CANYONS and CAVES of SAFRANBOLU

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ABSTRACT

Safranbolu, which has 6 separate canyons within a distance of 15 km's from east to west, has a geological importance even only with that special nature. There are two different geological formations in the area; Safranbolu Formation, which can be seen in large areas towards east, covering the Safranbolu village. This formation, begins with conglomerate at the bottom, having carbonated sandstone to the upper parts, then switches to sandy limestone and limestone on the upper parts. Limestone is mostly white to light grey in color and pebbled. The other geological formation; namely Sunduk, reaches to the area and canyons by mass flow from higher grounds and contains grey colored massive limestones. Bulak and Hızar caves, two long and important caves of the region are in that second geological formation.

After several explorations in that area during the last 2 years, our club found, explored and mapped 18 new caves. We also have at least same number of new cave notices from the same area. Within that poster presentation, region's geology and geomorphology will be explained in details and, in addition to that, all the new caves and the previously explored Bulak and Hızar caves will be evaluated.

GEOLOGY OF THE AREA

Resifal limestones of the area that had been worked which extents towards noth and east of Safranbolu Village belongs to three different geological formations.

First of those formations named ***Ulus Formation (Ku)*** begins just from the north of Safranbolu Village and extents towards northeast, contains sediments like mudstone, marn and limestone, partially broken with turbidite sediments as sandy limestone and conglomerate. The pieces of sandstone in this stack contains mostly limestone, quartzite and coal pieces. Those coal pieces must be carried from Carboniferous coals.

Due to tectonic deformation and underwater mass flow, it is not possible to calculate the thickness of Lower Cretaceous Ulus Formation (Ku), but it is believed to be more than 2.000 meters.

Another limestone formation, which covers the whole area including Saricicek Mountain at the north of Safranbolu village and Bulak and Hizar caves named as ***Sunduk Member (Kus)***. The grey, thick and solid limestones of that formation springed from Inalti Formation and moved into Ulus Formation by a mass flow. Like Ulus Formation, its age is also Lower Cretaceous.

Safranbolu Formation (Tes) covers Safranbolu village and can be seen in large areas towards east. Formation begins with a thin conglomerate-sandstone at the bottom, continues with carbonated sandstone, sandy limestone and limestone towards the top. Its Eocene limestones are mostly yellowish-white with concretions. Duzce and Sircali canyons and all the caves around those canyons are within that formation.

TECTONIC

The northwestern extend of the study area is bordered by Lower Cretaceous aged Ulus Formation. The mid and eastern sections contains Cenozoic depositions. The region has been subject to orogenic movements in geological time, causing foldings. Area began rising during Miocene and became a land during Paleozoic.

Structures in the Karabük-Safranbolu Cenozoic Basin are on an east-west axis. More distinctive synclines, narrow anticlines, directions of the folds are all showing compression forces of north-south direction. As a result of that compression, Ulus Formation pushed on top of Cenozoic depressions by an east-west fault direction.

The most important fault of the area is Karabuk Reverse Fault with a NE-SW direction. Jurassic limestones came over Cretaceous and Cenozoic limestones along the fault line. Deep fault structures formed within this main and its minor faults.

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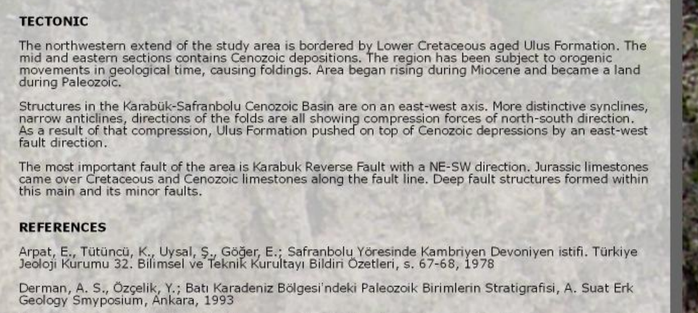
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PREVIOUS CAVE EXPLORATIONS

BULAK CAVE
Although this important cave was initially explored by BÜMAK (Boğaziçi University Caving Club) all the way to the two sumps in 1975-1977, the first map was drawn by Trent Polytechnic in 1978. French caver and diver David Wolozan and his team dived through 5 sumps to establish the connection from the cave to the main water resurgence. The upstream sump was also penetrated, adding 1.5 km to the known length of the cave, making the total length 5.250 m, 4. longest of Turkey.

HIZAR CAVE
This cave was also surveyed by the English club Trent Polytechnic in 1978. The map, of approximately 250 m long, and the documentation on this important cave is of poor quality.

