
Karstifiable rocks
(potential karst aquifer)
Continuous carbonate rocks
Discontinuous carbonate rocks
WOKAM database;
©BGR, IAH, KIT and UNESCO 2017
POLAND
CZECHIA
SLOVAKIA
HUNGARY
ROMANIA
CROATIA
SERBIA
Občasny pramen
Vrchovište
Jergaly
Periodická Vyvieracka
Limbašska Vyvieracka
- MIKAS
- NIKAS
Slovakian
NIKAS springs :
1 - Bobrovec
2 - Brestovská vyvieračka
3 - Buzgó
4 - Čertova skala
5 - Čierna vyvieračka
6 - Čierno II
7 - Dechtické pramenisko
8 - Drienovecká vyvieračka
9 - Harmanecký Veľký tunel
10-Hlavný prameň
11-Hlbokō
12-Kráter
13-Lazce
14-Malý kráter
15-Podhrad
16-Vyvieračka v Prosieckej dol
17-Vyvieranie
0
115
230
Km

| Country (NIKAS) | NIKAS springs | Coordinates / Nearby City | Spring discharge (Q in l/s,min/av/max) / tapped or not | Criteria* order / Main justification */ H-historic, A-aesthetic, S-scientific, E-Economic, Ec-ecologic | Data collected by |
|---|---|---|---|---|---|
| **Slovakia**  | 1. **Bobrovec (Bobrovecká dolina)** | N 49,263117° E 19,758109° Z = 944 m asl<br><br>Západné Tatry Mts, Oravice/ Vitanovce, Orava River basin | 102 / 197 / 306<br><br>The Bobrovecká dolina spring is captured by a horizontal gallery, permitted license for use of 166 l/s. | ***A, E, H, S***<br>*Spring issuing from Lower Jurassic limestones. It is one of the largest from $J_1$ aquifers. Construction of the spring's abstraction facility for water supply refers to the period of the 1970s and 1980s, period associated with the construction of large group water supply systems on the territory of the ČSSR. Aesthetically, one of very few in W. Carpathians with the possibility to observe groundwater outlets from the cracks in the rock massif; in the vast majority of cases, such inflows are covered by weathered rock and debris. In the case of the Bobrovecká dolina / Bobrovec spring, the sense of the designers of the capturing construction to preserve this interesting phenomenon should be appreciated. The spring is an important water source, one of the few in the Slovak Republic where the permitted abstraction from a single source is more than 100 l/s. The spring is interesting for its high stability, the ratio of its maximum and minimum discharge is only 3 : 1.* | Peter Malik |
| | 2. **Brestovská vyvieračka** | N 49,258619° E 19,657609° Z = 857 m asl<br><br>Západné Tatry Mts, Zuberec, Orava River basin | 7/130/984<br><br>Spring not tapped | ***Ec, S, A, H***<br>*Brestovská vyvieračka is issuing from small cave in Middle Triassic dolomites. It is the end point of the underground hydrological system of the nameless stream flowing through the Brestovská jaskyňa Cave (2 km canals explored). Several siphons were discovered on the underground flow route. The whole system as well as the spring is important for the presence of aquatic invertebrates (crustaceans Niphargus tatrensis, Bathynella natans, Crenobia alpina, Gammarus fossarum and others). The discharge zone creates a relatively large outlet from under the overhanging rock, and it is also a suitable educational object. There is an educational panel next to it. The spring is mainly connected with the history of speleology and cave diving in the hydrological system of the Brestovská jaskyňa Cave. It is frequently visited area by tourists, next to the open-air folk architecture museum in Zuberec and also public visits of the Brestovská jaskyňa Cave.* | Dagmar Haviarová |
| | 3. **Buzgó** | N 48,617875° E 20,587155° Z= 316 m asl<br><br>Slovenský kras | 5 / 57 / 1356<br><br>Not tapped, but in its immediate vicinity there is a | ***Ec, A, S***<br>*The spring water is issuing from Middle Triassic limestones, after flowing as underground flow through the Krásnohorská jaskyňa Cave. The* | Dagmar Haviarová |

