LONG ABSTRACTS

THE GEOLOGICAL SETTING IN THE AREA OF UDIN BORŠT

MARTIN KNEZ

About 3% of karst surface in Gorenjska region is covered by karst in conglomerates. Udin Boršt consists mainly of limestone conglomerates which means that rounded pebbles are mostly carbonate and almost entirely cemented by calcite matrix. Conglomerates are placed on an almost flat base of the Middle Oligocene marly clay, at some places more than 100 m thick. We should mention that a smaller part of pebbles (about 1%) building the terrace and also a part of cement consist of other non-carbonate rocks and ingredients. The terrace is almost entirely covered by detritus, several metres thick, due to weathering of the conglomerate base.

The conglomerate terrace between Kranj and Tržič along the left bank of the Tržiška Bistrica is composed by several conglomerate dams of different age. The development in several phases and erosion of gravel banks are results of processes in glacial or interglacial periods. Younger conglomerate dams contain older pieces evidencing repeated and variously deep entrenchment. According to age the conglomerate terrace Udin Boršt to the north-west of Kranj can be placed into the Pleistocene.

THE TECTONIC SITUATION OF UDIN BORŠT

STANKA ŠEBELA

The conglomerate terrace of Udin Boršt is part of Ljubljanska kotlina and Ljubljansko barje tectonic unit (GRAD & FERJANČIČ, 1976). The beginning of the Ljubljana depression dates in the period before the deposition of middle Oligocene layers. According to PLACER (1999a) Udin Boršt belongs to thrust unit of Southern Alps over External Dinarids.
In the area around Udin Boršt the most important Alpine orogenic movements are dated between Upper Cretaceous and Oligocene and in Miocene. Epeirogenic movements were present in Middle Triassic, Tertiary and can be detected even in recent Holocene. The earthquakes that are typical for the area of the Ljubljana depression are suggesting the presence of recently active faults.

On the area north from Udin Boršt the most important tectonic zone is Periadriatic fault, which is situated north of the Sava fault, as can be seen in figure 1. The Periadriatic fault (PAL) separates the northern Austroalpine and the South Alpine-Dinaric units. In Slovenia this major tectonic boundary widens and corresponds to the Central Karavanke zone, which consists of five narrow faults and four different narrow rock belts among them (FODOR *et al.,* 1998).

The Sava fault gently curves in a NW-SE direction, forming the northeastern boundary of the Ljubljana depression, then merging to the SE with the northernmost (Tuhinj-Motnik) syncline of the Sava folds region. Between the PAL and Sava fault a very complicated rotation pattern is observed (FODOR *et al.,* 1998). On the basis of correlation of the displaced Oligocene and Triassic rocks, dextral separation of the Sava fault could be estimated as 30-40 km (FODOR *et al.,* 1998). The Sava fault zone shows clockwise rotation. Dextral movement along Sava fault is according to PLACER (1996) 65-70 km. Dextral movement took place after Oligocene, maybe even after Miocene. Thrusting along the fault is connected with neotectonic activity (PLACER, 1996).

In western Slovenia we observe a significant and sharp (few mm/yr) dextral (±transpressive) gradient in GPS velocities along the Sava fault, Periadriatic zone, suggesting that lateral extrusion in the NE Alps is still active and being driven by the ccw rotation of Adria (Weber et al., 2004). The Kranj fault continues towards the SE into the Žužemberk fault (GRAD & FERJANČIČ, 1976; POLJAK, 2000). The Pleistocene fluvial terrace of Udin Boršt has a much higher inclination than is normal for a river alluvial fan. The cause can be found in tectonic activity in the area (ŽLEBNIK, 1971; ŠTER, 1994-1995).

THE CAVES OF UDIN BORŠT

FRANCI GABROVŠEK

The speleological settings in Udin Boršt are basically simple although very different than on the classical sites of the Slovene karst.

These are characterised by:
- 10-50 m thick layer of middle Pleistocene conglomerate on top of a thick sequence of Oligocene clay deposits (Figure 1). Contact between the highly permeable and soluble top with impermeable silky base offers a preferential plane for cave genesis.

- concentrated and dispersed autogenic recharge
- high primary porosity and permeability of conglomerate which exhibits different hydraulic properties than fractured limestone.

According to Palmer (1991) caves formed in such settings would exhibit a curvilinear branch-work geometry.

