

## OBJECTIVE AND INTENTIONAL ERRORS ON MODERN GEOGRAPHICAL MAPS OF SERBIA AND SURROUNDINGS

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**Абстракт:** У раду се анализирају појаве и важнији узроци стварних објективних али и намерних грешака, које се могу уочити на картама Србије и њеног окружења у периоду дужем од сто година, када ова картографија бележи видан развој и резултате. У том погледу обим и карактер објективних, ненамерних грешка, које су настајале највише услед недостатака технике и технологије прикупљања података, или исцртавања и репродукције карата, временом су се стално смањивале. Те грешке биле су предмет сталне стручне пажње и научних истраживања, па се нису често понављале. С друге стране, намерне грешке, које су регистроване као масовне још на почетку наведеног периода, углавном су настајале као резултат шпекулативних активности у изради карата. Такве грешке, напротив, нису се смањивале, него су се чак, и по врсти и по обиму, стално умножавале.

Упоредо са наведеним, на многим картама уочавају се и намерне грешке почињене у циљу замагљивања или искривљивања стварне слике картираних појава, а у служби пропаганде, манипулација и разних обмана везаних за бурне геополитичке догађаје око Србије са окружењем у последњих тридесетак година. О тим грешкама на картама веома се мало расправљало и писало у научној јавности иако је било честих реакција у штампи и другим средствима јавног информисања. У овом раду скреће се посебна пажња на такве намерне грешке, које наносе вишеструку штету модерној картографији Србије, како у научном, друштвеном, образовном и културном, тако и практичном, корисничком и економском погледу.

**Кључне речи:** карта, грешка, груба грешка, случајна грешка, систематска грешка, намерна грешка

**Abstract:** The paper analyses the occurrence and the major causes of objective, as well as intentional errors that can be perceived in maps of Serbia and its surroundings over a period of more than one hundred years, when this branch of cartography has manifested visible growth and results. In this respect, the scope and the character of objective, unintentional errors, mostly due to a lack of proper technique and technology for gathering

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data, gradually decreased over time. These errors were the object of constant professional scrutiny and scientific research, and were not often repeated as a result. On the other hand, intentional errors, which were registered as being of mass proportions at the beginning of the above-mentioned period, mainly occurred as a result of a speculative approach to map making. Such errors, however, did not decrease, but constantly multiplied in terms of their scope and type.

Parallel with the above-mentioned errors, in many maps one can perceive intentional errors committed with a view to clouding or distorting the real picture of the mapped phenomena, for the purpose of propaganda, manipulation and various misrepresentations in connection with the turbulent geopolitical events in Serbia and its surroundings over the past thirty years. These errors have rarely been discussed and written about within the scientific community, even though there have been frequent reactions in the press and in other media. This paper lays special emphasis on such intentional errors, which cause a lot of damage to the modern cartography of Serbia, in scientific, social, educational and cultural terms, as well as practical and economic terms, and in terms of use.

**Key words:** map, error, grave error, accidental error, systematic error, intentional error

## **Introduction**

When establishing the general values and quality of geographical maps, the analysis and estimation of errors that were made on them has been carried out. The errors on maps represent different deviations of the cartographic survey in relation to the mapped reality. They appear throughout all stages of mapping. They refer to the following: (1) geographical (thematic) credibility of given contents, (2) geometrical (spatial) exactness and correspondence with the mutual position of given objects, (3) completeness and (scale) complement of elements of the survey, (4) graphical (clear) perfection, modernity of the composition of the survey and means of expression and (5) usability of maps.

In relation to the origins of errors on maps, only objective, unavoidable, more or less always present errors were analysed in the previous cartographic literature, usually divided on grave errors (mistakes), systematic errors and accidental errors. They have the character of unintentional, unavoidable errors that reduce significantly the usability and quality of various cartographic products. However, until now it has little been discussed and written even less about the intentional errors on maps that distort the cartographic survey, but they are put on the map intentionally for various reasons. The scope and the character of all errors on the maps of Serbia and surroundings, over a period of more than a hundred years, was being changed visibly into two opposite directions: the number and sorts of the real, objective, unintentional errors reduced continually and to the least possible

level, whereas the number and variety of intentional errors increased significantly and rapidly in the last thirty years.