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| | | Mts., Krásnohorská Dlhá Lúka, Slana River basin | pumping well used for water supply of local municipality. | *entrance to the cave is located just above the spring through which the cave itself was discovered. The cave is 1550 m long, open to the public. The spring, together with the foam travertine cascades below the spring, creates a unique aesthetic scenery for visitors to the site. The spring is a site connected to several species of aquatic fauna (Polycelis felina, Bythinella austriaca, Bythinella pannonica, Haplotaxis gordioides, Lumbriculidae spp. juv., Stylodrilus parvus, Gammarus fossarum and others). The spring is one of the localities with the occurrence of the protected species of animal - the Pannonian sadlerian.* | |
| | 4. **Čertova skala** | N 49,063986°<br>E 18,535996°<br>Z = 352 m asl<br><br>Strážovské vrchy Mts., Domniža, Domanižovka River basin | 5 / 79 / 141 (old data)<br>171/173/181 (2012-2016 data)<br><br>Spring is captured by long horizontal gallery 98 m long, with 3 x 3 m profile, followed by another tunnel of 28 m length. | ***A, E, S, H***<br>*Spring drains Súľov formation (conglomerates, sandstones with reef and limestone of Paleogene – Lower/ Middle Eocene age. Construction of the spring's abstraction facility for water supply completed in in 1975. The Čertova skala spring has an extremely elegantly designed horizontal intake. The spring is an important drinking groundwater source, one of the few in the Slovak Republic where the permitted abstraction from one source is more than 100 l/s - in this case 197 l/s. Groundwater is used as drinking water in the Považský skupinový water supply system. The spring is interesting from the scientific point of view due to its extremely high stability (Qmax/Qmnin = 1.05), at the same time due to its high yield it also represents evidence of the significant karstification processes in the Palaeogene carbonate conglomerates.* | Ivan Šalaga |
| | 5. **Čierna vyvieračka** | N 48,562771°<br>E 20,465458°<br>Z = 240 m asl<br><br>Slovenský kras Gombasek, Slana River basin | 2 / 82/ 2096<br><br>Spring not tapped | ***A, S, Ec, H***<br>*Čierna vyvieračka (Black spring) is an ascent of the perennial active water flow of Gombasecká jaskyňa Cave named as Čierny potok (Black stream). The spring can be considered as an outlet center of the three main branches of the wast Silica - Gombasek underground hydrological system. The upper most section of the system is a lake (big doline filled with water). Gombasecká jakyňa Cave 1525 m long, is often described as a fairy tale underground space. Nature has given the stalactites various bizarre shapes and forms. is one of the most important caves in the Slovak Karst National Park.* | Peter Malik |
| | 6. **Čierno II** | E19,031483°<br>N48,807814°<br>Z = 750 m asl<br><br>Kremnické | 8 / 71 / 186<br><br>Tapped by brick shafts. The Čierno II karst spring is one | ***A, E, H, S***<br>*This gravity spring drains Middle Triassic limestones. This is one of the first groundwater intakes of the Pohronský group water supply system. Permit for* | Peter Malik |

