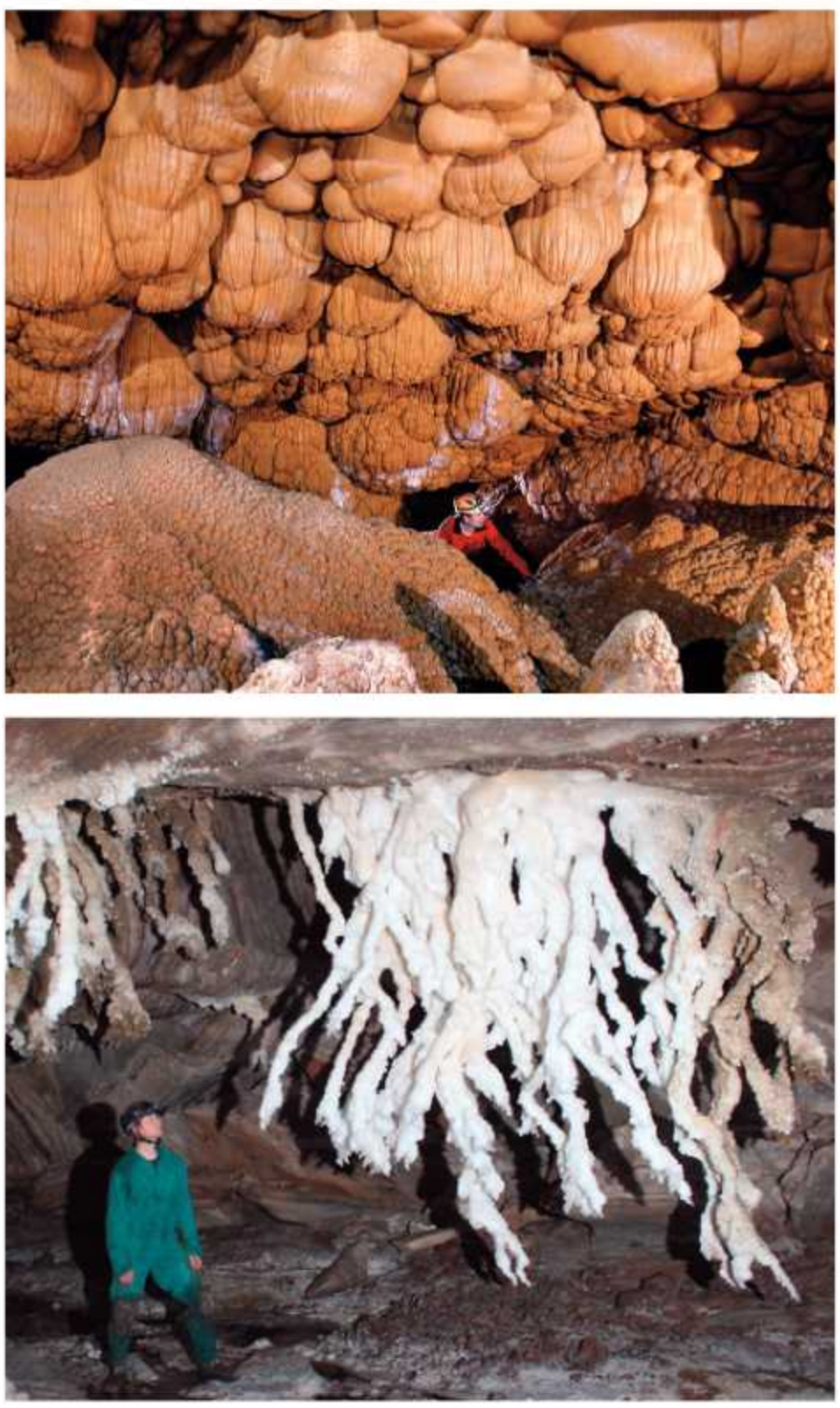
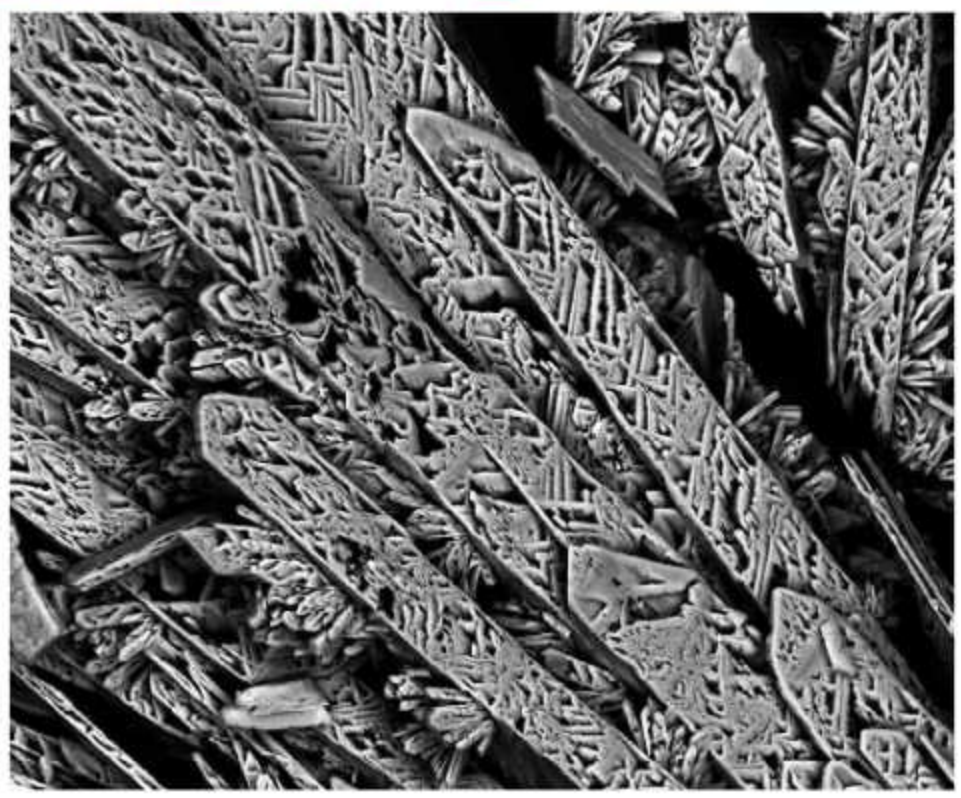
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WHERE HISTORY MEETS FUTURE

