east part of Macedonia belongs to the *ecoregion 7 East Balkan* (Ostbalkan). The Hellenic West Balkan in Macedonian frames corresponds to Level I regions 1, 2, 3, 4, and 5 of the division proposed in this work, while the East Balkan only to the region 7 and partly to the region 6 (Eastern Mountains). The central part of Macedonia – along the river Vardar (the region 6 from our division – Vardar Zone) was not considered separately in

the above mentioned biogeographic division; this suggests that it should be divided along the river Vardar and attributed either to Hellenic West Balkan or East Balkan. However, Vardar Zone differs significantly from both above regions in sense of geomorphology, land use pattern and biogeography which means that our division solves this issue appropriately. Paunović et al. (2012) refined the division of Illies (1978) for the territory of Serbia and extended the geographical distribution of *ecoregion* 5 - Dinaric western Balkan into the northernmost parts of Macedonia.

One of the first more detailed biogeographic divisions of Macedonia (within Yugoslavia) was presented by Hadži (1935 in: Karaman 1975). It is consisted of two larger zoogeographic subregions: Eurasian and Mediterranean. Eurasian subregion is represented by north zone (with three provinces: 1. *serbica* - large parts of west Macedonia including Ohrid Lake and Mokra Planina massif; 2. *pelisterica* - regions south of *serbica* province and west of the river Vardar and 3. *macedonica* - east Macedonian mountains) in Macedonia. Mediterranean subregion is represented by the province *vardarica* (covers Vardar valley). It seems that some of the provinces of Hadži (1935) are equivalent with the Level I regions of our division (*macedonica* corresponds to region 7, *vardarica* to region 6).

The division of Hadži (1935) was later on adopted and elaborated by Karaman (1975) who divided Macedonia into four *districts* taking the distribution of orthopterans and some other animal groups as a basic criterion. These four districts correspond to one or more of the level I regions of our division (unfortunately, there is no cartographic presentation in Karaman's work):

*Districtus vardaricus* - corresponds to the level I regions 4 and 6 from our division. It is subdivided into four parts:

*pars pelagoniae* – corresponds to the level II region 409 (Pelagonija) of our proposal

*pars vardaricus septentrionalis* - corresponds to the level II regions 616, 617, 618 and 619 of our division

*pars vardaricus meridionalis* - corresponds to the level II region 613 (Dolno Povardarie) and parts of 614 (61454 -61457).

*Districtus montium macedonici orientalis* - corresponds to the level I region 7 (Eastern Macedonian mountains) of our division.

*Districtus montium macedonici occidentalis* - corresponds to the level I regions 1, 2 and 3 of our proposal.

*Districtus montium macedonici meridionalis* - corresponds to the level I region 5 (Southern mountains) of our division.

All of the afore-mentioned divisions acknowledge the difference between eastern and western Macedonia and the more detailed ones recognize the existence of separate region of the river Vardar valley.

There is no doubt that the eastern Macedonian mountains form a homogenous region, thus identified as separate unit in all of the analyzed divisions (Hadži 1935; Karaman 1975; Illies ed. 1975 p.p.)

Filipovski et al. (1996) have divided Macedonia into eight climate-vegetation-soil zones and presented a map. These zones are homogenous in terms of climate, soils and vegetation. Most of the zones are determined by the altitudinal gradient and thus this division cannot be compared to our division of Macedonia. The only similarity in geographic scope can be noted in Vardar valley and south-eastern Macedonia with the Submediterranean zone with *Coccifero-Carpinetum orientalis* and Continental -submediterranean zone with *Querco-Carpinetum orientalis* - these two zones correspond to the level I region 6 of our division).

One of the most used biogeographic divisions of the Republic of Macedonia (and the Balkans) is the one proposed by Matvejev (Matvejev 1961, 1973; Matvejev & Puncer 1989; Lopatin & Matvejev 1995) and elaborated by Dimovski (1960, 1971) for certain regions in Macedonia. This division is based on the distribution of biomes (zonobiomes and orobiomes) and it has more similarity to the division of Filipovski et al. (1996) than to the division proposed in this paper.