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| | | vrchy Mts., Horný Harmanec, Hron River basin | of the significant water sources of the Harmanec branch of the Pohronie group drinking water supply system | *groundwater abstraction stated an average permitted abstraction from the spring of 75 l/s with a maximum abstraction value of 115 l/s. The Čierno II spring is known for its aesthetic way of capturing spring groundwater.* | |
| | 7. **Dechtické pramenisko** | N 48,549242°<br>E 17,583504°<br>Z = 185 m asl<br><br>Brezovské Karpaty Mts., Dechtice, Vah River basin | 293 / 415 / 475<br><br>Tapped. Currently, groundwater is pumped out from four large-diameter boreholes whose combined exploitable amount was calculated at 230.0 l/s, while the remaining part (100 to 300 l/s) freely flows into the surface stream. | *E, S, H, A, Ec*<br>*Linear spring issuing from karst aquifer formed in Middle – Upper Triassic dolomites. The spring area is significant water management point supplying the entire Trnava region located lower on the plain - the city of Trnava and its surroundings. There is an interesting discrepancy between the relatively small outcropping area of Triassic carbonates of the hydrogeological structure of Plešivá hora (38.4 km$^2$) and the large amount of outflowing karst-fissure groundwaters, which its relatively low infiltration capacity is not enough to cover. The Dechtice linear spring is still active despite the waterworks intake structures capturing part of its groundwater.* | Peter Malik |
| | 8. **Drienovecká vyvieračka (Jaskyna)** | N 48,624885°<br>E 20,952458°<br>Z = 244 m asl<br><br>Slovenský kras Drienovac, Bodva River basin | 0.1 / 28 / 983<br><br>Not Tapped | ***S, A, Ec, H***<br>*The Drienovecká vyvieračka spring drains Lower Triassic limestones. A damming wall has been built around the spring site. It is a preserved natural point outlet of the underground karst hydrological system of the Drienovská jaskyňa Cave to the surface (1348 m) explored channels. Archaeological findings of the Neolithic Bukovohorská culture (5000 – 4700 BC) and the Pilinská culture (1500 – 1200 BC) of the Middle and Early Bronze Age were also obtained. Drienovecká jaskyňa Cave is an important conjunctive wintering ground for bats, with up to 13 species recorded here.* | Peter Malik |
| | 9. **Harmanecký Veľký tunel (Čremošniansky tunel, Vrcholový tunel)** | N 48,831561°<br>E 19,019782°<br>Z = 651 m asl<br><br>Veľká Fatra Mts. Harmanec, Hron River basin | 17 / 219 / 278<br><br>Tapped. Collection of water inflows from springs behind the tunnel lining was solved by drainage pipes leading into a longitudinal groove behind the lining. The water was transferred into the main collector tunnel from drainage device through the lining foundations. | ***E, H, S***<br>*The abstracted groundwater source of Harmanecký Veľký tunnel is a large artificial drainage element in the karst massif of Middle Triassic Ramsau dolomites and Gutensein limestones. It is the longest railway tunnel in Slovakia with its length of 4697.15 m, built in 1936 – 1940. During its construction, many natural springs of karst water disappeared in its vicinity, while temporary inflow into tunnel was >800 l/s. After completion groundwater reappeared at both tunnel mouths. Water from the tunnel is gravitationally drained to the eastern portal to the waterworks capture facility, as well as to the western portal. Groundwater outflow from the Harmanecký Veľký tunnel is one of the most important* | Peter Malik |

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| | | | | *drinking water sources of the Pohronský group water supply system. Average permitted abstraction from the tunnel is 250 l/s.* | |
| | 10. **Hlavný prameň (Slavkovské žriedlo)** | N 49,070987°<br>E 20,855548°<br>Z = 566 m asl<br><br>Branisko Mt.<br>Vyšný Slavkov,<br>Torysa River basin | 64 / 80 / 133<br><br>Tapped. The originally areal outflow of the spring was captured by 3 capture notches led into a collection well, from where the water is fed into the reservoir in Lipany. | ***H, A, S, E***<br>*Hlavný spring in Vyšný Slavkov is one of the oldest water sources built in Slovakia. It is ussuing from Middle and Upper dolomitic aquifer. Water supply system was built In the years 1941 – 1949, to supply the city of Prešov (50 km away) and 24 municipalities along the water supply route. The spring discharge is very stable and even throughout the year. However, it is possible to notice the time difference (lag) of several months between the period of high water levels in the region (March - April) and the period in which the spring reaches its highest yield (usually only at the end of June). The water source in Vyšný Slavkov has a permit to withdraw water in an amount of maximum 100 l/s.* | Peter Malik |
| | 11. **Hlbokô** | N 48,992396°<br>E 19,680246°<br>Z= 774 m asl<br><br>Nízke Tatry Mts.<br>Liptovský Ján,<br>Váh River basin | 548 / - / 1182<br><br>Not tapped. | ***S, Ec, A, H***<br>*The Hlbokô spring issuing a 308 m long cave, with a constant karst water ouflow from Middle Triassic limestones. Due to the accessibility of the Hlbokô spring and the existence of cave spaces directly behind the spring, the spring represents an important object of research, especially for speleologists (speleodivers). The spring has its ecological, scientific, aesthetic and historical significance. Due to its size and abundance, the spring is an important ecological element of the Jánska dolina Valley. Permanent fauna of the springs is represented by gastropods, bivalve, etc. The Hlbokô spring is located in the Nízke Tatry National Park, National Nature Reserve of Jánska dolina, in the SKUEV0302 Area of European Importance Ďumbierske Tatras and SKCHVU018 Nízke Tatry Protected Bird Area.* | Dagmar Haviarová |
| | 12. **Kráter** | N 49,305645°<br>E 20,560391°<br>Z = 638 m asl<br><br>Spišská Magura Mts.<br>Vyšné Ružbachy,<br>Poprad River basin | 0 / 8 / 25<br><br>Not tapped. | ***A, S, H, Ec***<br>*The Kráter thermal spring (24.5°C) spring is located in the Vyšné Ružbachy spa area, issuing from Middle Triassic dolomites and limestones. The location of the natural outlet at the top of the travertine mound and its accessibility represents an important point of year-round interest for the general public. Travertine lake "Kráter" is a unique natural formation, which is considered as the most famous and the largest permanently watered travertine lake in Slovakia with mineral-thermal water. The water from the Travertine Lake "Kráter" is not used, it serves as an observation object to document the* | Daniel Marcin |