### **Assessors and Assessment of the Maps of Serbia and Surroundings in the Modern Era of the Development of Cartography**

The last quarter of the 19<sup>th</sup> century was considered to be the most significant period for the foundation of the modern cartography of Serbia, when the number of the maps appeared was far larger than the number of the literary papers from geo sciences. Jovan Cvijic gave the scientific and public critics on the quality of all published maps of Serbia and the Balkan countries at that time. Bringing a large production of maps of that time into the reciprocal connection with their quality, he emphasized then that “it is unpleasant to have even one“ expert in cartography “who would speak unfavourably about it, but, incontestably, there is not anyone who would complain reasonably to the small number of the maps of Serbia. This case is perhaps a little strange, but it really exists. And there was a will and much effort was invested and much was done, but the real value of that work was very little” (Cvijic 1889).

Cvijic explained the condition of large production of bad maps from two aspects. He put the speculation<sup>2</sup> in the first place, and even then the real reasons for the making of maps, giving his opinion about it: ”well, when we eliminate the maps the reason of the origin of which is the speculation and which contain in themselves the causes of bad production, then, it seems at least to me, the weak value of other cartography could be reduced only to a want of more reliable technical equipment, especially in the gathering of the cartographic data and the technical making of a map, or in the insufficient number of data “ (Cvijic, 1889). Obviously, he immediately eliminated the maps that were made for the speculative purposes because he considered them, according to himself, to be made badly by their purpose, while he investigated and analysed the real, objective causes of making the less qualitative maps, by the correction of which “the cartography of Serbia would move forward” (Cvijic, 1889).

At that time, in 1876 the Geographical Section was formed at the Main General Staff of the Serbian Army. It was the first institution for the surveying and making of maps, intended for the military needs. Later (1890), the first civil cadastre surveying began. The Geographical Section carried out the first topographic

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<sup>2</sup> In the Serbo-Croatian Dictionary of Matica Srpska, the word speculation means trade calculated on fast and easy profit that is carried out both by legal and illegal actions

surveying of Serbia (1880-1881) and made the first special map at a scale of 1:75 000 in 5 colours. Cvijic emphasized the great value of that map by saying: “It is much separated, too much from the whole previous cartography” (Cvijic, 1889), but he also had certain critical remarks, pointing to some “smaller” topographic errors and inaccurate topographic terms. As a model and pattern of precise and accurate maps, that “zeal of Geographical Section for the making of the original map set the seal on the development of cartography, and especially the engineering cartography of Serbia in the 20<sup>th</sup> century” (Vemic, 2007). Besides Cvijic, the estimation or assessment of maps, at his time, was also done by Josif Simonovic, Jovan Erdeljanovic, Radoje Dedinac, Dragutin Deroko and others, especially in the journal “Survey of Geographical Literature about the Balkan Peninsula” that was coming out for almost two decades between the 19<sup>th</sup> and the 20<sup>th</sup> century.

After that first successful period in the development of cartography of Serbia, it came to the permanent improvement of the technique and technology of the gathering of data, as well as the mapping and the making of maps, starting from the surveying by theodolites, aneroids and instruments for topographic recording. The mapping at larger scales was enabled by these instruments, while later they were replaced by aerial and satellite recording and photographic restitution of the mentioned remote images. The maps at larger scales were charted with more precise and considerable number of data. They were reproduced on many-coloured printing presses and the number of copies printed was larger. The maps of Geographical Section, later Military Geographical Institute, became the basic maps for the development of all other maps in Serbia and former Yugoslavia, especially the thematic ones. Their making was systematic and appropriate to the time by the use of the more and more recent technology. The necessary researches were carried out on them by which the mathematical accuracy was established, especially for the scaled series of the military topographic maps, by comparing those maps with the large scaled plans and terrain (land) they referred to. In that sense, the geographical credibility and geometrical accuracy of these maps were on the level of the better European, as well as Russian and American similar maps. That means that grave mistakes and accidental errors on them were reduced to a minimum, whereas the systematic errors were standardised as, for example, the writing of toponyms on its own and adjoining territories in Serbian language as well as in the languages of neighbours, so they could be removed systematically.