A map of defined geographic regions of Bulgaria is frequently used in biological publications (e.g. Guéorguiev & Guéorguiev 1995). This division bears great similarity with our level II division. The following regions have been identified in Bulgaria along the Macedonian-Bulgarian border: Osogovska Planina Mt., Vlahina Mt., Maleshevska Planina & Ograzhden, Sandanski-Pterich valley and Belasica Mt. These regions well correspond to our level II regions: 722 Osogovo, 724 Maleshevo (particularly to 72489 Vlaina Planina, 72492 Maleshevski Planini and 72493 Ograzhden – all of them in level I region 7 - Eastern Mountains), 615 Strumica river valley and 614 Southeast mountains (61457 - Belasica Mt.). The division used in the editions of Flora of Bulgaria (e.g. Jordanov ed. 1970) is similar but coarser and recognizes only three respective regions: West Frontier Mountains, Struma valley and the mountain Belasica.

Greece has been divided into 13 regions for the purposes of mapping of the flora (Strid 1996) or previously into eight regions (Strid 1995). The whole territory of the southern part of the Republic of Macedonia, west of the river Vardar (level I regions 3, 4 and 5) borders with North-Central floristic region of the divisions presented by Strid (1995, 1996). Only the Vardar zone (region 6 of our division) complements to a part of the North-East region from Strid (1995, 1996).

There is widely used map of geographical regions of Serbia that is based on similar criteria as the ones used for our division (Stevanović ed. 1999). There are four regions on the border with Macedonia: Metohija; Kosovo; Southern Serbia and Southeastern Serbia that are complementary with the level I regions: region 1 (10101, 10102); region 6 (62078); region 6 and 7 (62078, 72179) and region 7 (72181), respectively. In the work of Stevanović and Vasić eds. (1995) 2-level division of Marković (1970) (in: Stevanović and Vasić eds. 1995) was used. Serbia was divided into three large regions and 14 smaller regions. Only one of the larger regions named Mountainous-valley Serbia borders with Macedonia. It contains two smaller regions – Southern Serbia (complementary to the regions 62078, 61977, 72179 and 72181 of our division) and South-western Serbia (complementary to 10101 and 10102) that adjoin Macedonia.

The discrepancies between the regions proposed in our work with those from the neighbouring countries, if any, comes from the fact that our division is not purely floristic or faunistc, but it also considers the existing geographic or traditional acceptance of the spatial units in Macedonia. However, these differences are not significant (see above discussion).

**Conclusion**

The purpose of this work was to define regions for precise presentation of distribution data for flora and fauna. The level III regions proposed in this paper define more precisely all known mountains, hilly regions, river gorges, plateaus and valleys in the Republic of Macedonia. The precise borders between them presented on the map 1:25,000 are given for the first time. The level II and level I regions, although derived by aggregation of predefined level III regions, reflect very well biogeography of the country's territory except for the regions 1, 2 and 3 which are usually considered as one biogeographic unit in strictly biogeographic works. However, we do not consider this discrepancy as a shortcoming of our division. On the contrary, we think that division of western Macedonian mountains into northern part (region 1 and 2 of our division) and southern part (region 3 of our division) is more appropriate from biogeographic point of view. For example two high mountains in region 3 (Galichica and Pelister) are typically oromediteranean while mountains on the north have less Mediterranean characteristics.