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| | | | | *regime of mineral-thermal waters of shallow and deep circulation. Mineralization of water is 2345 mg/l.* | |
| | 13. **Lazce** | N 48,975796°<br>E 18,999608°<br>Z = 551 m asl<br><br>Veľká Fatra Mts.<br>Necpaly,<br>Turiec River basin | 324 / 547 / 1370<br><br>Tapped. The Lazce spring waterworks intake facility is formed by 88 m long horizontal gallery. It is exploited by the Turčianská vodárenská společnost, a.s. waterworks for the drinking water supply of the Turiec region. | ***E, S, H, A, Ec***<br>*Lazce spring is a karst-fissure groundwater source issuing from Middle Triassic limestones, with the highest average yield in the Western Carpathians. The Lazce spring waterworks intake facility is formed by 88 m long horizontal gallery, gradually collecting water from the karst massif. The permitted water withdrawal from the spring was 450 l/s. The length of the gallery is 88 m, it ends with a circular rotunda with an internal diameter of 7 m. The gallery building is based on a reinforced concrete grid with pillars. Unexploited groundwater of the Lazce spring represents a significant source of water subsidy for water-bound ecosystems in the lower part of the Necpalská dolina Valley.* | Peter Malik |
| | 14. **Malý kráter** | N 49,042947°<br>E 19,678049°<br>Z = 641 m asl<br><br>Nízke Tatry Mts.,<br>Liptovský Ján,<br>Váh River basin | - / 6 / -<br><br>Tapped thermo-minéral springs. | ***H, A, E. S, Ec***<br>*Thermal spring issuing from limestones and dolomites of the Lower and Middle Triassic limestones and dolomites of the Krížňa nappe structure. The spring is located on the southern edge of the village, between the paved road and the Štiavnica stream in the place of a travertine mound. Currently, the spring is captured in a concrete ring with a diameter of 1.5 m located inside the travertine mound, the bottom is 1.5 m deep. The use of the spring extraordinary waters as an occasional bath has its origins, perhaps, in the prehistoric past. However, this place is mentioned in the second oldest known publication dedicated to mineral waters in the territory of present-day Slovakia by Martin Szentiványi (1689). Even after ancient, perhaps even prehistoric human interventions changing the original form of the travertine mound with the outcrop crater, its genius loci remain an aesthetically extremely impressive element naturally integrated into the surrounding nature. Water is Ca-Mg – $HCO_3$-$SO_4$ type with mineralization of 3813 mg/l.* | Peter Malik |
| | 15. **Podhrad (Pod hradom, Vyvieračka pod hradom, Prameň Muránky)** | N 48,757214°<br>E 20,070212°<br>Z = 424 m asl<br><br>Muránska planina Plateau,<br>Murán,<br>Slaná River basin | 3 / 309 / 8743<br><br>Tapped for drinking water supply. It is a classic gravity water-collection facility. | ***S, E, H, A***<br>*Podhrad barrier type spring is isuuing from of the Upper Triassic limestones of Muráň nappe structure. The spring is characterized by significant discharge fluctuations. The Podhrad karst spring is located directly below one of the highest medieval castles in Slovakia. The spring has been continuously used for water supply as a drinking water source since 1960. The Muráň group water supply* | Peter Malik |