By the development of thematic and school cartography, which gave good initial results before and particularly after the World War II, the maps were more and more coming out of closed state institutions and often found in hands or on tables of

ordinary citizens. Road and tourist maps, published by various tourist organisations, set a good example among them. Besides those maps, the editions of newspaper cartography also appeared, containing various general geographical, historical and other thematic maps, and sometimes small atlases, too. The publishing of such maps and atlases brought about their assessment. Moreover, containing the significant arguments against the quality of the maps and assertion of many errors made in them, those assessments were published in the same daily newspapers as the maps for mainly competitive reasons, in a form of free expert opinion. Some of the cartographic publications had affirmative surveys, but without the real critical approach by which both their good and bad sides would be emphasized.

The most significant maps and atlases appeared periodically in the scientific journals, in the similar manner as books and other scientific or expert editions. That practice, actually, was not discontinued from Cvijic's critical reviews, but in contrast to Cvijic, those reviews were often one-sided. The positive values of published maps and atlases were mainly emphasized, while no mention was made of the negative values and errors due to apologetic approach of a reviewer. It appeared that, after Cvijic and his associates, the country did not have scientists who emphasized and criticized with arguments the errors on published maps. Zivojin Zika Jankovic did that very often and persistently, but as a user, not as an analyst or a critic.

Zivojin Zika Jankovic<sup>3</sup> was the well known assessor of the maps published at our country in the second half of the 20<sup>th</sup> century. His supplements and reviews came out mainly in daily press under the following titles: "Atlas without Yugoslavia" (Politika, 10.9. 1985), "Globe with an error" (Politika, 14.1. 1986), "Road map for confusion" (Politika 17.11. 1992), "Map of misinformation" (Politika 19.10. 1996), etc. Zika Jankovic found many grave, systematic, accidental errors on the maps, as well as intentional ones. He wrote for the mentioned globe "that a number of states is missing on it", that "many states have wrong names", or "it is not marked that Greenland belongs to Denmark." In the "Map of misinformation" he mentioned 20 cardinal errors such as: "there is adjarska on the map, but it

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<sup>3</sup> Zivojin Zika Jankovic (1926- ) was an officer of the Geodetic Service of Yugoslav National Army in the period from 1944 to 1972. He worked in Military Geographical Institute and taught lectures from cartography, cartographic drawing and map reproduction at Geodetic Military Academy. He published two textbooks and several reference books and over 30 expert and scientific papers in various military and geodetic journals. After his retirement, he published over 40 various maps and atlases (traffic and tourist mostly) edited by different publishing and news houses. He published around hundred critical texts on the appearance and quality of various cartographic publications, and mostly in the daily newspaper "Politika".

should be Madjarska (gary and it should be Hungary), or “there is Partizanske vode on the map instead of Zlatibor,” “there are not all the airports on the map, but those that do not exist are entered”, “the publisher’s name and the year of publishing were not included on the map, because a plagiarist did not dare to put that, while an employer from the bookstore did not know wherefrom those maps were purchased”. Following Jankovic, there were other users of the maps who also were noticing the errors on published maps, but they did not give information as regularly as Zika did.

### **Objective Errors on Maps**

Errors always exist on maps at all levels of their making, starting from the gathering of data, observing and measuring of objects and the phenomena of mapping, to the selection, carrying, composing, charting and the generalisation of the contents, as well as throughout their reproduction, either in classical, analogue or in digital form. They also appear at all levels of the meaning constitution: at single level, in the phase of coding the cartographic signs, at special level, in the phase of entering the signs according to the special thematic elements as well as at general level, in the phase of the composition of the entity of the cartographic survey. All errors on maps, objective or intentional, differ in regard of geographical credibility, geometrical accuracy, adequate scaling, survey and usability of the contents of the maps. Therefore, at every process of the making of a map, the two-degree or three-degree correction is carried out: (1) composing correction - in the process of the composing of maps, (2) publishing correction- at the first pressed (test) prints and (3) editorial survey or the review of maps, before the final print of copies.

