

The origin and evolution of the term “karst”

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Abstract: Even some recently published works including manuals, textbooks and lexicons, related to this topic contain inexact, not precise, discordant or wrong statements. Recent linguistic studies provide some new results regarding the word karst. The paper repeats some well known facts about the origin of the term karst but at the same time it gives some new results and interpretations. The name of the plateau in the background of the Trieste Bay (the Adriatic Sea) which the Slovenes call Kras, Italians Carso and Germans Karst is of pre-roman origin and Latinised into Carsus. The original name had the base *Karus- (Ptolemy wrote *Καρουσαδιώρητι*) from the root *kar- meaning rock, stone. From the Latinised form Carsus developed Slovene, Italian and German names according to the rules of their languages. From the Central Europe the easiest and practically the only way leading to the Mediterranean was the road from Vienna to the port of Trieste. Travellers across the Karst described this unusual country and its natural phenomena, mostly with negative connotation and subsequently other limestone landscapes were compared to Karst. In 1830 F. J. H. Hohenwart wrote that “karst is not on the Karst only, but it stretches from the plain of Friuli to the Greek islands”. Most of the descriptions of the Karst from that period were published in German language and this is the reason why the German form of the name became the international karstological term, the karst.

Key words: karst terminology; etymology of the term karst; term karst; history

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0 Introduction

It is 118 years ago when J. Cvijić^[1] published his fundamental work on karst and where he mentioned the origin and meaning of the term karst: “The word is of Celtic origin and it means rough, rocky terrain. As a regional name it was first used for the land between Trieste and Postojna”^[2]. Up to date numerous karstologists and linguists studied the question and a lot of details can be found in the

recent publications^[3]. But all the same even in modern works one can find incomplete or even false information about this subject. As an example the statements such as “The word Karst refers to landscapes similar to that of the Kras region of Serbia”^[4] or “In fact, the term *karst* comes from the Slav word, *krs*, and is associated with the limestone country in western Slovenia.”^[5] can be cited.

On the Italo-Slovenian border lies the north

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westernmost plateau of the Dinaric Mountains called Kras in Slovene, Carso in Italian, and Karst in German language. The plateau is well distinguished, limited by the Gulf of Trieste (which is in turn the north westernmost part of the Adriatic Sea), alluvial plain of the Soča (Isonzo) River, the Vipava River valley on non-carbonate formation of Eocene flysch, and flysch hills of Brkini. It covers about 550 km² (40 km long and 13 km wide) at 45° 45' N and 14° E. The altitude is between 150 m on the NW and rising to 450 m towards SE. The geological structure are Cretaceous and Tertiary carbonate rocks with main tectonic lines in Dinaric (NW-SE) direction^[6]. The general aspect of the plateau is relatively flat surface, while more in details it is interrupted by numerous karst depressions. On the plateau of Kras practically all typical karst features are developed. Regarding the surface of the plateau, karst features are of relatively modest dimensions. There are poljes, big and small dolines, including big collapse dolines, dry valleys, and numerous caves (Fig. 1). Among them Škocjanske Jame Caves, World Natural Heritage is worth to mention and there are many big caves, reaching from the plateau surface the underground river few hundreds of meters lower. Because of its "karst" phenomena the international scientific term karst derived from the name of this plateau, as well as some other karstological terms^[7]. Why it is so and why from this relatively small and, looking from the World's point of view, unimportant plateau international term derived is explained further.



Fig. 1 Typical Kras cultural landscape includes a doline turned to a sinkhole pond and vineyard (photo K. Kranjc)

1 What does the name Kras/Karst mean and from where did it come

During the centuries B. C. the plateau Kras was settled by Illyrian tribes which were subjugated by Romans following two military missions in 178 and 177 B. C. when the Romans conquered the kingdom of Histrians^[8]. The original pre-Roman (pre-Latin, probably Illiryan) name of the plateau is not known. From works of the antique authors we know the Romanised form of the name that is *Carsus* in Classical Latin language. The base of the name was **Karus-*, with the root **kar-* which means stone or rock. The proof is the Ptolemy's (Claudius Ptolemaeus; c. AD 90-c. AD 168) version in the Greek language of this name, that is *Kar(u) sádios oros* (τω Καρουσαδιώρει)^[3]. The original name was the Latinised form *Carsus*. From the accusative form of this name (i. e. *Carsum*) the modern Italian name of the plateau *Carso* developed as an inherited name. From the same accusative form the pre-Slovenian form **Kars(u)* was taken by the language of early Slavic tribes who settled this territory from the second part of the 6th century on. Via liquid metathesis the form **Kars(u)* changed into the modern form (*Kras*) at the beginning of the 9th century at the latest. That was the time when each pre-Slovenian 'r' or 'l' occurring between a vowel and a consonant changed its position before the vowel. The same process gave birth to the Slovene word *kralj* "king", after the name of the Franconian sovereign *Karl* (Charles) the Great (died 814). The word *Karl* was changed into the form of *kralj*. The German form *Karst* was taken from the Italian one. Its final 't' is secondary, following the German phonetic tendency that the words ending in 's' are extended by 't', e. g. the German *Axt* ('axe') compared to the English *ax(e)*. From the considerations above it follows that all the names mentioned originated from the Latinised *Carsus* which has the root **kars-*. The variants *Kras*, *Carso* and *Karst* must have evolved from the same origin. According to mentioned Ptolemy's written record, it seems that the root **kars-* developed by letter omission (syncope) from **karus*^[9].

