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## THE CZECH REPUBLIC - BASIC GEOGRAPHICAL CHARACTERISTICS

J. Malý: *The Czech Republic - Basic Geographical Characteristics*. - Sborník ČGS, 99, 2, pp. 111 - 118 (1994). - The contribution treats about basic geographical characteristics of the Czech Republic: its area, population, administrative division, geographical position, shape of the state territory and the state boundary.

KEY WORDS: the Czech Republic (CR) - geographical position - shape of the state territory - the state boundary.

### 1. Introduction

At the turn of the years 1992/1993, an important historical, political and geographical event occurred in Central Europe. After 74 years of its existence, the Czechoslovak state disappeared. On the 1st of January, two new independent states have come into existence on its territory: the Czech Republic and Slovakia. In the end of 1992, this was decided by national parliaments of both, in that time yet "federal" republics, as well as by the federal parliament.

### 2. Area, population, administrative division

The area of the CR is most often given as 78,864 km<sup>2</sup> (for instance Mištera, 1985, p. 13). This area represents about 0.05 % of the world dry lands and 0.75 % of the Europe's area. With its area, the CR ranks at the 21st position in Europe<sup>1)</sup> and is considered as a smaller European country. Among countries the area of which was in the past smaller than the Czechoslovakia's, Bulgaria, Hungary, Portugal and Austria are now larger than the CR. Among the newly arisen European countries, Russia, the Ukraine, Belorussia and the rest of former Yugoslavia (that is Serbia and Montenegro) are larger than the CR.

Population approaches 10.3 millions of inhabitants. The last population census in 1991 gave the population toll of 10,296.7 thousand. According to more recent investigations of the Czech Statistical Office, 10,328 thousand inhabitants lived on the Czech Republic's territory on June 30, 1993. In comparison with the world, respectively the European population, about 0.2 % of the world population and 1.5 % of the European population lives on the CR's territory. By its population, the CR ranks at the 12th position in Europe. More populous are today Hungary and Portugal, among newly arisen countries only Russia and the Ukraine.

Population density is 131 inhabitants/km<sup>2</sup>, which ranks the CR among the most densely populated European countries. If not taking in account the smallest states as Monaco or San Marino, the CR takes the 7th position in Europe (See Table).

<sup>1)</sup> Up to 1989, Czechoslovakia was at the 14th position in Europe, including the Soviet Union.

Table 1 – The most densely populated states of Europe (inhabitants per km<sup>2</sup> on July 1, 1990).

1.	Belgium	323
2.	The Netherlands	320
3.	Great Britain	228
4.	Germany	200
5.	Italy	188
6.	Switzerland	154
7.	Czech Republic	131
8.	Poland	121
9.	Denmark	115
10.	Hungary	114

Lit.: Statistical year-book of the Czech and Slovak Federal Republic 1992. Note: The survey does not include states as Malta, Monaco, Liechtenstein, Luxembourg, San Marino and Vatican, which, due to their size, have a higher density of population.

The capital, Prague, seat of President, Government and Parliament, spreads on an area of 496.19 km<sup>2</sup> and on December 31, 1992, its population was 1,217 thousand inhabitants.

Administrative division was inherited from the former federation: the state territory is divided into districts administering municipalities. There are in total 75 districts, but only 71 district towns, as Prague, Brno and Plzeň are seats of two or three districts. As the area is concerned, the largest districts are Šumperk (1,952 km<sup>2</sup>), Jindřichův Hradec (1,944 km<sup>2</sup>) and Bruntál (1,745 km<sup>2</sup>), the smallest – without taking into account town districts of Ostrava, Brno-Town and Plzeň-Town – are Karviná (347 km<sup>2</sup>), Jablonec n.N. (403 km<sup>2</sup>) and Ústí n.L. (404 km<sup>2</sup>). Since the inauguration of the new government after the elections of 1992, a new administrative division is being prepared. Its definitive form, as well as the date of its validation, were not known in the moment of terminating this contribution.

National symbols of the CR, as the Great and Small coats of arms, are the same as in the former “federal” Czech Republic. The national flag has been taken over from the former federation, as well as the national anthem with the exception of its Slovak part.