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| | | | | *system supplies villages and towns in the Muráňka river valley up to the area south of Jelšava, including the district town of Revúca, with a population of more than 20,000 water consumers.* | |
| | 16. **Vyvieračka v Prosieckej doline (Prosiecka vyvieračka)** | N 49,161912°<br>E 19,492767°<br>Z = 639 m asl<br><br>Chočské vrchy Mts.<br>Prosiek,<br>Vah River basin | 16 / 204 / 2991<br><br>Not tapped. | ***H, A, Ec, S***<br>*The spring Vyvieračka v Prosieckej doline is issuing from Middle Triassic limestones. Spring is in the very popular tourist trail leading through the karst canyon. It is place for one of very first conducted tracing test. During peak flows, the spring is an interesting point of transition from the almost dry valley floor to a mountain stream. The ecosystem of Prosiecka dolina is protected as a National Nature Reserve.* | Peter Malik, Dagmar Haviarová |
| | 17. **Vyvieranie** | N 49,005578°<br>E 19,583048°<br>Z = 786 m asl<br><br>Nízke Tatry Mts., Demänovská Dolina, Vah River basin | 4 / 600 / 3499<br><br>Tapped for drinking water supply for the city of Liptovský Mikuláš, installed since 1988 inside the Vyvieranie Cave on the place before the water of the underground stream reaches the surface. | ***E, Ec, S, A***<br>*The spring is connected to longest cave system in Slovakia (Demänovská Cave system) with a measured length of 48 km. It is issuing from Middle Triassic limestones. It is the largest drinking water source for the city of Liptovský Mikuláš with permitted withdrawal amount of 150 l/s. Vyvieranie spring is part of a Ramsar site (underground wetland). The life of many aquatic animals is linked to its waters; before its outlet to the surface, several species of rare aquatic invertebrates were identified in the waters of the underground Demänovka stream. The presence of several stygobionts indicates the good condition of preservation of the underground wetland. The spring is located in the Nízke Tatry National Park, the Demänovská dolina Valley National Nature Reserve, the Demänovská dolina Valley Caves Ramsar site, the Ďumbierske Tatry Area of European Importance SKUEVO302, and the Nízke Tatry Protected Bird.* | Dagmar Haviarová |

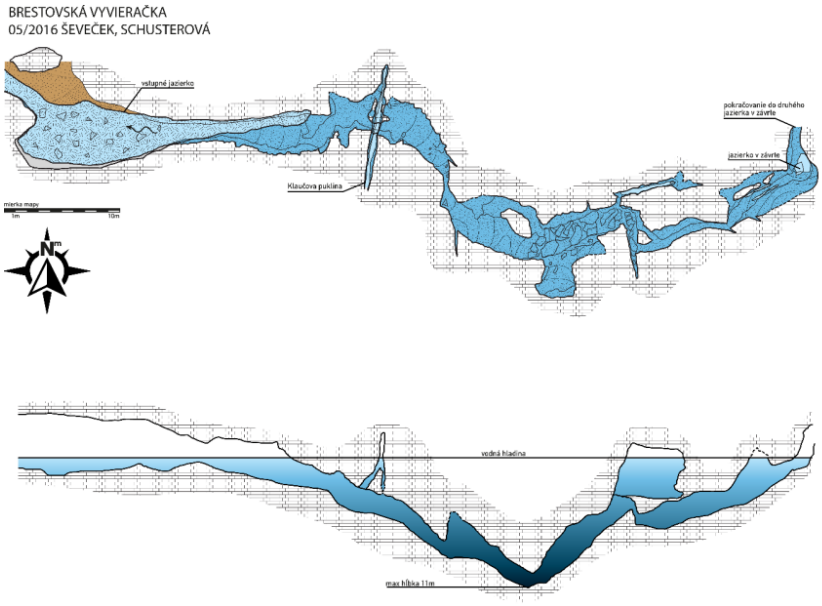
## NIKAS – Bobrovec (Bobrovecká dolina)