Looking through the literature there is a lot of examples of the names derived from the pre-Indo-European root *kar(r)a/gar(r)a* meaning rock, stone throughout the Europe. In 1935 G. Alessio^[10] started to study this base seriously. The same one covers different forms as **kal-*, **gal-*, **kar-*, **gar-*, also **al-* and **ar-* after the fall of the first consonant, and even like in Greek **l-* or **r-*. The same radical can be in the full form **kal-* or in the reduced one **kl-*. To the mentioned eight forms for the same base **kl-*, **gl-*, **kr-*, **gr-* can be added. From this it can be seen what perspectives are given by this system to the field of toponymic research.

According to Rostaing^[11] **kal-* initially meant stone, later shelter made of stone, and finally a house, a fortress or a village. In France there are numerous examples like Chelles, Challes, Chalo, Chalou, Caille, Challans, etc. Typical forms of Mediterranean karst coast are small bays called *calanque* in French, *calanco* in Provençal and *calanche* in Corse language. The prototype was **kal-anc-us*. Causses, the name of well known karst plateaus in France, has the origin in **kal-* too. In the name of the town Carcassonne appears **kar-*. From the karstological point of view more interesting are toponyms La Cra and La Crai and specially La Cras, all from Burgundy. It seems that Kras in Slovenia and La Cras in Burgundy are quite the same. In the delta of Rhone the name of the well known stone plain Crau derived from the form of **kr-*. But not the toponyms only, from the mentioned base derived also other karst terms: *karren* from **kar-* and French term for *karren clavier*, from the form **kl-*. The term *garrigue*, typical karst vegetation cover from the south of France came from **gar-*. The base **krapp-* is known also from Slavic, Albanian and “Piemontian” languages. Does the Slovene term for *karren*, *škraplje*, came from the same base, the **krapp-*? In the Slovene language the most of the study of this base was carried out by Bezljaj. The Slovene words like *kar* (protruding rock) and names as Karavanke Mts. (*karuant* = rocky, stony) and Carniola (Kranjska) have probably the same root **kar*^[12].

The different forms of the name appeared in Medieval documents; 1159 Carsus, Carsi, 1177 Grast, 1200 in Carsto (Karsto), 1236 de Carstis, 1240 in Karst, in Carsto, 1252 in Carsto, 1370 am Karst, and 1398 Karst^[3, 12]. In the documents and printed sources the Slovene form *kras* appears at least from 16th century on^[13, 14] and not only in 1874 as stated in some modern papers^[15].

2 From the toponym Kras/Karst to the international term karst

The invention of print and discoveries of new lands, continents even, was followed by increased production of maps and atlases. It is normal that on “local” maps the name of Kras figures but it seems that it was regionally important enough that it figures also on the maps of larger regions in greater scale. Just to cite some examples. On the Münster’s map of Illyricum (1552) is Kharst, on Zalterius’ of “Ducatus Carnioliae” (1569) is Charso, on Lazi-us’ map of “Goritiae, Karstii...” (1573). Sometimes the name Karst figures in the title already, as on the Mercator’s “Forum Iulium, Karstia, Carniola...” (1589)^[16]. First maps published by domestic authors^[13, 17] marked Kras with the name of Karstia. Valvasor in his book (1689) mentions the Slovene name Kras (*Na Krasu*) (Fig. 2), but it was first put on the map by Hacquet (1778)^[14] who strictly followed the principle that names on maps have to be written in domestic (people’s) language (Fig. 3). Why the plateau of Kras was so more important that it figured on the maps while the other regions, even bigger did not?

Karstner Boden (Nakraslo.) Wo/ Der Karst durch anjeto der ganze völlige Karstner Boden verstanden wird / so von Laytenburg und Genosetich/ bis zum Adriatischen Meer/ geht. Dieser Boden ist durchaus und über die Massen steinig. Es werffen sich

Fig. 2 In 1698 Valvasor^[13] mentioned Slovene name *Na-krasso* (= *Na Krasu*, that means On the Kras) and said about it: “Somewhere it is possible to see as far as few miles, but there is nothing but grey, no green, because everything is covered by stone...”.