Grave errors mean considerable deviation of the cartographic survey from the objective condition of mapped reality. “By absolute value or significance, grave errors are such that it can be said with certainty they resulted from grave oversight and mistake“(Peterca et al, 1974). Caused by insufficient attention of a cartographer they are called “personal” errors (Ristic, 2006) or mistakes. The largest number of such errors is eliminated by correcting in the process of the making of maps, but apart from the greatest attention of a corrector, some grave error is always hidden and left on the map. It is interesting that such errors, noticed later, can serve as certain evidence of the originality of that cartographic work, because they represent a deviation from relatively established rules of mapping. Thus the wrong survey of the position of the Belem city in Brazil, on one of the two adjacent maps of the school atlas of “Geokarta” from Belgrade, repeated with the same error on the two same maps of the atlas of “Epoha” from Pozega, was used as one of the key evidences in the court procedure of the violation of authorship



between the mentioned publishers as to prove the authors of the original atlas and the plagiarized one. The most frequent mistakes on the maps refer to geographical terms and other inscriptions on maps, where the cases of omitting, adding or changing some letters or numbers on them can often be seen. Thus, for example, on the Road Map of Yugoslavia (for territory of SFR of Yugoslavia) at scale of 1:500 000, in edition of Military Geographical Institute from 1990, there is s. Uzovica instead of s. Uzovnica.

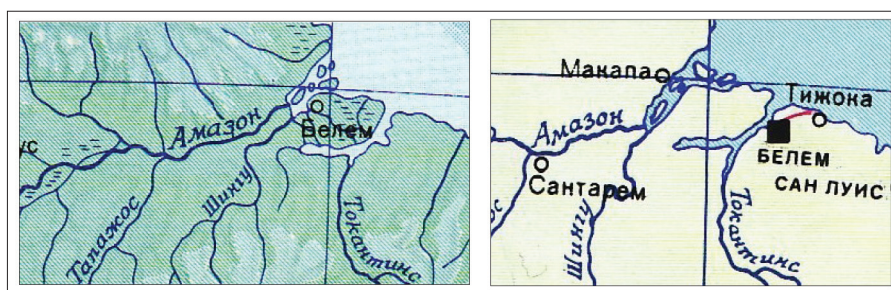


Figure 1. Wrong (left) and correct position of the Belem city (right) on two adjacent atlas maps

Systematic errors are objective errors which change the presented contents on the maps toward the mapped reality in the proportional relation. They result from the wrong method or procedure of the overtaking or entering of data on the maps. The systematic errors mainly appear under the influence of one or more constant causes such as choice of ellipsoids, fundamental points, starting meridian, projection, scale, equidistance, degree of generalizing, etc. Moreover, they can be caused by climate or microclimate conditions in which the measuring is carried out, imperfection of instruments and equipment for the gathering and data processing as well as the drawing of the contents on maps. “As an example of the systematic error, professor Inhof mentioned the error in heights on the state map of Switzerland from the last century. For the initial height of the survey, the value that was taken was wrong for 3.26 m, and the error was transmitted to all height data, so that the whole area of Switzerland was lifted for that size” (Peterca et al, 1974). The well known example of the wrong choice of scale was the Austrian-Hungarian topographic map from the end of the 19<sup>th</sup> century, at scale of 1:75 000, taken as a mechanical compromise between the cartographers who supported the scale of 1:50 000 and 1:100 000. Such systematic error was moved to the first topographic map of Serbia in edition of Geographical Section, which was criticised by Cvijic.

Concerning the geographical terms, the systematic errors appear as the result of wrongly taken linguistic principles and rules for writing, especially the writing of foreign names in standard language or the names on the own state territory in the languages of minorities. Apart from these errors, there were several systematic errors made on the maps of Serbia due to ignorance of the dialect (ekavian dialect instead of ijekavian, jekavian dialect instead of ekavian, etc).