### 3. Geographical position

Geographical position is generally meant as the relations of the given territory to something situated outside this territory (Häufler, 1984, p.9). Most often, the mathematical-geographical and the physical-geographical position is indicated.

#### 3.1 Mathematical-geographical position

The mathematical-geographical position is characterized by the relation of the given territory to geographical coordinates. The CR is situated roughly in the middle of the north temperate zone. Its mean mathematical-geographical position is 15°28'44" of east longitude and 49°48'19" of north latitude. <sup>2)</sup>

The position of the state territory limit points (Figure 1): The most northern point is situated at 51°03'26" of north latitude in the area of the Lobendava municipality near

<sup>2)</sup> The mean mathematical-geographical position is given by the arithmetical mean of limit coordinates values (Häufler, 1984, p.9).

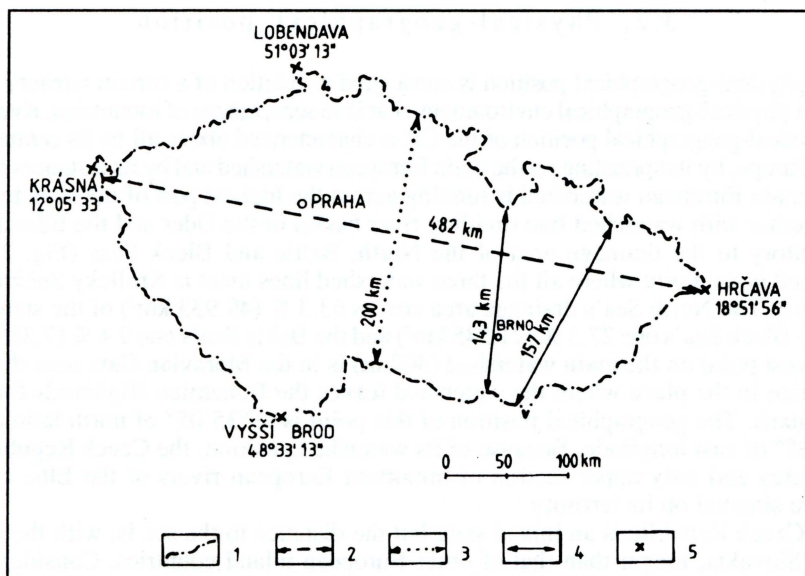


Fig. 1 – Shape of the state territory: 1 – state boundary, 2- maximal map distance, 3 – central breadth, 4 – minimal breadth, 5 – limit points.

Šluknov in the Děčín district, the most southern point at  $48^{\circ}33'13''$  of north latitude in the Vyšší Brod municipality area in the district of Český Krumlov, the most eastern point at  $18^{\circ}51'56''$  of east longitude in the area of Hřčava near Jablunkov, district of Frýdek-Místek, and finally the most western point is situated at  $12^{\circ}05'33''$  of east latitude in the area of Krásná by Aš in the Cheb district.

**The geographical centre of the Czech Republic** is situated by Čihošť near Ledeč n.S., district of Havlíčkův Brod, (Häufler, 1984, p.20). Its geographical coordinates are  $15^{\circ}20'01''$  of east longitude and  $49^{\circ}44'13''$  of north latitude (according to oral information of R. Čapek).

**Latitudinal spreading of the territory**, that is the central angle corresponding to the arc of the meridian limited by the local parallels, has the value of  $2^{\circ}30'13''$ , which corresponds to the distance of 278.4 km. **Longitudinal spreading of the territory**, that is the central angle corresponding to the arc of the parallel limited by the local meridians, has the value of  $6^{\circ}46'23''$ , which corresponds, at the mean parallel, to the length of 486 km<sup>3)</sup>, at the 50th parallel (on which Prague is situated) to 485 km. The difference of local time of the limit points is 27 minutes.

The territory is run across by the  $51^{\circ}$ ,  $50^{\circ}$  and  $49^{\circ}$  parallels of north latitude. The  $51^{\circ}$  parallel crosses the Šluknov and Frýdlant promontories, the  $50^{\circ}$  parallel traverses the south extremity of Prague and approaches Pardubice and Opava, the  $49^{\circ}$  parallel runs across České Budějovice.