Fig. 3 On the Hacquet^[14] map from 1778 places are marked with names in Slovene language. The name of the plateau Kras is written *Na Krassi*, which means on the Kras

From 16th - 19th centuries the geopolitical situation was quite different than nowadays. Most of the eastern coast was under the Venetian Republic with the exception of the port of Trieste, which was under Habsburgs (Austria). Inner parts of the land belonged to Austria (the Duchy of Carniola and so called Military Zone or Military Croatia) and to the Turkish Empire. For the citizens of Austrian Empire (including nowadays Czech Republic and Slovakia also) and a great part of Central Europe with a part of Eastern Europe, practically the only possible way to reach Mediterranean was the road from Vienna across Ljubljana and crossing Kras to the town of Trieste. In 1719, when Trieste was declared the free port the road became even more important. Therefore the "Imperial" road was improved and some parts were even made anew. The travellers and scholars who published their diaries or memoirs, geographers, topographers and cosmographers who described the countries and landscapes, all agreed in unusual and often harsh nature of Kras: bare limestone country with caves, no water, no soil, hot in summer, cold in winter, and strong "burja" (bora) wind, sometimes making the passage over the plateau impossible (Fig. 4). So Kras, in written sources mostly referred as Karst, became soon well known as seen by the example of the German emperor Franz I. In 1748 he sent the director of the court's rarities collection to Carniola to see what are those uncommon phenomena described by many authors. When describing the limestone land-

scapes elsewhere, these authors often compared them to Kras (Karst). In the adequate literature it was often written that the land is similar to Kras/Karst. The first as far as we know who definitely wrote that "the karst is not only on Kras (Karst)" is F. H. Hohenwart^[18] in the introduction to Postojna Cave guide-book from 1830. He stated: "For the traveller coming from Vienna, Adelsberg (nowadays Postojna) is the beginning of the karst; that is each rocky part of the land which started in the district of Udine and continued through the valleys of Pontafel and Canal del Ferro, reaches the coast near Tibein (Duino) and inland to Adelsberg, from there above Trieste and Fiume through Dalmatia, Ragusa, Albania and part of Bosnia towards Cephalonia."



Fig. 4 The picture shows a bare rocky landscape where "... Sometimes during the winter, unbelievable strong wind rises, which can overturn even a horse and a man..." (Valvasor^[13])

The first half of the 19th century was the period when detailed modern studies of Kras started, mostly by geologists and geographers. In 1848 in his description of the geological map of Istria, A. Morlot^[19] used the expressions as Karstland and Karstkalk (karst limestone), A. Boué's^[20] work has the title *Karst und Trichterplastik*, E. Mojsisovics^[21] (1880) wrote on geology of "Karsterscheinungen". The geologists were soon followed by hydrologists too; A. Grund^[22] (1903) wrote the basic work "Die Karsthydrographie" (Karst Hydrography) and the opponent to his theory F. Katzer^[23] (1909) published "Karst und Karsthydrographie" (Karst and Karst Hydrography), while A. Gavazzi^[24] (1904) describes lakes, that are poljes of the karst: "Die Seen des Karstes" (Lakes of the karst).

As it can be seen from this short presentation, practically all descriptions and professional works were written in German language and it is self-understanding that the German version, the Karst, entered the international terminology. From a still local or regional term of Hohenwart, Morlot and Boué, the word slowly covered larger and larger space. As early as in 1859 J. R. Lorenz Liburnau^[25] complains that when speaking or writing of karst everybody thinks only to the plateau of Kras, while in fact karst reaches far towards east in Croatia, for example.

At the end of the 19th and the beginning of the 20th century it is possible to say that karst was already an international scientific term. One of the most important scholars, who influenced maybe the most that the term karst became international one, was Jovan Cvijić. As a student of Vienna's university and well known professor of geomorphology A. Penck, it is normal that he used the form karst, already in the title of his the most important work regarding karst, the monograph “Das Karstphänomen” (The phenomenon of Karst)^[1].

3 Conclusion

The term *karst* derived of the name of the plateau in the background of the Bay of Trieste (Adriatic Sea) lying (the great part) in Slovenia and partly in Italy. The name of the plateau is Kras in Slovene, Carso in Italian and Karst in German. The original (Pre-Roman) name of the plateau which was Latinised in the form *Carsus*, had the root **kar*- that is stone. From the accusative form of the name (*Carsum*) modern names evolved in the 9th century. During the 19th century when the toponym Karst transformed in the general term, the professional literature was in German language and therefore the German form of the name Karst has been taken into the consideration.