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ANNEXES:

Annex 1. Table: Codes, names, types and surfaces of all identified regions

ELECTRONIC SUPPLEMENTARY MATERIAL:

Annex 2. Vector files (.shp) of the identified regions in the Republic of Macedonia

Annex 1. Table: Codes, names, types and surfaces of all identified regions

| Code | Name in Macedonian | Name in Macedonian (Latin transcription) | Name in English (EN Latin transcription) | Region's type | Surface (km²) |
|---|---|---|---|---|---|
| **1** | **Западни Планини** | **Zapadni Planini** | **Western Mountains** | | **2877.39** |
| 101 | Шарско-корабски масив | Šarsko-korabski masiv | Shara-Korab Massif | | 1243.64 |
| 10101 | Радуша | Raduša | Radusha | H | 102.24 |
| 10102 | Шар Планина | Šar Planina | Shar Planina | M | 830.44 |
| 10103 | Кораб | Korab | Korab | M | 178.77 |
| 10104 | Дешат | Dešat | Deshat | M | 101.56 |
| 10105 | Клисура на Радика | Klisura na Radika | Radika Gorge | G | 30.64 |
| 102 | Полог | Polog | Polog | | 322.06 |
| 10206 | Полог | Polog | Polog | V&P | 322.06 |
| 103 | Масив Бистра-Стогово | Masiv Bistra-Stogovo | Bistra-Stogovo Massif | | 1311.68 |
| 10307 | Буковик | Bukovik | Bukovik | M | 110.66 |
| 10308 | Кичевска Котлина | Kičevska Kotlina | Kichevo Valley | V&P | 617.16 |
| 10309 | Бистра | Bistra | Bistra | M | 336.87 |
| 10310 | Стогово | Stogovo | Stogovo | M | 127.88 |
| 10311 | Караорман | Karaorman | Karaorman | M | 239.80 |
| **2** | **Централни Планини** | **Centralni Planini** | **Central Mountains** | | **3304.11** |
| 204 | Планински венец Сува Гора | Planinski venec Suva Gora | Suva Gora Range | | 1124.51 |
| 20412 | Жеден | Žeden | Zheden | M | 157.93 |
| 20413 | Сува Гора | Suva Gora | Suva Gora | M | 446.27 |
| 20414 | Добра Вода | Dobra Voda | Dobra Voda | M | 520.32 |
| 205 | Долина на Треска | Dolina na Treska | Treska Valley | | 263.56 |
| 20515 | Пореч̀е | Poreče | Poreche | P | 183.88 |
| 20516 | Клисура на Треска | Klisura na Treska | Treska Gorge | G | 79.67 |
| 206 | Масив Мокра Планина | Masiv Mokra Planina | Mokra Planina Massif | | 1916.04 |
| 20617 | Водно | Vodno | Vodno | M | 48.41 |
| 20618 | Торбешија | Torbešija | Torbeshija | P | 54.96 |
| 20619 | Мокра Планина | Mokra Planina | Mokra Planina | M | 1332.88 |
| *20619a* | *Карацица* | *Karadžica* | *Karadzhica* | *M* | *562.59* |
| *20619b* | *Китка* | *Kitka* | *Kitka* | *M* | *119.48* |
| *20619c* | *Голешница* | *Golešnica* | *Goleshnica* | *M* | *244.31* |
| *20619d* | *Јакупица* | *Jakupica* | *Jakupica* | *M* | *225.24* |
| *20619e* | *Даутица* | *Dautica* | *Dautica* | *M* | *181.26* |
| 20620 | Азот | Azot | Azot | P | 95.73 |
| 20621 | Бабуна (планина) | Babuna (planina) | Babuna (the Mountain) | M | 384.05 |
| **3** | **Југозападен езерски регион** | **Jugozapaden ezerski region** | **Southwest Lake Area** | | **3636** |
| 307 | Демирхисарско подрачје | Demirhisarsko područje | Demir Hisar Area | | 1485.85 |
| 30722 | Илинска Планина | Ilinska Planina | Ilinska Planina | M | 252.01 |
| 30723 | Плакенска Планина | Plakenska Planina | Plakenska Planina | M | 191.57 |
| 30724 | Баба Сач и Лубен | Baba Sač i Luben | Baba Sach and Luben | M | 261.29 |
| 30725 | Бушева Планина | Buševa Planina | Busheva Planina | M | 293.65 |
| 30726 | Древеник | Drevenik | Drevenik | M | 110.5 |
| 30727 | Облаково-Снегово | Oblakovo-Snegovo | Oblakovo-Snegovo | M | 107.22 |
| 30728 | Бигла | Bigla | Bigla | M | 101.56 |
| 30729 | Демир Хисар | Demir Hisar | Demir Hisar | P | 168.05 |
| *30729a* | *Демирхисарско Поле* | *Demirhisarsko Pole* | *Demir Hisar Valley* | *V&P* | *79.64* |
| *30729b* | *Илиница* | *Ilinica* | *Ilinica* | *M* | *88.41* |
| 308 | Охридско-преспанско подрачје | Ohridsko-prespansko područje | Ohrid-Prespa Area | | 2150.15 |
| 30830 | Дебарско Поле | Debarsko Pole | Debar Valley | V&P | 61.69 |
| 30831 | Дримкол | Drimkol | Drimkol | G | 41.15 |
| 30832 | Јабланица | Jablanica | Jablanica | M | 221.83 |
| 30833 | Охридско Езеро | Ohridsko Ezero | Ohridsko Ezero | L | 247.54 |