The consequence of the mathematical-geographical position from the point of view of latitude is an oscillating level of sun radiation during the year accompanied by succession of four seasons. The consequence of the position from the point of view of longitude is the fact that the Czech Republic is situated in the so-called Central-European time zone going by the  $15^{\circ}$  meridian of east longitude.

<sup>3)</sup> The mean parallel value is equal to arithmetical mean calculated from the limit parallels values, that is  $49^{\circ}48'13''$ .

### 3.2. Physical-geographical position

The physical-geographical position is considered as relation of a certain territory to elements of physical-geographical environment, that is to seas, ranges of mountains, rivers, etc. The physical-geographical position of the CR is characterized above all by its central position in Europe, by its spreading on the main European watershed and by its distances to seas.

The main European watershed is running across the highest part of the state territory and together with watershed line dividing river basins of the Oder and the Elbe divides the territory to the drainage area of the North, Baltic and Black Seas (Fig. 2). The watershed nodal point where all the three watershed lines meet is Králický Sněžník Mt. (1,423 m). The North Sea's drainage area covers 63.3 % (49,933 km<sup>2</sup>) of the state territory, the Black Sea's one 27.3 % (21,545 km<sup>2</sup>) and the Baltic Sea's one 9.4 % (7,386 km<sup>2</sup>). The lowest point on the main watershed (302 m) is in the Moravian Gate near the town of Hranice in the place where the watershed leaves the Bohemian Highlands for West Carpathians. The geographical position of this point is 49°35'05" of north latitude and 17°45'35" of east longitude. Because of its watershed position, the Czech Republic is a source area and only upper section of important European rivers of the Elbe and the Oder are situated on its territory.

The Czech Republic is an inland state but the distance to the sea is, with the exception of Slovakia, longer than that of other European inland countries. Considering its position to seas, the CR has a slightly inland position, as it is situated not far from the boundary of the so-called costal zone going as far as 250 km from the coast. The shortest distances to the seas are similar. The shortest distance to the Baltic Sea (Szecin Bay) in the North is about 310 km, to the Adriatic Sea (Trieste Bay) in the South 330 km (Häufler, 1984, p.10) and to the North Sea to the Elbe estuary 380 km (Mištera, 1985, p.16). The open sea by the Rhin estuary is at about 540 km (Häufler, 1984, p.10).

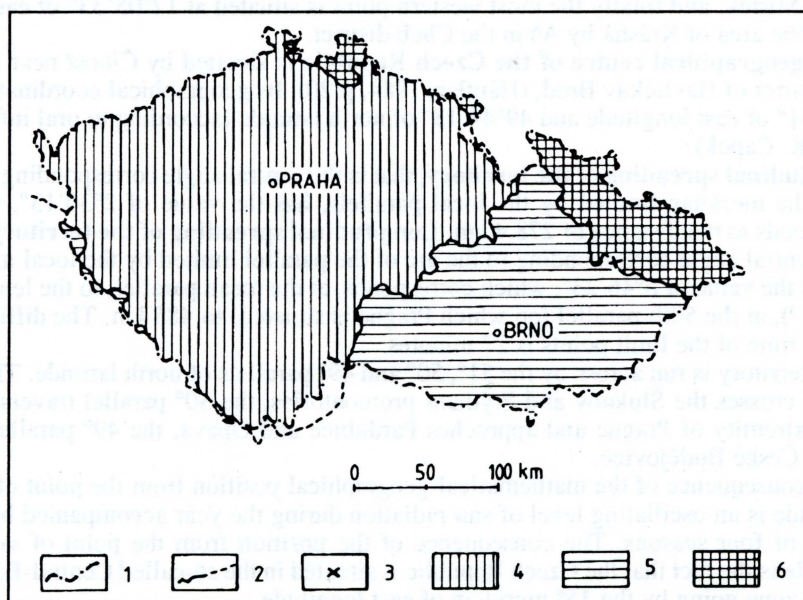


Fig. 2 - Course of the main European watershed and the drainage areas of the North, Baltic and Black Seas: 1 - state boundary, 2 - main European watershed, 3 - the lowest point on the main watershed, 4 - the drainage area of the North Sea, 5 - the drainage area of the Black Sea, 6 - the drainage area of the Baltic Sea.