In the Slovene cave Cadastre there are 13 registered caves in the area. Most entrances are at the western rim of the terrace or close to it. Most of the caves are rather small, just openings at the side rim of the terrace. It seems that continuation of some of these caves are blocked by small collapses. Four caves extend more than 200 m. Arneševa luknja is the longest with 815 m. It is a spring cave located near Spodnje Duplje. The northwards extending main channel is up to a few meters wide and up to a few meters high, but most of it is a crawl way. There are many small active and non-active tributaries to the main channel; most of them cannot be followed. Similar observations can be found in other long caves of the area, although they differ in details. Water from several caves was used for the water supply. Nowadays this water is used as a secondary water supply for cattle and irrigation, e.g. water from Velika Lebinca in more than 50 households.

An interesting fact is that the channels are not developed directly at the contact of conglomerate and impermeable base, but solely in the conglomerate. In the caves the Oligocene clay can hardly be seen. One can see it in the entrance part of Velika Lebinca.
So far the karst of Udin Boršt has not attracted much attention of karsologists or even cavers. But the clear-cut settings, the short time-gap for the evolution and small unaltered area is a great study site for the future. Not to mention that some of the caves are not even fully explored.

GEOMORPHOLOGY

Mitja Prelovšek

Udin Boršt is an old to middle Pleistocene conglomerate terrace in the Gorenjska region. On the basis of relative comparison with other terraces its formation could be placed to the Günz or Donau Ice age. The terrace is now up to 50 m higher than the younger Würm terrace. It is mainly composed of carbonate pebbles, only about 10 % of alluvium belong to quartz sandstone and some other non-carbonate rocks.

After the deposition of alluvial material the Interglacial age followed. Warmer period brought down-cutting of near rivers (especially the Sava and Tržiška Bistrica), lowering of erosional basis and cementation of deposited alluvium into conglomerate. Due to its age the terrace of Udin boršt is very intensely karstified terrace in comparison with younger terraces. Because of erosional processes the original levelness is now preserved only in some western and southern places, where karst surface developed. Long duration of surface denudation on conglomerate led to total dissolution of conglomerate and exposure of underlying impermeable strata in the north-western part of Udin Boršt.

Because of this, two basic types of relief can be analysed on Udin Boršt, which can be spatially very well distinguished (see geomorphic map). Fluvio-denudational relief developed in the northern and north-eastern part, while karst relief is observed in the southern and south-western part of Udin Boršt. This arrangement is the consequence of petrologic basis – the fluvio-denudational relief covers areas of impermeable Oligocene clay and the karst surface developed on permeable conglomerate.

Relatively long erosional geomorphic development can be seen in the richness of geomorphic landforms. On karst surface dolines with density up to 97 dolines per square kilometre can be seen. The highest density was analysed above the horizontal caves of Dupulnek, Arneševa luknja and Velika Lebinca. Those caves developed on the contact between Oligocene clay and upper lying conglomerate. These are typical hydrologically active epiphreatic caves. Due to karst porosity in conglomerate, subsidences are relatively numerous. Most of them can be seen in the centre of dolines, but some of them also developed on the slopes. Continual subsidence on some places is strongly connected with doline formation.

The fluvial landforms on Udin boršt and its surroundings developed as active and fossil river valleys. The major flow in Udin boršt is the Želinjski potok, which collects water in the centre of the conglomerate terrace. The gradient is low and inundation is frequent. As a consequence in such valleys gley soils with marsh vegetation developed. The contact karst at the juncture of permeable and impermeable strata is relatively poorly developed.

KARST ROCK FEATURES OF UDIN BORŠT

Tadej Slabe

Although the peculiar rocks of Udin Boršt considerably dictate the formation of rock relief and the perimeter of karst caverns the typical rock features reveal the most important factors of the shaping and development of this karst.

Karst surface develops below soil and vegetation. Frequently their influence reaches deep into the porous rock. Below the soil on the rocks, well cemented by carbonate matrix, subcutaneous cups and channels develop. Barren rock is scarce. It is typical of smaller walls and shelters. Frequently it is overgrown by lichen and moss that accelerate the rock weathering and cause its tiny dissection.

The upper part of epikarst, in particular the most porous part, is distinctly cavernous. Water, percolating through soil flows evenly downwards all over the surface and transports soil. Thus the contained organic substances accelerate the rock corrosion and allow the plants to penetrate. On some spots trees and bushes grow directly from apparently barren rock.