Annex 1. Table: Codes, names, types and surfaces of all identified regions. Continuation

| Code | Name in Macedonian | Name in Macedonian (Latin transcription) | Name in English (EN Latin transcription) | Region's type | Surface (km²) |
|---|---|---|---|---|---|
| 30834 | Охридска Котлина | Ohridska Kotlina | Ohridska Kotlina | V&P | 197.39 |
| *30834a* | *Струшко Поле* | *Struško Pole* | *Strushko Pole* | *V&P* | *108.69* |
| *30834b* | *Охридско Поле* | *Ohridsko Pole* | *Ohridsko Pole* | *V&P* | *88.70* |
| 30835 | Дебарца | Debarca | Debarca | V&P | 85.22 |
| 30836 | Мазатар | Mazatar | Mazatar | M | 129.5 |
| 30837 | Галичица | Galičica | Galichica | M | 372.47 |
| 30838 | Преспа | Prespa | Prespa | V&P | 150.49 |
| 30839 | Преспанско Езеро | Prespansko Ezero | Prespansko Ezero | L | 191.43 |
| 30840 | Пелистер | Pelister | Pelister | M | 451.42 |
| **4** | **ПЕЛАГОНИЈА** | **PELAGONIJA** | **PELAGONIJA** | | **1356.99** |
| 409 | Пелагонија | Pelagonija | Pelagonija | | 1356.99 |
| 40941 | Пелагонија | Pelagonija | Pelagonija | V&P | 1356.99 |
| *40941a* | *Прилепско Поле* | *Prilepsko Pole* | *Prilepsko Pole* | *V&P* | *637.95* |
| *40941b* | *Битолско Поле* | *Bitolsko Pole* | *Bitolsko Pole* | *V&P* | *719.04* |
| **5** | **ЈУЖНИ ПЛАНИНИ** | **JUŽNI PLANINI** | **SOUTHERN MOUNTAINS** | | **2512.67** |
| 510 | Мариовска област | Mariovska oblast | Mariovo Area | | 995.01 |
| 51042 | Селечка Планина | Selečka Planina | Selechka Planina | M | 249.48 |
| 51043 | Дрен | Dren | Dren | M | 196.05 |
| 51044 | Мариово | Mariovo | Mariovo | P | 430.5 |
| 51045 | Рожден | Rožden | Rozhden | M | 118.98 |
| 511 | Кајмакчалан-Кожуф | Kajmakčalan-Kožuf | Kajmakchalan - Kozhuf | | 1109.58 |
| 51146 | Кајмакчалан | Kajmakčalan | Kajmakchalan | M | 267.45 |
| 51147 | Козјак-мариовски | Kozjak-mariovski | Kozjak-Mariovo | M | 101.65 |
| 51148 | Кожуф | Kožuf | Kozhuf | M | 740.48 |