Characteristic for the physical-geographical position of the CR is its position on the contact of two large geomorphological, respectively geological units, that is the Bohemian Highlands (geologically Bohemian Massive) and the (West) Carpathians. Both units differ by their geological structure and by their age, as well as by their geological and geomorphological development. A larger part in the West of the Republic is occupied by the Bohemian Highlands belonging to the old Hercynian mountains. A smaller part in the East is formed by the West Carpathians. The geomorphological provinces of the Central-European Lowlands and the West-Panonian Basin reach into the Czech territory only marginally (Fig. 3).

The highest point of the state territory is the top of Sněžka Mt. (1,602 m) on the border with Poland, the lowest point (115 m) is at Hřensko in the place where the Elbe leaves the Czech territory for Germany (Vlček, 1984, p.12). Both points are about 108 km distant and their vertical difference is 1,487 m. The mean altitude of the Czech Republic is about 450 m; 469 m in Bohemia and 432 m in Moravia and Silesia (Atlas Republiky československé, 1935, p.6). The same characteristic for Europe is only 315 m (Häufler, 1984, p.10). 5.02 % of the territory is in an altitude inferior to 200 m and only 1.5 % of the territory in an altitude superior to 1,000 m.

#### 4. Shape of the state territory

The shape of the CR state territory is approximately rectangular and elongated in an east-west direction. The elongation of the state territory is characterized by the following data:

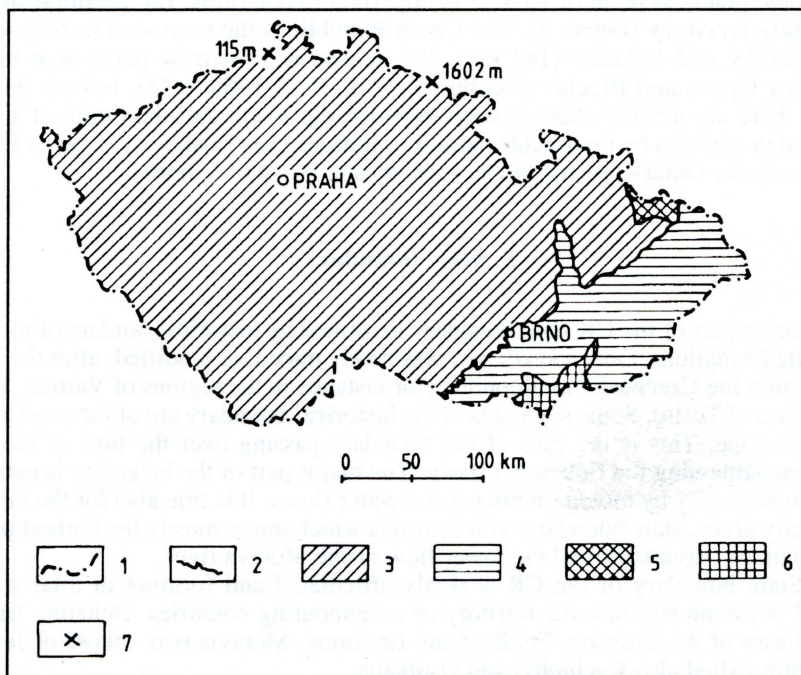


Fig. 3 - Basic geomorphological units on the territory of the CR: 1 - state boundary, 2 - boundary of the geomorphological provinces, 3 - the Bohemian Highlands, 4 - the West Carpathians, 5 - the Central European Lowland, 6 - the West Panonian Basin, 7 - the highest and the lowest points of the state territory.

**The distance of the limit coordinates**, that is the direct horizontal and the direct vertical distance of the limit points. Their values are equal to the so-called latitudinal, respectively longitudinal spreading of the state territory (See above).

