DEEP 23 (Dara Expedition for Exploration and Protection)

FULL EXPEDITION REPORT

Overview

The Deep 23 expedition comprised a team totalling 16 cavers from Lebanon, Canada, USA, Armenia, Poland and United Kingdom. The team was based in Broumana, north Beirut in Lebanon.

The DEEP23 expedition took place from mid-August through to early September of 2023.

Objectives

The expedition targeted Fouar Dara Sinkhole, the deepest cave in Lebanon (depth estimated between 612 and 622 m) located within the eastern Mediterranean coastal mountain range. The cave is cold (6-7ºC), wet, and physically demanding.

The expedition had two main objectives:

1. To protect Dara Sinkhole, which is under threat from quarrying and construction of new roads and houses, through documentation, surveying, detailed inventory of the cave's biology, collecting samples of calcite speleotherms, photos and filming. This is important as the cave is known to be linked hydrologically to springs along the coast that supply drinking water to the capital, Beirut. To document the cave to make a case for its protection to local communities, municipalities, and the government, this included photography and filming over the course of the expedition, and photogrammetry of selected sections of the cave. In particular, photogrammetric data was taken from the cave entrance to the bottom of the longest shaft (120 m pitch) (this was the first application of this technique in a Lebanese cave). We additionally compiled a detailed inventory of the cave's biology, which should contain a diverse fauna given its location in the Levant area which is the mixing hub between Asia, Africa, and Europe. No biological surveys are known from any cave in Lebanon. Finally, for the survey objective, we collected samples of calcite speleothems from the cave, which will allow determination of the timeline of the cave's development and fill the gap for a paleoclimate assessment and better understanding of climate change in the area.

2. Support and work together with the local caving community, both financially and through education and improved connections with international cavers. All equipment used and in good condition was left with the local caving community which is experiencing severe financial difficulties due to the dire economic crisis in Lebanon.

Minor objectives included prospecting in the area around the Fara Dara Sinkhole and exploring Mgharet el Kasarat, one of the resurgence caves for Fara Dara, where the Beirut River provides a significant water supply for Beirut.

Participants

Name	Nationality
Issam Bou Jaoude (Leader)	Lebanese / Canadian
Wael Karanouh	Lebanese
Samir Akil	Lebanese
Emma Porter	British
Mike Clayton	British
Firas Fayad	British
John Helm	British
Bartek Biela	Polish
Paulina Biela	Polish
Justin Roosenmaallen	Canadian
Erin Lynch	American
Michael Moffitt	American
Knutt Peterson	American
Minori Yoshida	American
Alex Seaton	British
Khajag Nazarian	Armenian

Financial Budget

Travel costs: £20,712.00

Subsistence: £4,764.00

Equipment: £2,500.00 (note: this excludes the provision of majority of rope, as personally supplied by team members)

Expedition Summary

The rigging of Fouar Dara began on 10 August 2023 by the Lebanese cavers, before the overseas cavers arrived on 18 or 19 August 2023. The large number of pitches in the cave resulted in many bags of rope and hardware required to be carried into the cave. Close to the entrance is a 120m shaft. This was split into 9 pitches to allow multiple cavers to descend or ascend at the same time and reduce the time spent waiting for a free rope. The problem was that the shaft used a significant amount of rope and hardware.

Due to the surface temperatures during the day, the aim was to enter the cave before 8am. The temperature inside the cave, once below Camp 0 (approx. -240m) was cool and similar to British cave temperatures. Once below Camp 0, the cave became wetter, with some deep pools to traverse or wade through. The use of thermals, undersuit and oversuit were required from -240m onwards. Some cavers opted for thin wetsuits under their oversuits for the deeper section of the cave.

Although the cave had been rigged previously, it was necessary to re-bolt some pitches and install new spits due to damage caused by the annual winter water levels. The annual winter water levels must also carry a large amount of rubbish, as plastics and even four tyres were located in the main streamway at -610m.

120m shaft (photo: B. Biela)

By the official start date for the expedition, the cave was already rigged to -240m. The rest of the cave was rigged by various team members on;

21 August 2023: -240m to -350m (team 1) and -350m to -460m (team 2)

Ascending from Camp 1 (photo: B. Biela)

23 August 2023: -460m to -610m

Whilst the rigging was taking place, some team members started the photogrammetry from the entrance to the head of the - 120m shaft. The raw data was to be processed when back in the United States, where suitable computing power is available.

Once the cave was rigged to the bottom, a team went down to install some traps (mop heads) to capture cave organisms in the streamway at -610m (24 August 2023).

On the 23 August 2023, two team members walked up the adjacent river valley and up onto the hill above Dara. They found two possible cave entrances but both were choked with mud infill. The locations were recorded on a GPS, for future investigation.

Entrance A GPS reading: 36-S-07628723754563

Entrance B GPS reading: 36-S-0762902375446144

(photos: E. Porter & M. Clayton)

Due to illness and injuries (one being a fall of 3m resulting in a Lebanese caver sustaining a back injury) within the team, the number of cavers capable of reaching the bottom of the cave was

diminished. This reduced the scope of exploration in the cave. However, the leads that were seen were later found to have been pushed to their limit on previous expeditions.

As we were running out of time for this expedition, there was a final trip to the bottom of the cave on the 27 August 2023 to recover the traps from the streamway and attempt to catch some organisms from the streamway with catch nets. On the way down, some traps made from the bases of water bottles were sunk into the silt at camps 1 and 2, to be recovered on subsequent de-rigging trips over the following days. In this trip, the cave was de-rigged from the bottom up to camp 2 and the bags of rope carried out to camp 1.

Ascending towards camp 0 (photo: B. Biela)

From this time, some team members had to depart back to the States or Canada, which reduced the number of active cavers to complete the de-rigging.

Between 28 and 31 August 2023, the cave was de-rigged. The final days were spent cleaning and inspecting the equipment. The ropes and carabiners were to remain in Lebanon and gifted to the local caving community to help continue the development the sport caving in the country. As all equipment needs to be imported, the cost of caving equipment is very high in relation to average earnings.

At the end of the expedition, the biological samples were delivered to Dr Mounir Said at the American University of Beirut for analysis. We await the results to see if any novel species were found at depth.

De-rigging the 120m shaft (photo: B Biela)

Summary

Exploration in Dara remains a challenge. The 120m pitch near the entrance, the distance and nature of the cave with the amount of equipment required, means that any expedition is a significant undertaking.

Future expeditions to Lebanon will depend on the political situation within the country and the surrounding area. During the expedition, the Foreign, Commonwealth & Development Office (FCDO) restricted access to some parts of the country and soon after our return to the UK, the FCDO advised against all travel to Lebanon.

Most of the team (photo: I. Bou Jaoude)

Acknowledgments

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De-rigging the entrance series (photo: E. Porter)