Summarizing the knowledge of single rock features in the caves of Udin Boršt we may obtain basic common properties of their origin and development. Cave passages often start as small tubes above the impermeable beds, this means above the impermeable base or beds that are lying between the carbonate layers. Water transporting and depositing sediments downcuts into upper carbonate layers. Of course, the passages develop in the carbonate rock itself. Larger passages were later transformed by water flow. A part of the caves is permanently flooded and a part seasonal. This is evidenced by ceiling and wall pockets. A part of the passages where water flows on the passage bottom only is deepened more explicitly. The traces of former periodical infill of the cave by fine-grained sediments are seen in the form of ceiling channels. Along the sediments frequently covering the bottom of passages they develop as corrosion notches. Such passages are semicircularly widened at lower part of the cross-section. The percolation water also reaches the passages and reshaping is the most distinctive along the upright fissures.

THE SOIL OF UDIN BORŠT

Janez Mulec & Tanja Pipan

The soil of Udin Boršt is developed on carbonate conglomerate and to a lesser extent on oligocene marine clay. Soil composition has a lithological basis. The biggest soil unit is pseudogley, luvisol on conglomerate (80 %). Luvisol is characteristic of a moderate climate with coniferous and deciduous woods, where the underlying horizon is abundant in clay. Precipitation is responsible for the constant washing out of the soil particles. Pseudogley is poorly structured with a low content of organic material. This kind of soil is characterized by a low content of humus and lowered availability of phosphorus and calcium which corresponds in lower hectare yields and reduced diversity of the flora in the area. Another 3 types of soil on more flat land by the streams of Udin Boršt are euteric and, for the flora more fertile. As is the case with luvisol, hypogley belongs to hydromorphic soils which result underground, surface or flooded water, either temporary or permanent. Hypogley has all the characteristics of excessive wetness.

THE VEGETATION OF UDIN BORŠT

Janez Mulec & Tanja Pipan

Udin Boršt covers approximately 1.300 ha of woodlands on 200,000 up to 300,000 years old conglomerate karst. It is known from old records that in the early Middle Ages this area was overlain by forest. Due to acidic characteristic of Udin Boršt's soil it is mainly covered with the red pine and bilberry (*Vaccinio myrtilli-Pinetum sylvestris*). In the lower parts the area is covered with the communities of *Galio rotundifolii-Abietetum*, *Blechno-Fagetum* and *Helleboro nigri-Carpinetum betuli*. In the undergrowth and in other habitats of Udin Boršt types such as wetlands, swamps and cave entrances several other plant species could be found. At the entrance of Arneševa luknja cave where special ecological conditions dominate, some special perennials, i.e. *Geranium robertianum*, *Cerdamine amara* and mosses, i.e. *Marchantia polymorpha*, could be identified.

THE FAUNA OF UDIN BORŠT

Tanja Pipan

Slovenia is a comparatively small country (20.273 km^2), but highly diversified in landscape and with an active geological past. It harbours a very rich fauna, in spite of some disturbance by man. Moreover, Slovenia has the richest aquatic subterranean fauna and its terrestrial cave fauna is close to the richest in the world.

The subterranean fauna of Udin Boršt is very poorly investigated. Up to now all the published data are accidental findings, mostly by cavers. It has been concluded that the subterranean fauna of Udin Boršt is much richer and more diverse than is known at present.

Discoveries of cave fauna (Table 1) are published for only four caves, of the 13 caves that appear in the region of Udin Boršt (according of the Cave Cadastre of the Karst Research Institute ZRC SAZU and Cave Association of Slovenia). Notes written by cavers are at the moment the only source of fauna data for the caves of Udin Boršt.

In the caves arachnids, isopods, cave beetles, diptera, grasshoppers, salamanders and bats were frequently found. *Proteus anguinus* lives also in the subterranean waters of Udin Boršt.

Surface invertebrates present in the area of Udin Boršt are molluscs (gastropods), arachnids, spiders, millipedes and insects (beetles, butterflies). In the group of vertebrates were found amphibians (frogs, toads), reptiles (lizards, snakes), mammals (deer, hare, marten, ermine, weasel, polecat, badger, fox, hedgehog, mole, mice, shrew, etc.), birds (warblers, finch, butcher-bird, yellowhammer, pigeon, raven, birds of prey, owls, etc.).