NEW EXPLORATIONS

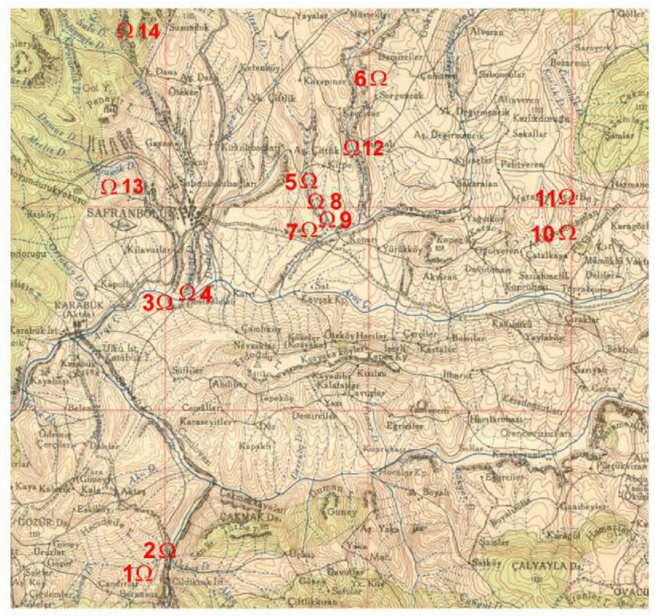
Safranbolu was only a nice, small village which we had continously visit during our various caving trips from Istanbul to east. Though the north of the village is calcerous, there was no information about the caves of the area except Bulak and Hizar which were found and explored 30 years ago.

Then, after receiving the first information by 2009, we began working around Safranbolu and the first thing that we noticed was the canyons. Everywhere was full of canyons. Some of them was 5-6 kms long and even one of them passes from the middle of the village. In an area of 15x15 kms there were 6 canyons. Also astonishingly, the area and the canyons were all limestone and full of caves!

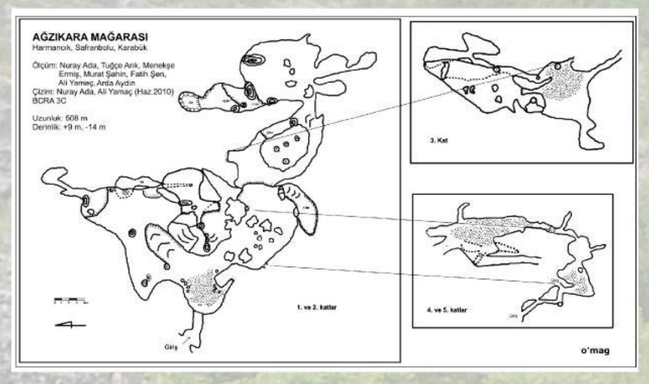
Within 2 years and 6 visits we had found, explored and measured 18 new caves with a total length of more than 3.000 meters. Apart from all those there are still unexplored areas and caves.

CAVES FOUND

İNÖNÜ CAVE	812 m
100. YIL CAVE	803 m
YARASAİNİ CAVE	559 m
AĞZIKARA CAVE	508 m
KIZILİN CAVE	152 m
CİLDİKISIK CAVE	100 m
AKCASU CAVE	89 m
YAÇI 1 CAVE	37 m
DEĞİRMENİNİ 4 CAVE	22 m
SAMANİNİ CAVE	20 m
100. YIL CAVE 2	19 m
ÖRÜMCEKLİ CAVE	15 m
DEĞİRMENİNİ 5 CAVE	13 m
ÇOBAN İNİ CAVE	11 m
DEĞİRMENİNİ 6 CAVE	6 m
DEĞİRMENİNİ 1 CAVE	-
DEĞİRMENİNİ 2 CAVE	-
DEĞİRMENİNİ 3 CAVE	-



1 Cildikısık	6 Kızılin	11 Örümcekli
2 Çoban	7 Samanini	12 Akcaşu
3 100. Yıl	8 Değirmenini 1,2 ve 3	13 Bulak
4 100. Yıl 2	9 Değirmenini 4,5 ve 6	14 Hızar
5 Yarasaini	10 Ağzıkara	

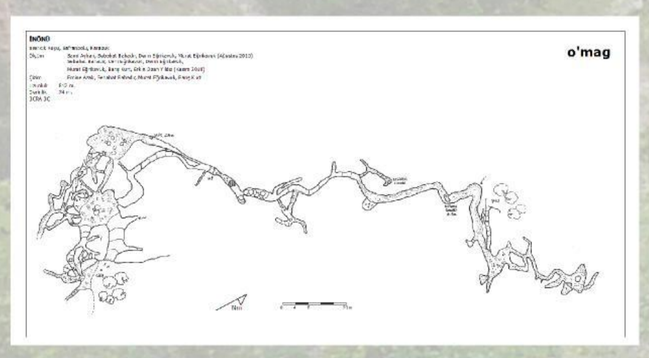


AĞZIKARA CAVE
A 1.5 hour trek is required to reach the entrance of this cave, which is located on the wall of a canyon stretching southwest of the Harmancık Village in Safranbolu. The limestone formation here is quite different from the other valleys and canyons of Safranbolu. Although the east-west axis of the cave is less then 80 meters, total length reaches 508 meters due to five levels of passages. Several locations are well decorated with formations. The lower levels of the eastern section especially contains several stalacmites and stalagmites. Another interesting aspect of this cave is the large amount of acheological material, despite its remote location from any settlements. The lowest levels especially contain large amounts of broken pottery.