Accidental errors on maps are those errors the causes of which are unknown or they are known but numerous. According to absolute value, those errors are small and they cannot exceed certain limiting-maximum value. Their appearance is accidental and they have all the characteristics of accidental events which come under law of large numbers. Accidental errors referring to geometrical accuracy of the maps are investigated most. Having in mind that the probability of their origin is equal both to the positive and negative sign, then, according to the theory of the smallest squares, the mean square error is being established as the criterion for expressing the geometrical accuracy of each map.

### **Intentional errors on maps**

It is well known that cartography in general, and so the cartography of Serbia in the 20<sup>th</sup> century, advanced greatly after the introduction of aerial and cosmic recording in gathering of data as well as the methods of photogrammetry on making the originals of maps. Moreover, cartography advanced by introducing the photographic procedure (repro-films) in the process of map reproduction as well as the printing machines for their copying. But, the significant progress occurred in the last quarter of the 20<sup>th</sup> century, by introducing the modern computer equipment, i.e. by automation at all phases of the making of maps. That technological progress exactly as well as the changes in socio-economic system of the country, enabled the phenomenon of private publishing in our country. Parallel with it, the Serbian market was opened that much larger number of maps appeared to be in circulation in practical and cultural sphere.

Similarly as at the time of Cvijic, one century backwards, in the last 20 years, many maps were mainly made for the speculative purposes which brought about the great number of grave and intentional errors on them the present maps have almost been full of. Nowadays the considerable number of plagiarized maps has appeared, considering that one can make them at home with a help of a computer. Hurrying to put such maps on the market, the less skilled operators usually make many mistakes, and so one can find the maps on which more or less all the elements are located wrongly, and the state boundaries even. Those maps have usually been



the subject of the court procedures, but while those procedures last and such maps are not forbidden, they make a great damage especially when found in the primary and secondary schools.

However, in the last quarter of the 20<sup>th</sup> century, when the disintegration of the SFR of Yugoslavia started, a great number of intentional errors appeared which deformed the objective image of the mapped phenomena with the aim of misinformation or propaganda for political or geopolitical purposes. Such errors were often found by Zivojin Zika Jankovic who always made comments on them in public. On September 1985, when the school started, he, for example, found that the map of Yugoslavia did not exist in “The First School Atlas of the II and the III Grade of the Primary School”, published by “Naucna knjiga” from Belgrade, while the maps of the SAP of Vojvodina and the SAP of Kosovo were given as the separate physical-geographical maps. Even though the state of Yugoslavia did exist, the atlas that was being sold not only in Serbia, but in other Yugoslav republics, did not have a map of its own state. For such intentional error<sup>4</sup>, there was no one who brought the procedure at pedagogical authorities to prohibit the use of such atlas. Apart from the denying of the existence of Yugoslavia, the aim of such cartographic surveys was to present Serbia to be territorially as much as smallest, and therefore the autonomous provinces were not presented as the administrative units within the country, but they were separated as alleged natural physical-geographical territorial entities.

The tendency of such mapping continued. Thus, in 1992 the “Road Maps of the SFR of Yugoslavia” was published, the title page of which contained the state boundaries with a survey of the road map given at far larger scale, so that only the territory of the city of Belgrade with the surroundings could be put within those boundaries. Therefore, by the reduction of the SFR of Yugoslavia which had six federal units, to the SR of Yugoslavia of two units, even smaller territory of it was still being propagandized and suggested.

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<sup>4</sup> The Making of the intentional errors on the maps was not unknown in the history of cartography. They were made with the aim of reporting some other, hidden, messages in relation to the objective geographical survey and situation. The well known example of such survey was the map of the U.S.S.R in the Mercator’s projection, on which the territory of the U.S.S.R was considerably distorted towards the north and looked much larger than the real one. It was also known that this projection was the most suitable due to its mathematical conformity, because it enabled the equality of copying the angles at all points of cartographic image in the projection in relation to the reality (Jovanovic 1983), so that it was used for navigational charts. The first such map aimed for description of some land was intentionally made by the cartographers of the fascist Germany before the World War II, in order that after the war, the Soviets made their own map in the same projection for their own reasons.