THE HYDROLOGICAL CHARACTERISTICS OF THE UDIN BORŠT AREA

Metka Petrič

From the hydrogeological point of view the Udin Boršt area is interesting as an aquifer with specific properties. The central part is built by Pleistocene conglomerates, which can be characterised as porous aquifer (Fig. 46). But as they are

composed mostly by limestone pebbles they are karstified. Infiltration of precipitation is therefore not only diffuse across the whole area, but also concentrated through karstified and more permeable zones in numerous dolines. Karst channels in the underground are important for collection and flow of water. Also at bigger springs groundwater emerges through the channels, which are in some places developed as karst caves. Springs are located at the contact between conglomerate aquifer and very low permeable Oligocene marine clay underneath, which has the role of a hydrogeological barrier. Additional units are alluvial deposits along surface streams in the eastern part, which are characterised as porous aquifers with higher capacity.

Mostly in the eastern part of the terrace surface streams are formed in the valleys in which marine clay often outcrops at the bottom. After precipitation events valleys are filled with water, but during longer periods without rain they are mostly dry. Among them the most important is the Želinski potok brook in the central part. In its lower stream discharges between 5 l/s and 170 l/s were measured in the period from the spring 2003 to the end of winter 2004.

In the western part surface streams are rare. Rainwater is mostly accumulated in the underground. It flows along the contact with very low permeable marine clay and through numerous springs at the border returns to the surface. In the entire Udin Boršt area 39 springs with common capacity around 25 l/s are registered. Discharges of springs are small and only for some of them the capacity exceeds 1 l/s. Their common characteristics are relatively small oscillations of discharge at different hydrological conditions. The biggest among them is the captured spring above the village of Strahinj with the capacity of 8 l/s. Groundwater emerges also through several caves. The most important are the springs from the caves Arneševa luknja, Arneševa zijalka, Dupulnek, Velika Lebinca and Kadunčev studenec. Some basic data on chemical composition of water at these springs are gathered in Table 1. Samples were taken during low waters in January 2005.

Interesting karst phenomena are sinking streams on the conglomerate terrace, which are formed due to local changes in permeability of rocks or sediments. From the spring area where groundwater emerges to the surface at the contact with less permeable layers, water flows briefly on the surface. After reaching well permeable conglomerates it sinks again underground.

There are no regular measurements of discharges of springs and surface streams in the Udin Boršt area, therefore no data on the amount and shares of underground and surface runoff are available. So for the estimation of common outflow the method of water balance and data on precipitation and evapotranspiration were used. In the area of 17 km^2 the mean yearly amount of precipitation is from 1500 to 1600 mm, and the mean yearly evapotranspiration from 650 to 700 mm. This is enough to recharge common surface and underground runoff of around 470 l/s.

Especially in the past the aquifer of Udin Boršt was also an important source of drinking water of the surrounding villages. At numerous springs near the settlements captures for water supply, feeding troughs, and local waterworks were built and water was used for drinking, watering of animals, washing, watering of gardens, etc. Today nearly all settlements have public water supply (Fig. 51). At present only the spring above Strahinj, which has been the source of drinking water for the village Naklo since 1911, is registered as a capture. But at least for occasional use also numerous other springs along the border are still active.

Due to described karstic nature the Udin Boršt area is very vulnerable and pollution on the surface can spread fast to the water sources at the border. But its advantageous characteristic is low hazard posed by potentially polluting activities. The terrace is mostly covered by wood in which human activities are above all limited to various recreational activities. Potential threat is posed by possible leakage of contaminated wastewater from the landfill site Tenetiše which is situated at the border of the conglomerate terrace. Regular observation and timely detecting of the groundwater contamination is assured by the monitoring of water quality in boreholes at the edge of the landfill. Additional hazard are illegal dumps, which should be properly removed.

THE HISTORY OF CAVE KNOWLEDGE AND RESEARCH

Andrej Kranjc

Folk tales and tradition evidence that people in Udin Boršt were aware of caves from old. Such is the tale of Pesoglavec (A human with a Dog's Head) chasing people who then hid in Arneševa luknja. Also a White Castle supposedly built at the border of Udin Boršt was supposed to have sunk into a cave. A historical base is found in stories telling that people used to hide in these caves when Turks were coming. In the 19th century a special type of outlaw (rokovnjač) occurred in Gorenjska. One of the centres was in Udin Boršt where brigands hid and lived in caves. This type of outlaw started under the French occupation and ceased in 1848. At that time the villagers hid in the caves not only themselves but also their property and harvest. Also in the walls of the conglomerate terrace Okroglo there are several caves. In one of them Germans besieged a group of partisans on April 22, 1942. Eight fighters committed suicide; four were caught and later shot and only one succeeded in escaping.

