

SPELEOLOGICAL EXPEDITION

LION 2013



The logo features a stylized black and white illustration of a lion's head with a mustache and a headband. A red caving rope is attached to the lion's head, leading to a caving helmet with the text 'LOC 21' on it. The helmet is positioned over a small hole in the ground.



ΣΠΗΛΑΓΟΛΟΓΙΚΟ ΕΛΛΗΝΙΚΟ ΑΘΛΗΤΙΚΟ ΣΕΛΑΣ
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**ΑΠΟΣΤΟΛΗ
ΣΕΛΑΣ 2013**
11-25 ΑΥΓΟΥΣΤΟΥ
LOC21, ΤΡΥΠΑ ΤΟΥ ΛΙΟΝΤΑΡΙΟΥ
ΛΕΥΚΑ ΟΡΗ, ΚΡΗΤΗ

ΔΙΟΡΓΑΝΩΣΗ
 

ΜΕ ΤΗΝ ΥΠΟΣΤΗΡΙΞΗ ΤΩΝ
 

ΧΟΡΗΓΟΣ ΜΕΤΑΦΟΡΑΣ


SELAS Caving Club (of Athens)

In co-operation with EOS Hania Club(Hania, Crete)
and the support of POA Mountaineering Club (Athens)

CRETE, GREECE
AUGUST 2013

EuroSpeleo Projects FSE



Sponsored by



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Synopsis

This year's expedition to what is currently the second deepest cave in Greece, the "Hole of the Lion" (-1,1,110m) on the White Mountains massif of the Hania Prefecture of Crete took place with the participation and cooperation of the two clubs: Speleological team of the Mountaineering Club of Hania (E.O.S. Hanion) and the P.O.A. Mountaineering and Climbing Club. Cavers from a number of other clubs also participated, such as Proteas, Theseas, SP.O.K., SP.EL.E.O. and from the Hellenic Speleological Society. This expedition was the first Euro Speleo Project to be implemented in our country by a Greek club. The support of the F.S.E. resulted in the expedition being granted equipment of a great value which was used during the expedition and also remains for future expedition use. The expedition was also supported by P.O.A. financially and by S.EL.A.S. also, which provided the balance of equipment necessary for the expedition. The unflinching support of the Speleological team of the Mountaineering Club of Hania in a number of fields was also instrumental in the expedition's success.

As always, this expedition of S.EL.A.S. had its innovative aspects, something unavoidable when so many different ways of thinking, coming from different backgrounds, converge on finding solutions to the same problems. The most notable of this year's innovations was the installation of collapsible water tanks in the cave LO23 (Keramos) to allow an expedition to operate in August when the source of water in the cave runs dry.

There were three preparatory expeditions, the main eleven day expedition and one wrap-up expedition (these are the actions with a larger duration than 3 days). There were also many weekend trips also, mainly involving cavers from the Speleological team of the Mountaineering Club of Hania who contributed greatly to the collection of water. The larger expeditions are recounted below:

- The 1st ran from May 6 to May 13 under the leadership of Thomas Ditsas and the participation of 13 other cavers. This pre-expedition was very fundamental in organizing the base camp, it further placed the first water tank in LO23 and rigging commenced on the Lion, reaching -280m.
- The 2nd ran from June 29 until July 2 under the leadership of Nikos Charitos from P.O.A. and involved six other cavers. The team made important corrections to the rigging but also observed the destruction of the water tanks in LO23 and the loss of stored water. The team took steps to rectify the loss.
- The third ran from July 12 to 16 with Kostas Adamopoulos and Panos Georgopoulos from P.O.A. With three more cavers participating. This team continued to rig the cave, reaching -400m. In addition, a further 150 litres of water were collected bringing the reserve water volume to 800 litres. In addition, the expedition identified four new unknown cave entrances (in the area above the base camp, at about 1900m altitude). In addition, the entrance of LO16 was properly recorded. LO16 had been explored in 1982 and is known to be a potential source of water. Of the new entrances, one was explored to a depth of 10m.
- The main expedition ran from 11 to 22 August, with the participation of 20 cavers from four countries (Greece-France-Poland-Romania). To the above number we are not counting cavers from local clubs that visited us for a weekend or a long weekend. The cave was rigged to -500m where a bivouac was established with a capacity for 2 people to overnight. Exploration and survey work was focused on the upstream leg of the collector and reached more than 500m of new passage. This new section goes towards the South. The exploration stopped at a waterfall of 8m height which could be climbed if there was more time available and has been left for a future expedition.
- De-rigging was carried out during a three-day post-expedition which ran from 5 to 7 October with the participation of six cavers. During this post-expedition, the hydrological sensor positioned at -500m for the purpose of recording temperature, pressure and waterflow during the year was moved into a more suitable position, 50cm below the present surface of the water. Part of the equipment remained in the cave to facilitate a return in 2014 for the collection of sensors and continuation of the exploration.