In general, the direct horizontal distance of the limit coordinates is not considered as the longest dimension of the territory, as it, in all its length, does not cross the state territory. The longest direct dimension crossing in all its length the state territory, is about 482 km and is called **maximal map distance** (Figure 1). This datum is nevertheless only approximate, as it is impossible to establish it precisely because of a considerable distortion of the used map. This dimension is limited by a segment crossing from Vojtanov via south part of Prague, Čáslav and Šternberk to Mosty u Jablunkova. The centre of the segment lies at the southern edge of Čáslavská kotlina Basin near Ronov n. Doubravou.

The breadth of the state territory, measured perpendicularly to the maximal map distance in its centre (so-called central breadth), is about 200 km (Figure 1). This datum very well characterizes the breadth of the state territory which is proved also by the comparison with the arithmetical mean value calculated from the maximal<sup>4)</sup> and the minimal breadth of the territory (See below). This arithmetical mean is 211.5 km, the difference from the central breadth being only 11.5 km. The ratio between the maximal map distance and the central breadth (482:200) is 2.4. This fact shows the best the elongation of the state territory.

**The maximal length of the state territory in the parallel direction** is 452 km and was measured on the parallel of 49°32'10". **The maximal breadth in the meridian direction** is 276 km which corresponds to the meridian of 14°20'30" (Statistická ročenka ČSFR, 1992, p. 82. according to oral information of L. Skládal).

From the practical point of view, it is important to determine **the minimal breadth of the state territory** (Figure 1). The Czech Republic is the narrowest in Moravia between Králíky and Mikulov (143 km). The second most narrow place is at the line connecting Opava and Břeclav (Häufler, Korčák, Král, 1960, p.18). In both those direction, there are ancient shortest ways between the North and the South of Europe, supported in addition by favourable natural conditions (See Boskovičká brázda Furrow, respectively the Outer-Carpathian Depressions and Basin of Vienna).

## 5. State boundary

The major part of the CR state boundary is formed by historical borders of more ancient state formations. Only a small part was newly traced, or modified, after the World War I within the Czechoslovak Republic (for instance in the regions of Valtice, Vitorazy, Hlučín and Těšín). Some segments of the historical boundary are of the most ancient ones in Europe. This is the case of the boundary passing over the tops of mountain ranges encompassing the Bohemian Basin. The major part of the boundary is natural as it is formed mainly by mountain ranges and water flows. It is true also for the new, but historically given, state boundary with Slovakia which traces mostly the highest parts of the Carpathian Mountains and the lower flow of the Morava river.

The State boundary of the CR is richly articulated and forming in total six pronounced promontories into the territory of neighbouring countries. Bohemia has four promontories of Aš, Šluknov, Frýdlant and Broumov, Moravia two - those of Javorník (sometimes called also Rychleby) and Osoblaha.

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<sup>4)</sup> The maximal breadth of the territory is given by the length of the segment connecting the most northern and the most southern points of the state territory. Its value is 278 km.

The total boundary length is about 2,290 km <sup>5)</sup>. The longest part is that with Germany (810.3 km, that is 35,4 %), follows that with Poland (761.8 km - 33.3 %), Austria (466.3 km - 20.4 %) and finally Slovakia. The length of the new state boundary with Slovakia is not yet exactly precised and different sources oscillate between 220 and 265 km (for instance Plesník, 1989, p. 39). In this case, the value of 250 km, representing 10.9 % of the total length of the state boundary, was used to calculate the total length of the CR state boundary and for derivation of other numeric characteristics (See below).

To evaluate the boundary length, respectively to compare the boundary length with other territorial units, the index of boundary length per 100 km<sup>2</sup> of state territory and the so-called Wagner index <sup>6)</sup> is most often used. Per 100 km<sup>2</sup> of the CR state territory, there is 2.9 km of boundary with neighbouring countries. For comparison: the same index is 1.1 km for Poland, 2.3 km for Hungary, 2.9 km for Slovakia, 3.1 km for Austria and even 4.5 km for Switzerland (Häufler, 1984, Häufler, Korčák, Král, 1960). When comparing the ratio of boundary length and territory area, it is important to note that the value of that simple index is disproportionally increasing with the area reduction. Comparison of big states with smaller ones can be thus not very objective.