KES MOUNTAIN SINKHOLE (KAHRAMANMARAS– SOUTHEASTERN TURKEY)

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As OBRUK Cave Research Group, we've been exploring Kes Mountain Sinkhole since four years. The sinkhole is 65 km north of Kahramanmaraş in southeastern Turkey, high on the mountains at the east of Tekir Village. It is believed that the waters that enter the underground aquifer from that cave, which is at 1900 meters of altitude, pass through the Yesilgoz Doline, at 900 meters altitude. Total distance between the doline and sinkhole is roughly 4,000 meters. During the first expedition in 2009, our team dived in Yesilgoz and found the underwater entrance of the cave. In addition, we explored Kes Mountain Sinkhole for the first time. By 2010, it was understood that the pit which begins at -175 meters continues as a single drop of 170 m. Moreover, at that point the cave's structural formation has an immense alteration; suddenly the huge galleries of the cave changed to a very narrow and endlessly long and deep fault fissure. By July 2011, after OBRUK's third exploration at Keş Mountain Sinkhole, the total depth of the cave reached to -650 meters, being fifth deepest cave of Turkey. Finally, by July 2012 we had reached a siphon at -728 meters. Unfortunately, connection with Yesilgoz resurge couldn't be proved. So, a dye test, not only at Kes Sinkhole, bu also in 3 different sinkholes in the same area is planned for next year.