| 512 | Тиквешка планинска област | Tikveška planinska oblast | Tikvesh Mountainous Area | | 810,31 |
| 51249 | Галчин-Орле | Galčin-Orle | Galchin-Orle | M | 200.76 |
| 51250 | Тиквешко Езеро | Tikveško Ezero | Tikveshko Ezero | G | 27.26 |
| 51251 | Витачево | Vitačevo | Vitachevo | Pl | 180.06 |
| **6** | **ВАРДАРСКА ЗОНА** | **VARDARSKA ZONA** | **VARDAR ZONE** | | **6993,17** |
| 613 | Долно Повардарие | Dolno Povardarie | Dolno Povardarie | | 320.09 |
| 61352 | Демиркаписка Клисура | Demirkapiska Klisura | Demirkapiska Klisura | G | 90.07 |
| 61353 | Гевгелиско-валандовска Котлина | Gevgelisko-valandovska Kotlina | Gevgelija-Valandovo Valley | V&P | 230.02 |
| *61353a* | *Валандовско Поле* | *Valandovsko Pole* | *Valandovsko Pole* | *V&P* | *88.03* |
| *61353b* | *Гевгелиско Поле* | *Gevgelisko Pole* | *Gevgelisko Pole* | *V&P* | *142* |
| 614 | Југоисточни Планини | Jugoistočni Planini | Southeastern Mountains | | 1388.96 |
| 61454 | Богданско-дојрански ридови | Bogdansko-dojranski ridovi | Bogdanci-Dojran Hills | H | 199.97 |
| *61454a* | *Боска* | *Boska* | *Boska* | *H* | *60.41* |
| *61454b* | *Погана* | *Pogana* | *Pogana* | *H* | *87.18* |
| *61454c* | *Дуб* | *Dub* | *Dub* | *H* | *52.38* |
| 61455 | Дојранско Поле | Dojransko Pole | Dojransko Pole | V&P | 26.24 |
| 61456 | Дојранско Езеро | Dojransko Ezero | Dojransko Ezero | L | 26.03 |
| 61457 | Беласица | Belasica | Belasica | M | 198.21 |
| 61458 | Серта | Serta | Serta | M | 690.54 |
| 61459 | Смрдеш | Smrdeš | Smrdesh | H | 247.97 |
| 615 | Долина на река Струмица | Dolina na reka Strumica | Strumica River Valley | | 427.95 |
| 61560 | Струмичко-радовишка Котлина | Strumičko-radoviška Kotlina | Strumica-Radovish Valley | V&P | 427.95 |
| *61560a* | *Струмичко Поле* | *Strumičko Pole* | *Strumichko Pole* | *V&P* | *312.91* |
| *61560b* | *Радовишко Поле* | *Radoviško Pole* | *Radovishko Pole* | *V&P* | *115.04* |

Annex 1. Table: Codes, names, types and surfaces of all identified regions. Continuation