This default can be eliminated by Wagner index. For the CR, it is 2.30 <sup>7)</sup> that means the state boundary is roughly two and half times longer than the perimeter of a circle with the area equal to that of the state. Analogical figure for Poland is 1.80, for Hungary 2.05, for Slovakia 2.1, for Austria 2.56 and for Switzerland 2.58 (Häufler, 1984). This index is more favourable for Poland (1.80), Hungary (2.05) and Slovakia (2.1), less favourable then for Austria (2.56) and Switzerland (2.58).

Another possible index for evaluating boundary evolution and for characterizing the shape of the state territory is the index of the so-called territorial compactness calculated by the formula

$$C = \frac{2 \cdot \sqrt{\pi \cdot A}}{l} \quad (A - \text{territory area, } l - \text{boundary length})$$

The value for the CR is 0.43. More compact territory than the CR's is in Poland (0.56), Hungary (0.49) and Slovakia (0.47), less compact then in Austria (0.39) (Häufler, 1984).

According to the above mentioned facts, it is possible to arrive to a conclusion that the CR has, with respect to its area, an extraordinary long state boundary. Among our neighbours, only Austria is in an even worse situation.

#### References:

- Atlas ČSSR (1984). GKP, Praha.  
 Atlas Republiky československé (1935). Česká akademie věd a umění, Praha.  
 Atlas Československé socialistické republiky (1966). ČSAV a ÚSGK, Praha.  
 Bulletin Českého statistického úřadu (1993). ČSÚ, Praha.

<sup>5)</sup> The exact figure will be known only after definitive tracing of the state boundary between the Czech Republic and Slovakia. Four possible modifications of the present boundary are considered. The work of the common Czecho-Slovak boundary tracing commission should be finished in 1994.

<sup>6)</sup> Wagner index is used in geography for evaluation of "development" of cost or boundary of a certain territory with respect to its area. In this case, it expresses the ratio of the real boundary length and the theoretically minimal length, which is the perimeter of a circle of the same area.

<sup>7)</sup> For the former Czechoslovakia, the Wagner index was 2.7. By coincidence, the same value of 2.7 was calculated also for the state boundary length per 100 km<sup>2</sup> of territory.

- DEMEK, J. a kol. (1975): ČSSR - příroda, lidé a hospodářství. Studia Geographica, 48, Brno, 294 p.
- DEMEK, J. edit. (1987): Zeměpisný lexikon ČSR. Hory a nížiny. Academia, Praha, 584 p.
- HÄUFLER, V. (1984): Ekonomická geografie Československa. Academia, Praha, 639 p.
- HÄUFLER, V., KORČÁK, J., KRÁL, V. (1960): Zeměpis Československa. Nakl. ČSAV, Praha, 667 p.
- KUNSKÝ, J. (1968): Fyzický zeměpis Československa. SPN, Praha, 537 p.
- MIŠTERA, L. a kol. (1985): Geografie Československé socialistické republiky. SPN, Praha, 385 p.
- PLESNÍK, P. a kol. (1989): Malá slovenská vlastivěda. I. díl, Obzor, Bratislava, 398 p.
- Předběžné výsledky sčítání lidu, domů a bytů k 3.3.1991 v České a Slovenské federativní republice (1991). FSÚ, Praha, 114 p.
- Statistická ročenka ČSFR (1992). FSÚ, Praha, 735 p.
- Věkové složení obyvatelstva České republiky v roce 1992 (1993). ČSÚ, Praha.
- VLČEK, V. edit. (1984): Zeměpisný lexikon ČSR. Vodní toky a nádrže. Academia, Praha, 315 p.

## Shrnutí

### ČESKÁ REPUBLIKA - ZÁKLADNÍ GEOGRAFICKÉ CHARAKTERISTIKY

Česká republika vznikla po rozpadu ČSFR 1.1. 1993. Svou rozlohou 78 864 km<sup>2</sup> se řadí mezi menší evropské státy (21. místo v Evropě). Počtem obyvatel 10 328 tis. zaujímá 12. místo. Podle hustoty zalidnění patří mezi přední evropské země (7. místo bez nejmenších státeků).