*Entrance portal of the waterworks facility of the Bobrovecká dolina spring, managed by the Orava Water Company. Photo: Peter Malík.*

*Groundwater discharging from fissures of scratched carbonates in the waterworks facility of the Bobrovec (Bobrovecká dolina) spring. Photo: Alexandra Vasilenková.*

*Groundwater discharging from fissures of scratched carbonates in the waterworks facility of the Bobrovec (Bobrovecká dolina) spring. Photo: Peter Malík.*

## NIKAS - Brestovská vyvieračka




*Cave map of the Brestovská vvyvieračka spring.*

*Brestovská vyvieračka spring. Photo: Pavol Staník.*

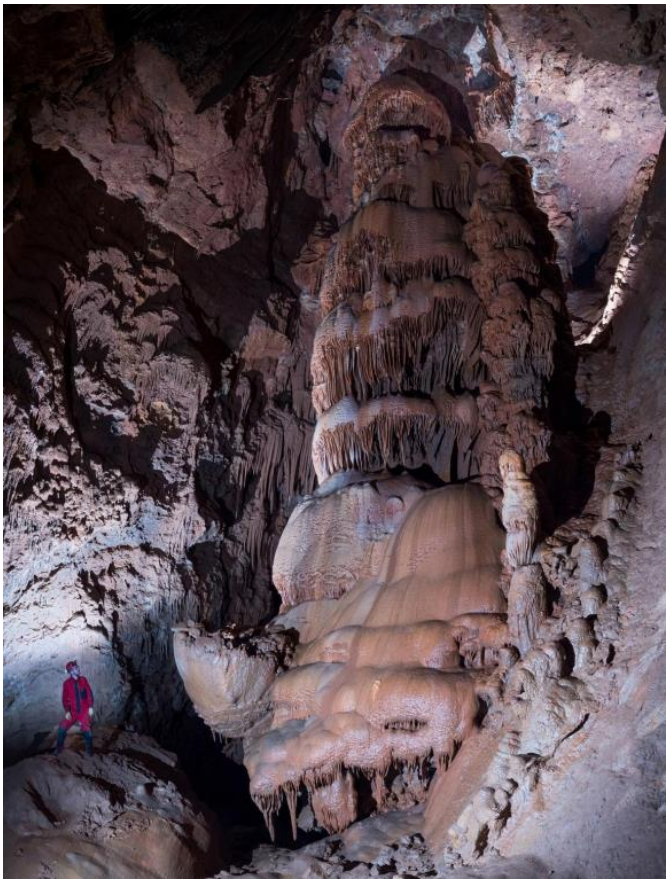
*Brestovská vyvieračka spring during high flow. Photo: Dagmar Haviarová.*

## NIKAS - Buzgó

*Buzgó spring during low water stage. Photo: Erika Kováčová.*

*Buzgó spring at high water stage. In the back the entrance to the Krásnohorská jaskyňa Cave, in the front the old gauging object of SHMI. Photo: Dagmar Haviarová.*

*Marikino jazero Lake, orifice of the rear siphon inside the Krásnohorská jaskyňa Cave. From here the underground stream can be easily followed up to the Buzgó spring. Photo: Pavol Staník.*



*Speleothem of Rožňava Cavers – gigantic speleothem inside the Krásnohorská jaskyňa Cave behind the Buzgó spring, with its height of 34,0 m once supposed in the time of its discovery (1964) to be the highest in the (contemporary) world. Photo: Pavol Staník.*