1. Introduction

Kes Mountain Sinkhole is located at an altitude of about 1800 meters on Keş Mountain, near Tekir Village, 65 km north of Kahramanmaraş city, southeastern Turkey.

As OBRUK Cave Research Group, we had been informed about the sinkhole by the Middle East Technical University Cave Diving Group (MADAG). During their reconnaissance dives to Yesilgoz Doline in the same area at 2008, villagers informed them that the water which springs from the bottom of that doline comes from a sinkhole on the top of the mountain.

Cave divers found two separate entrances at the bottom of that resurgence, roughly at 40 meters deep. But, unfortunately they were not able to penetrate due to the tightness of vertical passage.

Our exploration began at Kes Mountain Sinkhole the next year. In July 2009, with a small team of 6 cavers we found the entrance of the sinkhole, descended and surveyed down to -175 meters. After the first and second descents, Kes Mountain Sinkhole continues with an extraordinarily wide main gallery and high ceilings.

In certain parts, the width of the gallery reaches 20 meters and the height is more than 30 meters. Although Kes Mountain Sinkhole is an underground aquifer of not one, but two small rivers, this main entrance is almost dry during the summer season and those dimensions are extremely large even for the largest and deepest sinkholes of Turkey. A very limited amount of water was trickling into the main gallery from small branches at a depth of -125 meters, beyond which point, there was a small but constant stream.

At -175 meters, the geological formation of the cave suddenly changed. At that point the width of the main gallery narrowed down to 5 meters, with a seemingly infinite drop. In addition to the depth, it was impossible to see the ceiling and forward of the gallery. The water bed was apparently dropping straight into a huge fault plane.



Fig. 1: Kes Mountain Sinkhole, Yesilgoz Doline and the area in general

During the second year's trip, after descending to -300 meters we still hadn't reached the bottom of that pit.

July 2011 marked the exploration's third year. Spending 15 days with a stronger team of 20 cavers, we first reached the bottom of that large pit and set up an underground camp at -345 meters. A two-wire phone connection from that point to the surface camp was also established.

At Day 10 of the exploration, members of OBRUK Cave Research Group reached -650 meters. Cave was still continuing with a cascade of small descents. As we had done previously, nearly 1000 meters of rope and telephone lines were packed and left in suitable places of the cave for next years' exploration.

