

Caves

Author: 17 years old

Idea of essay

My essay is about caves and karst areas. I deal with our work at the JZD, environment and importance of this topics.

Places

Moravian Karst is the biggest karst area in the Czech republic and it is situated on the south of the country.

JZD (in Czech, it is an abbreviation meaning “Agricultural cooperative”) is a cave, where we work. The cave is located in Moravian karst, near the town Blansko.

I was looking forward to this event for a long time. A month before I learned that we are going to take a mysterious expedition to the Moravian karst and that we will have the possibility to creep through a land which hasn't been researched yet. I was 11 years old at that time and the image of me getting to the depth of the Earth was filling me with enthusiasm. I had all packed, my knees weren't very stable under my rucksack, but the undying longing of discovering something was growing with every kilometre of the way. I had no idea what will be the impact of this to me. Will it be a good one or a bad one? At that moment, I couldn't even think about the idea that caves and everything that goes with it will tug at my heartstrings. When I'm looking back, all I can say is just “It is beautiful.” And where I was going to?

I was tired, but happy. All dirty from the mud, I sat down on the ground and I was warming my cold body in the sun. I didn't care about where I am sitting, why blood is pouring from my knee, simply I wasn't aware of anything and I was just thinking, that only few moment ago I was pulling buckets of heavy mud from our cave. The cave which we are hollowing is called “JZD” (in Czech, it is an abbreviation meaning “Agricultural cooperative”) and it is owned by a speleological “corporation” called Myotis, which manages a big part of the Moravian karst. So-called JZD is a small cave near the village Vilemovice, where our speleological organization has its headquarters. The entrance is in a place, where you wouldn't expect it – behind an agricultural complex, so you can't see there any nature, maybe just nettles and grass along the sink. The entrance is vertical and it is supported by concrete rings until 15 metres underground, deeper there is only natural cave. In total, the cave is around 200 metres long and we can find here a lot of cramped places but also quite large spaces, decorated with wall sinters and little dripstones - spaghetti stalactites. The cave is still getting deeper except for some chimneys which are blind and on their very end some water is pouring – it is probably settling from the near fields and soaks back into the ground. At the time I was eleven, we were shooting the rock and digging the sand and mud, which has been aggrading here due to a

river stream. I was told, that if I had found a dome, which should be somewhere by the river, I would get a big plush mole. Unfortunately I haven't found any, so I didn't get the toy.

Today, I'm 17 years old and we are still working on the same cave. We have made a big progress; the cave has been made bigger for about 30 metres. It is interesting to see, how the nearby changes around our cave. In 2008 the ceiling fell and we had to dig all the ground. We found a new aisle thanks to the river that has been disappearing here. We decided to start digging it and today, it has 5 metres and still goes on. However, the job goes slowly. People, who come here to help, have speleology only as a hobby. There isn't enough money too and enough equipment as well for this research, but we can say this about every speleological research.

Right now, you could say: "Wait, why does he pull the mud from the hole, which doesn't have to lead anywhere? He must be crazy." In some way, I'm crazy, for sure, but there is a chance. The chance keeps us moving further and refills our powers. We have the chance of finding at least a little cave, which will lead us to bigger domes, which will be so beautiful, breathtaking. That is a dream of every speleologist.

Do you also know the importance of caves? I'm sure you all do, but I would like to tell you something about it. The biggest importance, at least for me, is the drinking water. In most karst areas, there is water, which can be categorised to surface water and groundwater and they affect each other. However, the water cycle in karst areas is more complicated than anywhere else. Somewhere the stream fall down and then it suddenly appears fast and it is spewing on very surprising places. We distinguish 3 zones in karsts where the water can be found. *"The upper zone is dry; it can be characterized by transporting the rain and surface water to lower zones, the vertical streaming predominates here totally from the karst surface to the groundwater surface."* The water penetrates from here to lower levels by soaking or trickling down through joints. And that is the problem. People don't realise, what's the influence of this water for the lower levels. One of the factors that influence the surface water is agriculture. On the surface which is very dry here, there is a type of soil called rendzina - a soil on calcareous substrate. In the past people made here fields, which are being cultivated to this day. It wasn't a problem earlier, because synthetic fertilisers with high amount of nitrogen weren't used, however today some farmers use them a lot and they don't care about the environment. Only one heavy rain and all the fertiliser penetrates to lower levels and can't be filtered well. And when this polluted water gets to the 3rd zone, I will talk about it later; a large amount of water is degraded. If this is repeated, it can cause pollution of all the water – it will be non-drinking. To prevent this, grass has been planted on many karst fields. That is not the only solution, though. Sure we could use fertilisers environment-friendlier, they are more expensive, but they also decompose faster. Another part of problems is spraying, especially pesticide spraying. Not only that they pollute water, but they can affect people health too. It is necessary to use these substances very rarely, with balance sheet and if it is possible, to don't use them at all.