## NIKAS – Čertova skala

*Čertova skala spring - outflow from the fissure. Photo: Kamila Rehorovská.*

*Čertova skala spring - access path along the drainage gallery / adit. Photo: Kamila Rehorovská.*

## NIKAS – Čierna vyvieračka

*Čierna vyvieračka spring - SHMI gauging object No. 1869. Photo: Peter Malík.*

*Speleothem Decoration of Gombasecká Cave - typical long straws. Photo: wikipedia.*

## NIKAS – Čierno II

*The inner part of the waterworks catchment facility of the Čierno II karst spring. Photo: Iveta Zvarová*

## NIKAS - Dechtické pramenisko

*Discharge measurements at the surface stream Horná Blava below the Dechtické pramenisko linear spring. Photo: Peter Malík*

*Hydrogeological borehole De-10 - one of the waterworks intake facilities of the Dechtické pramenisko linear spring. Photo: Peter Malík*

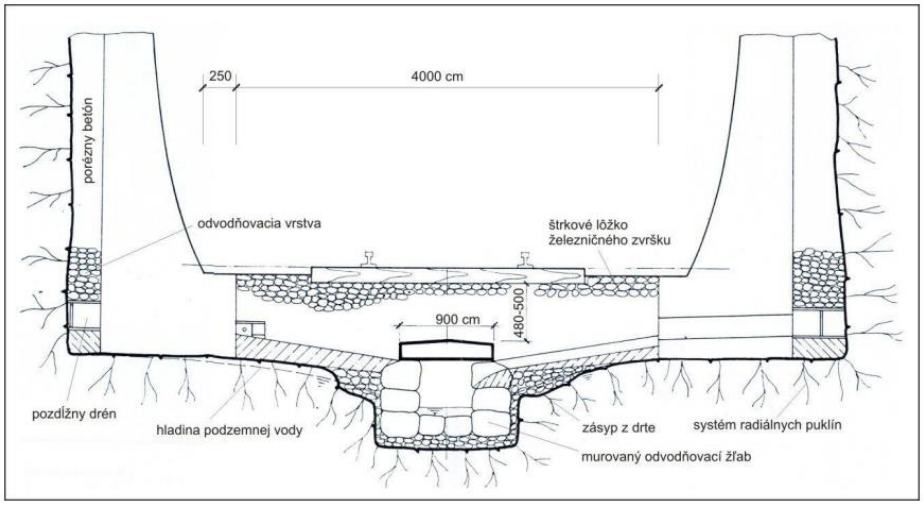
## NIKAS – Drienovecká vyvieračka

*Underground flow in Drienovecká jaskyňa Cave. Photo: Peter Malík*

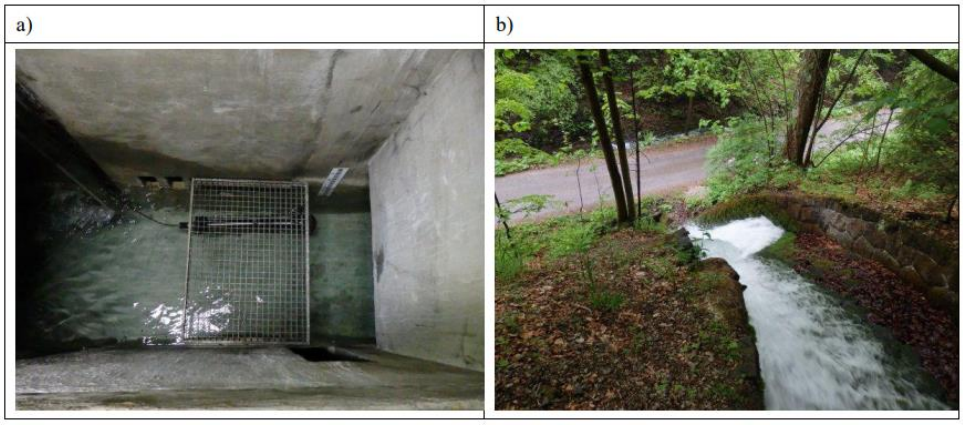
*Drienovecká vyvieračka spring - direct view of the spring. Photo: Peter Malík.*