On that map, Opovo was located on the northern boundaries, Zemun on the west and Azanja on the eastern boundaries, while Topola was in the south, i.e. Mionica (Valjevo) was at the Adriatic Sea of that SR of Yugoslavia (Figure 2). That map, with an advertising of NIS Yugopetrol on it which had probably been a purchaser or a sponsor of its making, was being sold at many gas-stations and it was available to a great number of users as in the country so out of it.

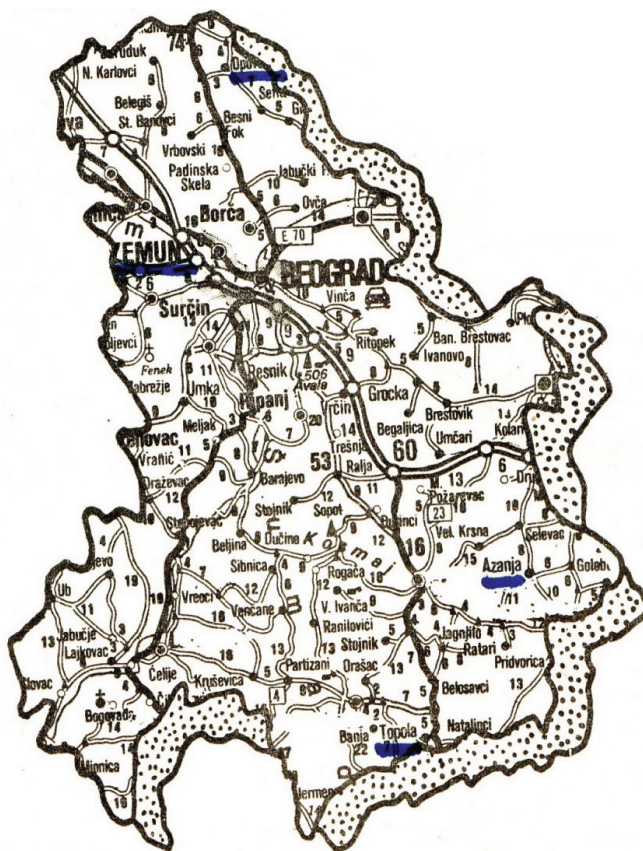


Figure 2. Map from the title page of the “Road Maps of the SR of Yugoslavia” with the large scale thematic contents entered in the contours of the state boundary

Such intentional errors were increasing rapidly on the maps of the publishers in Serbia, especially the errors of the Albanian publishers on Kosovo and Metohia, referring to this Serbian province. In 1998, in edition of the daily newspaper “Rilindia” from Pristina, the map of the province of Kosovo and Metohia was

published under the title “Map of Kosovo” in Albanian language (with legend in English). Many toponyms were changed on the map in relation to their traditional form. Besides oikonyms that were changed most (names of inhabited places), the authors of that map: PhD Redzep Doci and professor PhD Aslan Puska, with an associate for toponyms MSc Murat Meha, also changed some oronyms and horonyms and the macro terms among them, too. They, for example, renamed Urosevac, one of the larger towns, into Ferizaj, the small town of Srbica was renamed into Skenderaj, the highest mountain range Prokletije was renamed into *Alp e Shqipitare* (Albanian Alps), while they renamed the regional name Metohia into Rrafshii Dukaginit (Plain Dukaginit).

Intentional errors are more numerous on the maps of foreign publishers, intended for users in Serbia and most often published in collaboration with domestic publishers in large number of copies printed. The most obvious example of it is “Atlas of Serbia” from the edition called “World Atlas in six books” of the Slovenian firm Monde Neuf, published by the publishing and news house “Politika” (Belgrade, 2007), without any data on copies printed. The authors of this atlas are foreigners, Ivan Bertic, Denis and Demir Sehic (physical maps), while two Sehics are also the editors of the atlas. The reviewer of the atlas is PhD Zoran Curic, whereas the major reviewer is PhD Marina Todorovic. The atlas is intended for wider circle of users, although conceptually it is the closest to school atlas.