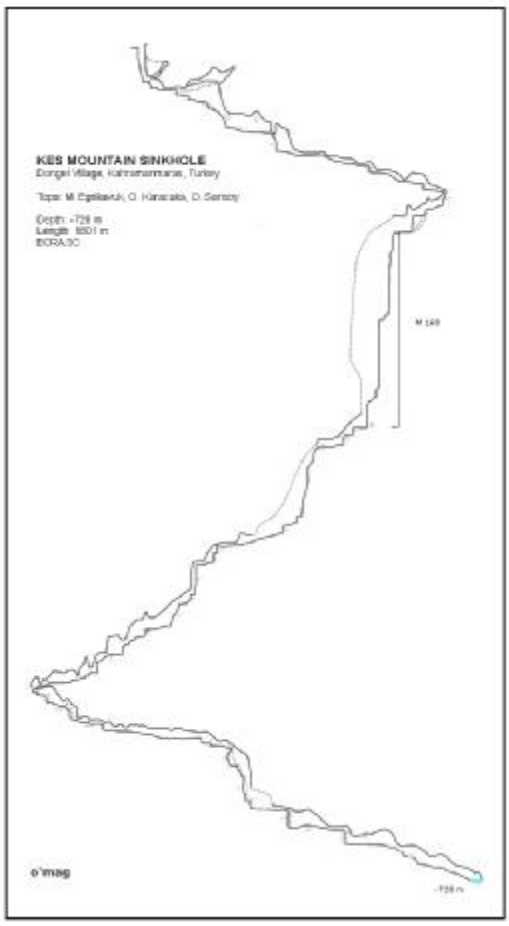


Fig 2: Kes Mountain Sinkhole

By July 2012, our fourth year began in Kes Mountain Sinkhole. 18 members of OBRUK, in addition to 8 Lebanese and 2 Iranian cavers, explored the cave for 15 days. Around -650 meters depth, geological formation of the cave changed again and it became obvious that Kes Sinkhole will not join with Yesilgoz resurge. Sinkhole; which began with large passages, slowly changed to small, narrow maeanders and descending as spiral passages, rather than covering the distance towards Yesilgoz Doline. Though, for the first time till this depth, we had contacted with a continuous water flow, compare to doline it still has a little water. And, after few more small descends, sinkhole ended with a small lake and a siphon at -728 meters.

2. Geology

At least five different geological formations can be observed around Tekir Village. These are mostly deep sea sediments and they were in a continuous action within the tectonic movements and overthrust foldings of surrounding area. The area, which lies completely in an orogenic phase, has two main structural differences from east to west. Although all are mostly limestones, there are huge age differences between those formations.

East and southeast part of Tekir village is mostly a single formation. This geological unity, which also includes Yeşilgoz Doline and Dongel caves, is mostly light colored, reefal limestone with corals and foraminifera. There are two different opinions about the period of that formation; either Middle or Upper Miocene.

Within the north east of that unity lies Kes Mountain Formation. It covers the whole area from Kes Mountain towards Kaman Mountain, to the north; with mostly dark gray or gray, re-crystallized and sometimes dolomitizated limestones dated as Permian.

3. Comments on Exploration

Limestones of Taurus Mountains at southern Turkey has some very deep caves and it is obvious that, in the future, many deeper caves will also be explored in those mountain ranges.

The five deepest caves of Turkey for the time being are:

Peynirlikonu Sinkhole (Içel)	-1429m
Kuzgun Sinkhole (Nigde)	-1400m
Cukurpinar Sinkhole (Içel)	-1196m
Kuyukule Sinkhole (Isparta)	-832m
Kes Mountain Sinkhole (K. Maras)	-728m

But, apart from being the fifth deepest, Kes Mountain Sinkhole has some different aspects among others. First of all, it is the easternmost cave on that list. Even if we do not consider the first five, but the first ten deepest caves of Turkey, it is still the easternmost of them all.

Secondly, it is the first "deep cave" of Kahramanmaras, which has a limestone area of more than 5.000 km^2 , mostly within the altitudes of 1.800 – 2.500 meters. Apart from its natural beauty, we strongly believe that this area has an enormous cave potential.

4. Kes Mountain Sinkhole – Yesilgoz Doline Connection

The rumor that the water which sinks at Kes Mountain Sinkhole resurges from Yesilgoz Doline was the main reason of our exploration in that sinkhole. All the villagers told us that 24 hours after it begins raining at Kes Mountain, the water of the doline becomes muddy, even though its not raining in the lower parts. Also, it is said that during May and April one can hear the sound of running water under the ground at the farmed fields above Yesilgoz Doline.

But, after four years of exploration, we are still far from proving that connection. Entrance of Keş Mountain

Sinkhole is at 1900 meters altitude and Yeşilgoz Doline is at 900 meters. Apart from that 1000 meters of depth difference, horizontal distance between the two caves is around 4 km. But after descending nearly 70% of that total estimated depth at Kes Mountain Sinkhole, its horizontal extension is still not more than 300 meters.

Also, the amount of water resurgence from Yesilgoz Doline and the amount of water flow at the deepest parts of sinkhole are incomparably different. When water output is 6-8 m^3 at the doline, the water flow in the sinkhole is not more than 0,5 m^3.

But, numerous other sinkholes and karstic aquifers around the vicinity of Kes Mountain Sinkhole and Yesilgoz Doline are the evidences of a huge underground water system. So, the water which springs from that doline can be sinking to underground elsewhere. Next year a comprehensive dye test will be carried not only at Kes Sinkhole but, within the 3 additional sinkholes of the same area.

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