Water is another factor playing an important role at studying Udin Boršt as water was lacking on the gravel lowland. In the first half of the 18th century already a dispute arose between the inhabitants of Naklo and Pivka villages about the Lebinica water use; the water flows out of Velika Lebinca cave. Later most of the villages were water supplied from Udin Boršt, partly out of caves. As elsewhere in conglomerates in Udin Boršt also there are traces of rock cutting for millstones – these are oblong cut stones.

The first printed news about the caves in Udin Boršt is found

in VALVASOR's Die Ehre des Herzogthums Crain (1689) mentioning several caves from Udin Boršt and nearby, among them also the largest, Arneševa luknja. The book History of the Ljubljana Bishop's Diocese (1885) mentions seven caves: Lebinica, Zijalka (with the spring), Luknja v Voglu, Dupulnik, Boltar (spring near Luk-nja), Veliki and Mali Pekel. Incidentally some speleomorphological and geomorphological processes are mentioned (filled up passages, headward erosion, rock collapse).

The modern caving research started in 1946 when Egon Pretner, collecting cave fauna visited four caves in Udin Boršt (Arneševa luknja, Dopulnek, Mala and Velika Lebinca) In 1954 the members of the Natural Science Circle of the 1st Grammar School, Kranj started to visit caves in Udin Boršt and in nearby conglomerate terraces collecting cave fauna, studying karst springs and measuring physico-chemical properties of water. Several excursions were dedicated to Arneševa luknja. Around that time a co-worker of the Karst Research Institute of the Slovenian Academy of Sciences and Arts from Postojna started to research these caves. Arneševa luknja was surveyed and published in the very first volume of Acta carsologica. The caves in Udin Boršt were revisited in the seventieths of the past century in connection with the important project of the Karst Research Institute entitled Speleological Map of Slovenia in collaboration with Caving Club Kranj. Since then usual caving activities are held in Udin Boršt.

LAND USE OF THE KARST TERRACE UDIN BORŠT AND ITS SURROUNDINGS

NATAŠA RAVBAR & MITJA PRELOVŠEK

Land use of a certain area is presented by expansion of definite land categories. Land use continuously changes and is consequently shown in changes of land categories area.
In the present article authors are researching expansion and changes of different land categories of the Udin Boršt and its surroundings. At their research they used data from the cadastral register from the second half of the 18. Century and compared it with the present situation. Researching present situation of land use of the Udin Boršt and its surrounding area they considered narrower area of the Udin Boršt and a 500 meters zone round it. They have noticed characteristic differences in land use between individual natural geographic units in the past and in the present time.

Because of washy soils and dissected relief the conglomerate terrace of Udin Boršt is less favourable for farming than the lower one. Consequently Udin Boršt has been mainly covered by forest until the present. In spite of human intervention in the Udin Boršt (hunting, forestry, etc.) only the forest structure has been changed but fortunately not completely cut out. On the contrary forest of the surrounding plains had been cut down already far in the past. Grassland, fields and settlements had replaced it.

The present situation of land use of the studied area is above all a consequence of quick industrial development, urbanisation and modernisation of agriculture in the period after the Second World War and after the Slovene independence. Forest and agricultural area have been highly reduced due to settlement, industry and traffic.

The area of the Udin Boršt conglomerate terrace is for the most part covered by forest that today has a mainly recreational function. On the southern part settlements such as Kokrica and Mlaka and traffic of local and national importance are more and more intensely indenting forest area of the Udin Boršt. On the west new parts of the settlements of Cegelnica and Žiganja vas rose as the consequences of urbanization. Cultivable land is only situated on the fertile flat land of the gravel terraces that originate from the last Ice Age.

There are clumpy or wayside settlements with a characteristic division of the land in lines (ILEŠIČ, 1950). In the present farms are oriented in intensive production. On the fields and in the orchards usually only one crop prevails. Potato, wheat, barley, oats, pears and apples are mainly grown.

Researching present situation of land use of the Udin Boršt and 500 meters surrounding area it was ascertained that forest covers 58%, cultivable land 30% and urban area covers 11% of total area (RABA KMETIJSKIH ZEMLJIŠČ, 2002). Enclosed map of the Udin Boršt and surrounding area shows expansion, location and dimension of the fundamental land categories (fields, orchards, meadows, forests, overgrown land, urban area and others) in the present.