| Code | Name in Macedonian | Name in Macedonian (Latin transcription) | Name in English (EN Latin transcription) | Region's type | Surface (km²) |
|---|---|---|---|---|---|
| 616 | Средно Повардарие | Sredno Povardarie | Sredno Povardarie | | 1295.28 |
| 61661 | Бошавија | Bošavija | Boshavija | V&P | 121.64 |
| 61662 | Тиквеш | Tikveš | Tikvesh | P | 490.94 |
| 61663 | Раечка Долина | Raečka Dolina | Raec Valley | V&P | 102.64 |
| 61664 | Клепа | Klepa | Klepa | M | 269.22 |
| 61665 | Бабуна и Тополка | Babuna i Topolka | Babuna and Topolka | V&P | 159.46 |
| 61666 | Велес-Градско | Veles-Gradsko | Veles-Gradsko | V&P | 151.38 |
| 617 | Долна Брегалница | Dolna Bregalnica | Dolna Bregalnica | | 474.73 |
| 61767 | Кучукол | Kučukol | Kuchukol | H | 122.5 |
| 61768 | Слан Дол | Slan Dol | Slan Dol | P | 269.76 |
| 61769 | Богословец | Bogoslovec | Bogoslovec | H | 82.17 |
| 618 | Овчеполска област | Ovčepolska oblast | Ovche Pole Area | | 1636.02 |
| 61870 | Штипско Поле | Štipsko Pole | Shtipsko Pole | V&P | 119.67 |
| 61871 | Кочанско Поле | Kočansko Pole | Kochansko Pole | V&P | 189.64 |
| 61872 | Овче Поле | Ovče Pole | Ovche Pole | V&P | 444.79 |
| 61873 | Манговица | Mangovica | Mangovica | H | 487.12 |
| 61874 | Градиштанска Планина | Gradištanska Planina | Gradishtanska Planina | H | 394.8 |
| 619 | Скопско-кумановска Котлина | Skopsko-kumanovska Kotlina | Skopje-Kumanovo Valley | | 986.96 |
| 61975 | Таорска Клисура и Бадар | Taorska Klisura i Badar | Taorska Klisura and Badar | G | 83.57 |
| 61976 | Скопско Поле | Skopsko Pole | Skopsko Pole | V&P | 552.39 |
| 61977 | Жеглигово | Žegligovo | Zhegligovo | V&P | 351 |
| 620 | Скопска Црна Гора | Skopska Crna Gora | Skopska Crna Gora | | 463.48 |
| 62078 | Скопска Црна Гора | Skopska Crna Gora | Skopska Crna Gora | M | 463.48 |
| **7** | **Источни Планини** | **Istočni Planini** | **Eastern Mountains** | | **4736.51** |
| 721 | Североисточни Планини | Severoistočni Planini | Northeastern Mountains | | 939.37 |
| 72179 | Руен | Ruen | Ruen | H | 66.69 |
| 72180 | Средорек | Sredorek | Sredorek | P | 218.45 |
| 72181 | Герман | German | German | M | 553.57 |
| *72181a* | *Козјак-кумановски* | *Kozjak-kumanovski* | *Kozjak-Kumanovo* | *M* | *193.49* |
| *72181b* | *Герман* | *German* | *German* | *M* | *69.73* |
| *72181c* | *Билина Планина* | *Bilina Planina* | *Bilina Planina* | *M* | *290.35* |
| 72182 | Славиште | Slavište | Slavishte | V&P | 90.66 |
| 722 | Осогово | Osogovo | Osogovo | | 1249.75 |
| 72283 | Осоговски Планини | Osogovski Planini | Osogovski Planini | M | 1249.75 |
| 723 | Плачковица-Голак | Plačkovica-Golak | Plachkovica-Golak | | 1434.02 |
| 72384 | Калиманци | Kalimanci | Kalimanci | H | 149.71 |
| 72385 | Голак | Golak | Golak | M | 216.94 |
| 72386 | Плачковица | Plačkovica | Plachkovica | M | 933.76 |
| 72387 | Готен | Goten | Goten | M | 133.6 |
| 724 | Малешевија | Maleševija | Maleshevija | | 1123.36 |
| 72488 | Пијанец | Pijanec | Pijanec | V&P | 70.66 |
| 72489 | Влаина Планина | Vlaina Planina | Vlaina Planina | M | 163.11 |
| 72490 | Бејаз Тепе | Bejaz Tepe | Bejaz Tepe | M | 82.95 |
| 72491 | Малешево | Maleševo | Maleshevo | Pl | 110.96 |
| 72492 | Малешевски Планини | Maleševski Planini | Maleshevski Planini | M | 356.43 |
| 72493 | Огражден | Ogražden | Ograzhden | M | 339.25 |

**Legend**: M - mountain; H - hilly; Pl - plateau; V&P - valleys and plains; L - lake; P - province.