## NIKAS – Harmanecký Veľký tunel

*Eastern portal of the Čremošný tunnel, in the background the Harmanecký Veľký tunnel water intake. Photo: Peter Malík.*




*Technical solution of drainage and method of groundwater intake and its isolation from the operational part of the Harmanecký Veľký tunnel. Kiszling (1993) in Dzúrik et al. (2016).*




*Water drained by the the Harmanecký Veľký tunnel: a) diverted to water pipeline; b) left as ecological outflow.*

## NIKAS – Hlavný prameň

*Entrance to the Hlavný spring area - the first degree protection zone (Vyšný Slavkov). Photo: Ingrid Mydlová.*

*The Hlavný spring (Vyšný Slavkov) - a view of the collection well. Photo: Ingrid Mydlová.*

## NIKAS – Hlbokô

*Hlbokô spring. Photo: P. Staník*

## NIKAS – Kráter

*View of the Travertine Lake "Kráter" in the summer period (https://www.ruzbachy.sk/galeria/krater)*

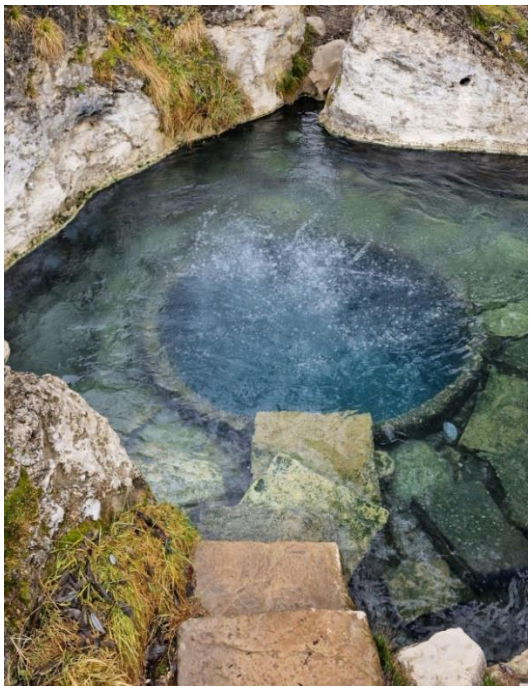
*Aerial view of the Travertine Lake "Kráter" (https://www.ruzbachy.sk/galeria/krater).*

## NIKAS – Lazce

*The apse at the upper end of the Lazce spring collection gallery in the Necpalská valley with exposed Middle Triassic massive dolomites. Photo: Peter Bajtoš*

*The flow measurement device (Poncelet's weir) at the end of the Lazce spring collection gallery. Photo: Peter Bajtoš.*

## NIKAS – Malý krater



*Detail of the mineral spring outlet of Malý kráter / Kaďa / Kúpeľný in Liptovský Ján. Photo: Gustáv Varga / www.mapy.cz.*

*Mineral spring Malý kráter / Kaďa / Kúpeľný in Liptovský Ján - bathing visitors. Photo: Josef Tomek / [www.mapy.cz](www.mapy.cz).*

## NIKAS – Podhrad

*Slovak Hydromet Institute (SHMI) gauging object under the waterworks intake facility object of the Podhrad spring in Muráň at average water stages. Photo: SHMI, taken from [www.shmu.sk](www.shmu.sk).*

*General view of the waterworks intake facility object of the Podhrad spring in Muráň. Photo: Peter Malík.*

## NIKAS – Vyvieračka v Prosieckej doline

*Vyvieračka v Prosieckej doline spring during low water stage. Photo: Gustáv Varga / www.mapy.cz (left); The spring during high water stage on 19. 05. 2010. Photo: Juraj Szunyog*

*Vyvieračka v Prosieckej doline spring during high water stage on 19. 05. 2010 - general view. Photo: Juraj Szunyog*

## NIKAS – Vyvieranie

*Gauging object for discharge monitoring at the Vyvieranie spring, photo: František Bottlik*

*Underground stream Demänovka in the Demänovská jaskyňa Slobody Cave. Photo: Pavol Staník*