Regarding this atlas, a very sharp critique was published in the daily paper “Politika” on February 27<sup>th</sup> 2008 under the title: “Mistakes and deceits“, in which Dragoljub M. Kocic, a professor from Belgrade, recognised, from his point of view, grave, intentional errors, calculated to underestimate the cultural wealth of Serbia. He singled out a map on the 96-97 pages of the atlas titled “Tourism, National Parks and Natural and Cultural Inheritance”, where he noticed that only six monasteries were shown on that map, i.e. only those monasteries included into the world cultural inheritance. Four monasteries are located in Kosovo and Metohia (Pecka Patrijarsija, Decani, Bogorodica ljeviska and Gracanica) and two monasteries are from the rest of Serbia (Sopocani and Studenica), by which the authors of this map were suggesting that “there is nothing more in Serbia that is valuable culturally.” That it was the intentional error about, professor Kocic explained more precisely by stating: “If they have not already done it, concerning the religious cultural monuments (Zica, Manasija, Ravanica, Monasteries of Fruska Gora, etc.), it is symptomatic why they did not show the localities of Gamzigrad, Viminacium, Lepenski Vir, Vinca, Starcevo and others, whereof some of them are the part of the world cultural inheritance.”



All other users of this atlas and even pupils in the elementary and secondary schools, will notice, without much effort, a series of intentional errors, repeated consistently on most maps. First of all, it can be noticed that the territory of the Autonomous Province of Kosovo and Metohia was presented without lines of division on districts, as the basis for the mapping of thematic contents applied on the entirety of the map, even though the Kosovo and Metohia districts were put regularly into the list of districts next to the same maps.



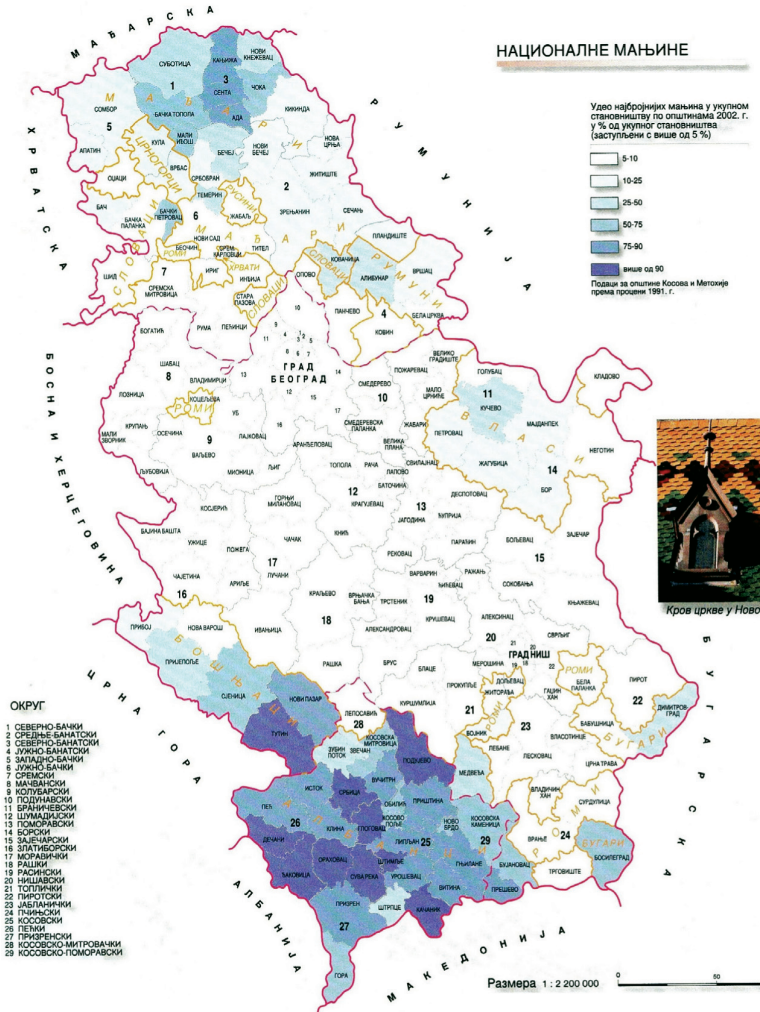


Figure 3. Example of artificially polarised survey of ethnic structure of population with contra used method of surveying