In addition, given that the expedition contained researchers amongst the participants, who were able to initiate research due to the fact that the cave had been rigged. Specifically, five Radon detectors were placed for measuring radiation from Radon gas by S.EL.A.S. member Yiannis Kaisas of the Democritus Institute. In addition, three sensors for measuring temperature and pressure were placed in the cave at -50m, at -460m and at -485m. The sensors will record data every 30 minutes over the course of a year and will be retrieved next year during our next expedition. The sensors were brought to us from the Polytechnic of Crete at Hania by the Academic Daniel Moraitis who took part in the first pre-expedition and the main expedition also. He advised on the placement of the sensors within the cave. Dr. Moraitis, Christos Pennos (a doctoral candidate in the field of Geology) and the geologist George Sotiriadis (president of Proteas and a member of the expedition) made many observations of the area around the basecamp and the cave itself. A joint conclusion of their collaboration is the existence in the past of a glacier in the area which may well be linked to the Lion and its speleogenesis.

The expedition was supported by:



European Federation of Speleology
(through the Eurospeleo projects initiative)



Hellenic Federation of Speleology

The expedition travelled with:



The expedition used caving gear of the following brands:



Participants

In total there were **20 full members** of the expedition (excluding Cavers from E.O.S. Hania that helped us the most during the expedition and will be listed separately). As shown below there were 2 cavers from France, 1 from Poland, 1 from Romania and 16 from Greece that responded to our call for participation and finally joined us in the mountain. In the below list we do not include the members of the Pre and post expedition which are listed separately (in majority the same with the below persons – all from Greece)

The manpower of the main expedition by day and by nation is shown below:

Name / Surname Country		Expeditions Members by day																		
		7/8/13	8/8/13	9/8/13	10/8/13	11/8/13	12/8/13	13/8/13	14/8/13	15/8/13	16/8/13	17/8/13	18/8/13	19/8/13	20/8/13	21/8/13	22/8/13	23/8/13	24/8/13	25/8/13
Alain Soubirane	France																			
Alexander Le Fevre	France																			
Kostas Adamopoulos	Greece																			
Apostolos Kourtis	Greece																			
Magdalena Wrona	Poland																			
Panos Georgopoulos	Greece																			
Giannis Georgiadis	Greece																			
Michalis Tsopelas	Greece																			
Thomas Ditsas	Greece																			
Dimitris Mpourdas	Greece																			
Giorgos Sotiriadis	Greece																			
Chris Pennos	Greece																			
Miltos Hasialis	Greece																			
John Kaisas	Greece																			
Panagiotis Georgiou	Greece																			
Xenia Georgopoulou	Greece																			
Alexandros Mariolis	Greece																			
Stelios Zacharias	Greece																			
Dana Chachula	Romania																			
Margarita Kanellidou	Greece																			
Efsaia Vardoulakis	Greece																			

In general, the manpower for the various missions may be seen in the table below:

No.	Country	Contacts Names	Email	Pre-exp 1	Pre-exp 2	Pre-exp 3	Exp	Post exp
1	Greece	Kostas Adamopoulos	caspex73@gmail.com	x		x	x	x
2	Greece	Michalis Tsopelas	mtsopelas@hotmail.com	x			x	x
3	Greece	Alexandros Margiolis	amargiolis@yahoo.gr	x		x	x	x
4	Greece	Apostolos Kourtis	trelos50@yahoo.gr			x	x	
5	Greece	Panos Georgopoulos	panos.georgopoulos@gmail.com	x		x	x	x
6	Greece	Thomas Ditsas	geomscapes@gmail.com	x			x	
7	Greece	Dimitris Mpourdas	dbourdas@hotmail.com	x			x	
8	Greece	Giorgos Sotiriadis	geosotiriadis@yahoo.gr				x	
9	Greece	Chris Pennos	pennos4@hotmail.com				x	
10	Greece	Miltos Hasialis	miltosxasia@yahoo.gr	x			x	
11	Greece	John Kaisas	ikaisas@gmail.com	x			x	
12	Greece	Panagiotis Georgiou	georgpa@gmail.com	x			x	
13	Greece	Xenia Georgopoulou	georgopx@yahoo.com	x			x	
14	Greece	Stelios Zacharias	stelios.zacharias@selas.org				x	
15	Greece	Margarita Kanellidou	mkanell@yahoo.gr				x	
16	Greece	Efsaia Vardoulaki	efsai@yahoo.com				x	x