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术语“Karst”的起源和演化

(摘要)

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对于术语“karst”的起源和演化,不少文献(包括手册、教科书、字典等)仍有不准确、不一致甚至错误的论述。鉴于此,本文不仅重述了众所周知的关于“karst”起源的事实,而且介绍了“karst”起源和演化的最新语言学研究结果。

“karst”是由喀尔斯(Kras)高地的名称演化而来的。喀尔斯位于亚得里亚海的里雅斯特湾(Gulf of Trieste)达尔马提亚(Dalmatia)海岸地区,其大部分属于斯洛文尼亚。喀尔斯是一处海拔 150~450 m,覆盖面积 550 km² (长约 40 km,宽约 13 km)的碳酸盐岩高地。斯洛文尼亚语、意大利语和德语分别称之为 Kras、Carso 和 Karst。喀尔斯高地表面大致平坦,但从局部看,喀斯特洼地遍布,各种典型的喀斯特地貌形态随处可见,包括坡立谷、大小溶斗(包括大的塌陷溶斗)、喀斯特干谷和溶洞。这些形态规模较小,起伏平缓。

喀尔斯高地的名称起源于前罗马时期,其古典拉丁语名称(也是目前已知最早的名称)为 Carsus。该词的词根 *kar(u)s-是由意思为“石头或岩石”的词根 *kar-演化而来。从欧洲众多文献中可以发现有许多名词来自前印欧语系的词根 kar(r)a/gar(r)a。这些词根最初意思指石头或岩石,而后发展为石头筑成的遮盖物——一间房屋,一座城堡,甚至一个村落,这些词根还演化成喀斯特相关术语。

由 Carsus 的宾格形式 Carsum 演变成现代意大利语名称 Carso;同样的宾格依据前斯洛文尼亚语言规则(即 r 或 l 出现在元音和辅音字母之间时,须将其移至元音字母之前。)演变成 Kras;德语 Karst 则是由意大利语 Carso 依据德语变化规则(以 s 结束的单词末尾须添加 t)演变而来。由此可见,Kras、Karst 和 Carso 均源于古拉丁文 Carsus,该词含有词根 *kar(u)s-。

印刷技术的改进和新大陆的发现,带动了地图和地图集的出版。喀尔斯高地的名称不仅出现在地方性地图上,而且被大尺度区域性地图所标示出来,德文 Karst 甚至被用作区域地图的标题,足见喀尔斯高地的重要性。喀尔斯高地之所以比其它更大的地区重要且较早为人们所认识,与历史的地缘政治形势有关。16 至 19 世纪,地中海东海岸大多由威尼斯共和国管辖,的里雅斯特港口和内陆地区则隶属于奥地利和土耳其帝国。对于奥地利帝国的公民,大部分中欧人和小部分东欧人来说,通向地中海唯一可行的途径就是从维也纳穿过卢布尔雅那市(Ljubljana),经喀尔斯高地,至的里雅斯特镇。1719 年,当的里雅斯特港宣布成为自由港后,这条道路变得更为重要。与此同时,喀尔斯高地不寻常的地貌和恶劣的自然环境给途经的旅行者和学者留下了深刻的印象。在他们的旅行记录中对 Kras 有近乎相同的描述:“碳酸盐岩裸露,岩洞繁多,没有水和土壤,夏暑冬寒,冬季强烈的冷风暴有时让高地无法通行……”。此后,当描述其他喀斯特地区时,作者们往往会将其与 Kras(Karst)相类比。1830 年 F. J. H. Hohenwart 在《Postojna 岩洞导游手册》中,第一次确切地写道“喀斯特地貌不仅存在于 Karst 高地,它从 Friuli 平原一直延伸至希腊岛……”。

十九世纪上半叶,地质、地理和水文学者开始了对喀尔斯高地的详细研究,出版了喀斯特地质地貌方面的著作,并开始使用一些喀斯特术语。自 1830 年起,由于这些记述性的文字和专业著作大多用德语撰写,德语名称 Karst 逐渐为更多地区的人们所了解。19 世纪末 20 世纪初,可以说“karst”已经成为国际科技术语。对“karst”加入国际术语行列影响最大的可能是毕业于维也纳大学的 Jovan Cvijić 教授,他是最重要的学者之一,也是著名地形学教授 A. Penck 的学生。他最重要的喀斯特著作“Das Karstphänomen”(The phenomenon of Karst)的书名中就使用了“karst”。“karst”就这样由一个地名逐渐演变为学术名词,然后成为国际科技术语。

关键词:喀斯特术语学;Karst 的语源学;术语 karst;历史

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