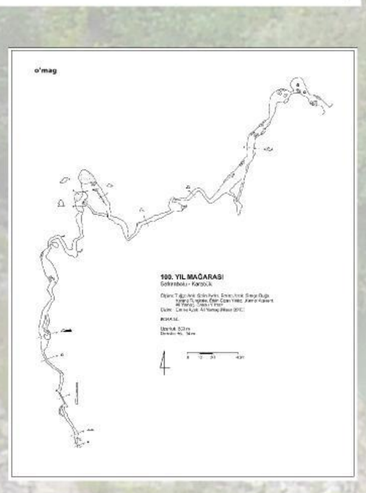
İNÖNÜ CAVE

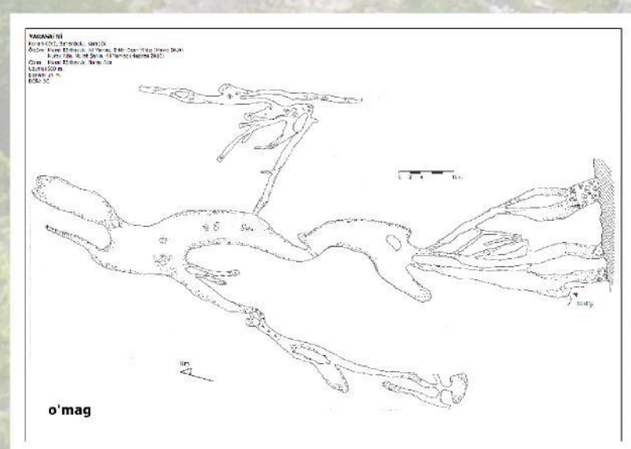
In the whole Bartın-Karabük-Safranbolu region, the geological unit, known as the Bürnük Formation surfaces only in a small 3 km² area east of the Orencik Village. This formation contains, in parts, limestone and dolomite in addition to conglomerate. Estimated to be at least 200 m deep, the Bürnük Formation is dated to Jurassic based on the fossils recovered from the upper layers, although both the evolution and dating is subject to debate. Located in this formation, the Inönü Cave exhibits a similar amount of variety. The two large entrances, now suspended, formed in limestone and were probably active waterways in the earlier evolution of the cave. The current streamcut a new entrance completely in conglomerate, 6 meters away. The conglomerate here is comprised of varying dimensions and largely volcanic origin pebbles. Conglomerate and limestone are observable simultaneously in the large hall at the cave entrance. The northwestern part is fully conglomerate, while the fossil gallery continuing to the northeast is limestone. The stream visible on the left side of the hall meanders throgh the rocks, breaking them apart. A second and smaller hall beyond is completely limestone and decorated with stalactites and stalgmites. The stream reaches this second hall, but disappears under it immediately. From the continuing fossil gallery, the water flowing 14-16 m below is visible (but unreachable) in locations. These suspended galleries are all in limestone, where as the water path below is probably conglomerate.





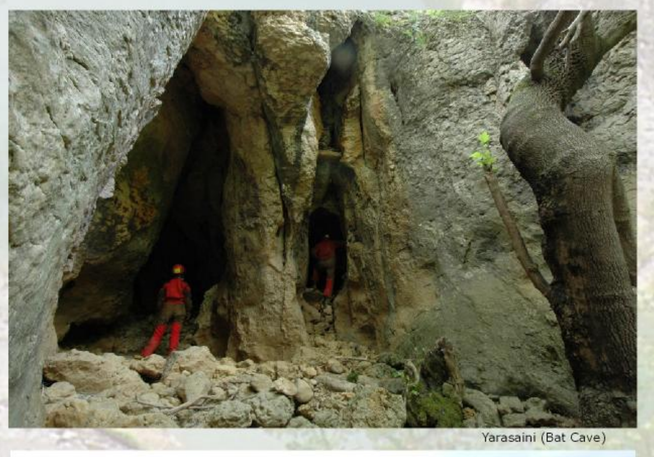
Yarasaini (Bat Cave)





100. YIL CAVE
The cave lies under a park and chilren's playground in Karabük, next to residential buildings. It is a single 803 meter long gallery extending to the west. Although the canyon containing the cave entrance was formed with concretions, the cave lies completely in solid limestone, partially with small pieced conglomerate. The cave is completely fossil, except meager seeping at a few isolated points. One 35 meter long passage 700 meters into the cave is a fault block, formed through tectonic activity, with 16 meters ceiling height and 70 cm wide.

YARASAİNİ (BAT CAVE)
Located north of Konarı Village and on the western wall of the Konarı Canyon, this cave has five seperate entrances, one as a chimney. In May and June the entrances were a good 4 meters above the water level of the river, but the large number of tree trunks and branches in the galleries are signs of the rising water levels at other periods. Also known as the "Cüzzamlılar Cave", one branch of this cave descends almost to the river water level. This part is quite wet with a muddy floor. In other areas, large populations of bats are present.



Yarasaini (Bat Cave)



Duzce Canyon

Photo: Emine Azak