"The transferring zone is characterized by an intensive horizontal and vertical water movement." This zone can be seen most times in caves. It's not only the streams and rivers

flowing through the cave system, but also the water trickling from the 1st zone. The water level fluctuates here a lot; it depends on precipitation. The problems here are floods. They bring a lot of garbage from cities and villages and this pollutes caves.

“The lowest zone can be characterized as permanently flooded area by groundwater.” It can be divided into two parts. I will focus on the subzone of very difficult circulation now. As the name says, there is almost no circulation of water here. That means it is a stable source of water, which is deep underground but it can be used for drinking thanks to the natural filtration which can't be imitated, nor even with today's technologies. This water is very important for keeping the water cycle in nature. These water reservoirs could be useful to the Earth's population, when the majority of freshwater will be depleted. Nowadays water from karsts is being used mainly in areas where it doesn't rain regularly. This water is extracted by wells, adits, drill holes etc. and is used as drinking water source. However, it is necessary to avoid overusing this source.

Agriculture is for people very important. In karst areas there is often fertile soil extremely rich for different kinds of nutrients. That means it can be very well used for intensive plant growing. The disadvantage of the soil is the very well permeability – the soil is very dry. This leads to watering and fertilising which I wrote previously about. Some types of plains are used for pastoralism (livestock farming for meat and milk). In less developed countries however, there is predomination of mineral extraction – those are very common in karsts. Mostly it is limestone, gravel and dolomite. New quarries are opened together with new cement works and limekilns.

A big problem is development on the surface of a karst. Earlier, we had been building only smaller buildings which didn't burden the environment so much. During the years, the settlements have been growing and the requirements for the nature have been getting bigger and bigger (more water extracting, more forest logging, regulating water streams). These changes affected the surface a lot. Overusing these sources led to sinking, landslides or land subsidence. It is very important though to estimate well the karstification of rocks to prevent these processes.

A cave is a very fragile ecosystem. Microorganisms living there in water are adapted for certain environment and they hardly tolerate any type of pollution. They can be used as pollution indicators. We can find here also mammals that are finding here a shelter and housing. I would mention bats here. There aren't any in our cave, but just few kilometres away there is a cave, which is a wintering area of lesser horseshoe bats. Why should we care about them? As every animal, they have their position in the food chain and every species is exceptional. “When we are talking about protecting the underground karst fauna, it should be based on the nature protecting law. Underground fauna is, scientifically, one of the most valuable parts of living nature.” If they are being woken up during the hibernation, they die soon. It is very important to abide the no entry rule to their wintering areas during hibernation. There are some plants too, but they aren't indigenous usually. They are brought here thanks to vectors (animals, people). Green films of non-vascular plants on dripstones are results of

presence of nutrients (nitrogen from synthetic fertilisers etc.) and light (in accessible caves there is a light source from spotlights), that means that we should use special lights nowadays.

Another important phenomenon in cave complexes is the occurrence of flora and fauna's remnants. For thousands years, shell (mostly from gastropods) preservation has been running in limestone. However most of these fossils are being found outside the cave or entirely in their entrance, due to erosion in the cave system and the fossil creation. We can find here relics of Pleistocene beasts (e.g. lion, hyena, cave bear), which have been hiding here mostly during cold periods. The caves are archaeological sites with relics of humans, their tools or arts. This way, we learn a lot about our ancestors, about their way of life. However, these remnants are often being found devalued by impact of nature or human. Unfortunately, finders usually don't break only the relics, but also the whole cave – mostly in cases with amateur finders. When we pick up some artefacts, we need expert from archaeology and from natural sciences too, so we prevent damaging the whole system. *“Specific researching methods are customized for the specific locality character...”* The most common archaeological relics are tools and potteries. These discoveries help to date the layers where they were lying. Furthermore there are discoveries of cave arts, cave entrance modifications, fireplaces, graves etc.

I'm sure you understood the importance of exploring the karst areas. One man can't solve all the problems, but he can point them out. The society needs to know about this and it has to care about this. The request is big, but it is realizable – to be more environmentally-friendly. I don't have illusions, people won't start right now behave in way they won't be damaging the environment. Maybe few generations later a turnover could happen. That's the reason why I think we should start to learn kids about these problems in schools. Our cave, “JZD” is one of many. There is still a chance that thanks to our work something big will be discovered. That chance is not big, but it is still there. Above all we do this for ourselves. Who wouldn't like to look at dewy dripstones, to hear the silence, to breathe fresh air? Especially nowadays, when everything is faster and faster and hurry is a daily routine. To stop, look around myself, sit down for a while and have a break. And you ask if we mind all the hard toil? We relax during it and kick out our emotions.