However, the survey of the district was intentionally omitted in order to get an impression that Kosovo and Metohija have the separate entirety, and because in the provincial boundaries, the farming cultures as sugar beet, sunflower, potato, beans, apples, plums, grapes, etc. thrive evenly. Even though it was the work of foreign authors, the atlas obviously passed the incompetent review in Serbia, or the reviewers themselves agreed about that.

The most drastic example of the intentional errors that were made in this atlas represented the cartographic diptych on the subject “Ethnical structure of population” without any cartographic survey in accordance with the title (p. 72-73). Namely, the title of the subject was replaced immediately by the subtitle “Serbs and national minorities” and in accordance with such subtitle, the cartographic survey was separated, polarised and given on two maps. Instead to have all national entities presented on one map according to the principle of ethnic majority as it is usually presented on ethnic maps, here, the Serbs were shown on one map, while all national minorities that live in Serbia were on the other map, thus suggesting opposition and conflict.

Apart from that conceptual separation of ethnic structure of the population of Serbia on the Serbs and national minorities, the authors of these maps also made another drastic error and changed the methods of their thematic surveying. Thus, the Serbs as one ethnicity were shown in two different colours instead in one (green up to 50% and orange from 50 to 100%), while ten national minorities (Hungarians, Slovaks, Ruthenians, Romanians, Vlachs, Bulgarians, Albanians, Bosnians, Gypsies and Montenegrins) were in one (blue) colour, instead to be presented in ten colours.

Intentional change of theses was also transferred to the textual explanation beneath the maps in the procedure of thematic surveying where the following was written in the first sentence: “The Serbs are the Slavic people, very close to their neighbouring Bosnians, Montenegrins and Croats by language”. It comes out that those three nations are older and more known than the Serbs, especially the Bosnians who proclaimed themselves as nation in the 1990s. The Bosnians, who separated from their Muslim people by the self-proclamation, (one of three constitutive nations together with the Serbs and Croats in Bosnia), also proclaimed their language and called it Bosnian language, but which have never existed before, because all the Muslims have always spoken Serbian (Serbo-Croatian) in Bosnia.

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### Summary

In contemporary geographical maps of Serbia and its surroundings, one can perceive a great number of objective errors, as well as many intentional errors. In the contemporary era of the development of the cartography of Serbia and its surroundings, objective errors have been reduced to a minimum, whereas intentional errors have multiplied, both as regards their scope and their type. Such phenomena indicate that in the above-mentioned period the logic and the aesthetics of maps have continuously been improved; as regards their ethics, the situation is precisely the opposite: the ethics of those maps has steadily worsened. More than a century ago, objective errors were perceived and analysed by Jovan Cvijić, who assessed the maps containing such errors, while he did not analyse intentional errors at all. He rejected outright as bad those maps made for speculative purposes, which contained intentional errors as a matter of course, and such maps were to be found even in his time.

The cartography of Serbia has developed continually owing to the general scientific and technological progress, which has contributed to eliminating the causes of objective errors, so that, owing to the constant attention of cartographic experts and scientists, the number of such errors has constantly diminished. On the contrary, intentional errors have constantly multiplied, both in terms of scope and in terms of type, especially over the last 30 years or so, when the socio-economic system of the country changed, the market became more open and when everyone, with the help of a computer, could make maps. Apart from the above-mentioned reasons, many intentional errors in maps have undoubtedly been caused by the turbulent geopolitical events over the last few decades in connection with Serbia and its surroundings. However, no relevant scientific critique of maps containing intentional errors has existed; it is therefore expected of cartographic researchers to renew the scientific practice that existed in Cvijić's era and initiate a critical approach to each new edition of a map.