Matematickogeografická poloha: ČR leží zhruba uprostřed severního mírného pásu. Poloha mezních bodů: nejsevernější 51° 03' 26" s.š. u Lobendavy, nejjižnější 48° 33' 13" s.š. u Vyššího Brodu, nejvýchodnější 18° 51' 56" v.d. u Hřčavy a nejzápadnější 12° 05' 33" u Krásné. Geografický střed leží u Čižochy nedaleko Ledče n. S., na 15° 20' 01" v.d. a 49° 44' 13" s.š. Šířkové rozpětí státního území činí 2° 30' 13", což odpovídá vzdálenosti 278,4 km. Délkové rozpětí 6° 46' 23" odpovídá 486 km. Rozdíl místních částí činí 27 minut.

Fyzickogeografická poloha ČR je charakterizována především ústřední polohou v Evropě, rozložením na hlavním evropském rozvodí a vzdálenostmi k mořím. Úmoří Severního moře náleží 63,3 % (49 933 km<sup>2</sup>) státního území, Černému moři 27,3 % (21 545 km<sup>2</sup>) a Baltickému moři 9,4 % (7 386 km<sup>2</sup>). Nejnížší bod na hlavním rozvodí (302 m) leží v Moravské bráně. Jeho zeměpisná poloha je 49° 35' 05" s.š. a 17° 45' 35" v.d. Z hlediska polohy k mořím má ČR slabě vnitrozemskou polohu. Nejkratší vzdálenost k mořím: k Baltickému moři cca 310 km, k Jaderskému moři 330 km a k Severnímu moři 380 km. Území republiky leží na styku dvou velkých geomorfologických jednotek - České vysočiny (geologicky Český masiv) a (Západních) Karpat. Nejvyšším bodem je vrchol Sněžky (1602 m) v Krkonoších, nejnižším výtok Labe v Hřensku (115 m). Oba body jsou od sebe vzdáleny asi 108 km, jejich vertikální rozdíl činí 1487 m. Střední nadmořská výška se pohybuje okolo 450 m (Čechy 469 m, Morava a Slezsko 432 m). V nadmořské výšce do 200 m se nachází 5,02 % území a nad 1000 m 1,5 %.

Tvar státního území má přibližně obdélníkovou podobu a je protažený v rovnoběžkovém směru. Protáženost území charakterizují především vzdálenosti mezních souřadnic (486 a 278 km) a maximální mapová vzdálenost (482 km) se středovou šířkou (200 km), jejichž poměr činí 2,4. Maximální délka území ve směru rovnoběžky je 452 km (platí pro rovnoběžku 49° 32' 10"), maximální šířka ve směru poledníku 276 km (platí pro poledník 14° 20' 30"). Minimální šířka území činí 143 km (na Moravě mezi Králíky a Mikulovem).

Státní hranice ČR tvoří z větší části historické hranice starších státních útvarů. Některé úseky patří k nejstarším v Evropě vůbec a z převážné části mají přirozený charakter. Celková délka hranic činí přibližně 2 290 km, z toho na Německo připadá 810,3 km (35,4 %), na Polsko 761,8 km (33,3 %), na Rakousko 466,3 m (20,4 %) a nejkratší jsou státní hranice se Slovenskem. Jejich délka je až do definitivního vymezení uváděna přibližně na 250 km. Státní hranice jsou členité a v porovnání s rozlohou států mimořádně dlouhé. Vyplývá to z toho, že na 100 km<sup>2</sup> státního území připadá 2,9 km hranic se sousedními státy, Wagnerův index vývoje hranic činí 2,30 a ukazatel teritoriální kompaktnosti je 0,43.

Tab. 1 - Nej hustější zalidněné státy Evropy (k 1.7.1990 v ob./km<sup>2</sup>).

Obr. 1 - Tvar státního území.

Obr. 2 - Průběh hlavního evropského rozvodí s vyznačením jednotlivých úmoří.

Obr. 3 - Základní geomorfologické jednotky na území ČR.