THE CHARACTERISTICS OF SETTLEMENTS OF UDIN BORŠT AND ITS SURROUNDINGS

MITJA PRELOVŠEK & NATAŠA RAVBAR

The Pleistocene conglomerate terrace Udin Boršt with acid soils and many microrelief landforms has never been attractive to people. Much more suitable land lies in the neighbourhood on the younger terrace with plain surface and more fertile soils. This is the main reason that settlements are placed around Udin Boršt and that conglomerate terrace remained forested and uninhabited.

The only period, in which people built settlements, was the Iron Age. At that time people lived in some sort of villages named "gradišče". Settlements were fortified with mounds and ditches, around them were placed fields and pastures. The reason that they colonized Udin Boršt was military. The settlements on hills were much less vulnerable against attacks than others in the plain.

In the time of the Roman empire the military risk was reduced and it was possible to move to lower, more fertile Würm terrace. Settlements were placed to the lower part of the terrace slope. This location is more adapted due to contact with fields on the lower side and the forest on the upper site of a village. With medieval colonization the number of settlements and

cultivated area on the lower terrace grew, while higher Udin Boršt has been covered by forest. In the preindustrial times this wooded area was used for economical purpose.

In the second half of the 20th century the influence of the urban center Kranj strongly increased. The Southern and southwestern part of Udin Boršt has become the suburban belt of the city Kranj. In some settlements, the number of inhabitants has grown by 100 and more percent. Such settlements are Tenetiše, Senično, Strahinj, Zgornje Duplje, Žiganja vas, Mlaka, Kokrica and Naklo. As can be seen from newly built houses today, this trend is still present and seems set to continue in the future.

The settlements around the southern part of Udin Boršt are strongly influenced by Kranj. 43 % of inhabitants in the 500 m belt around Udin Boršt work in Kranj, others are working mainly in Tržič, Naklo and Golnik. As can be seen from signs along the streets, some of population has their own enterprises. More than a half of population around Udin Boršt is employed in the service sector. Only 2 % of this population is farmers, which are mainly oriented to the public market.

Nowadays Udin Boršt is still covered with forest, but the function of the forest has changed considerably. Tenčić (2003) states 12 present functions of Udin Boršt: woodcutting, collecting forest fruits, hunting, hydrologic, climatic, hygienic/sanitary, biotopical, the function of nature and cultural monument preservation, recreational, research, aesthetic and educational. For those people who do not own land, Udin Boršt is a suitable place for recreation and relaxation.

TOPONYMY

Andrej Kranjc

The international term karst derives from the name of the limestone plateau Kras in the recharge area of the Trieste Bay getting its name from its distinctive dry, rocky, bare surface. The name includes the pre-Indo-European stem *kar/gar, kara/gara*, meaning stone (Rostaing, 1974). The rock composed of cemented pebbles is called conglomerate and the Slovene popular expression is ”labóra“. And what does Udin Boršt mean? Boršt is a folk name for the German word Forst (forest). Udin is an abbreviation of ”Vojvodin“ for ”Duke-owned“ (after the owner his grace the Duke Charles, 1564-1590). On the maps there are names connected with geological setting: Glina (a clay) and Pečice (after *peč, pečina* – a rock); the names related to boggy land and wet soil are: Beli log (a white grove), Ribjek (a fish pond) and V bajerju (in a pond). In Udin Boršt the name related to nature is Brezje (a birch tree). Three names are connected with water: Mlaka (a puddle), Pivka (a small seasonal lake or sinking place) and Žeje (a thirst). The village name Naklo is maybe related to a sinkhole pond. Zadraga village is named either after the valley or the Draga stream. Duplje village is named after caves nearby: dupa, duplo, duplja, duplina meaning a hollow or a cavity. Strahinj village is maybe named after the word strohol, strohola – a hollow trunk. In Udin Boršt there are generally known names for speleological objects such as shaft, cave, hollow. Usually the name of the owner is added (Arh, Arneš, Dacar, Kadunc), thus Arneš’s Cave. Some names are related to location, such as Jama v Arhovem partu (the cave in the Arh plot). Slightly different are: Dopulnek (maybe related to a hollow trunk - *duplo)*, Lebinca (anthroponym Ljub- or Ljubin-) and Pekel (the hell).