17	Greece	Tellis Dilindas	adilintas@gmail.com	x			x
18	Poland	Magdalena Wrona	brodzia@gmail.com				x
19	France	Alain Soubirane	alain.soubirane@ingenico.com				x
20	France	Alexandre Le Fevre	tle.fevre@wanadoo.fr				x
21	Romania	Oana Chachula	oana_chachula@yahoo.com				x
22	Greece	Maria Stathaki	stathaki_m@yahoo.gr		x		x
23	Greece	Roë Sergentani	roisergentani>windowolive.com				x
24	Greece	Katerina Hobitaki	hobit8@yahoo.com				x
25	Greece	Nikos Charitos	dh-arch@otenet.gr		x		
26	Greece	Giannis Haritakis	sportchania@gmail.com		x		
27	Greece	Daniel Moraitis	damoraetis@squ.edu.om		x		
28	Greece	George Mazonakis	george@mazonakis.gr		x		
29	Greece	Nektarios Tellis	nektarios_t@yahoo.gr		x		
30	Greece	Giannis Papantonakis	johnpapant@hotmail.com		x		
31	Greece	Giannis Skondinakis	unavailable		x		
32	Greece	Andreas Apokoroniotakis	unavailable		x		
33	Greece	Stavros Aposporis	stavrosaposporis@gmail.com			x	
34	Greece	Elias Kazais	elias.kazais@selas.org				x
35	Greece	Komninos Boutaras	komni_b@yahoo.com				x
36	Greece	George Kasoumis	cromlech3@hotmail.com				x

Logistical support for manoeuvres was provided by Alexandros and George Mazonakis of EOS Hanion on Crete. Logistical support was also provided in Athens by Kostas Iatrou, Apollon Oikonomopoulos, Aggeliki Balliou of SELAS Caving Club.

Members of E.O.S. Hania and other local clubs :

The Local Mountaineering club (E.O.S. Hanion) contributed the most to the success of the expedition) by offering outmost support before, during and after the expedition. The club participated with the following members in the expedition most of whom stayed in the camp for a weekend or a long weekend:

George Mazonakis,
Katerina Hobitaki,
Maria Stathaki
Roë Sergentani

And many other people that helped out with the water during weekend.
EOS Hanion people, You are Great!

Grigoris Anastasopoulos and Korina from SPOK joined us for 4 days! Thank you!
Daniel Moraitis was part of the first pre-expedition and he also came to train us on the installation of the temperature & pressure sensors (loggers). We plan to return next year and collect the sensors and deliver these very valuable data to the Polytechnic University of Crete and to Daniel for further research and study.



Governance and Objectives

Coordinating committee: Kostas Adamopoulos, Alex Margiolis, Mike Tsoelas (S.E.L.A.S), Panos Georgopoulos (P.O.A, cave rescue)

Fundamental objectives:

A) Safety - Emphasis on prevention and avoidance of any accident during the expedition (explorations matter less: we will not allow any compromise on safety at all times)

B) Respect – Respect of the caves that we will explore and the environment (no rubbish – no alterations) and respect for each other!

Objectives:

Continuation of the explorations of “Lion” cave (-1110m)

- The “Lion” is the 2nd deepest cave in Greece (-1110m deep, 2.5 km long) but still has potential for new passages to be found.
- Exploration to the left of the river (moving upstream against the water flow) at -480m and in a few other points.
- Investigation of the possibility to connect the Lion with the cave “LOC81” or with "Gourgouthakas" (the deepest cave in Greece at -1,208m with an entrance very close to the Lion)
- To install equipment for the collection of hydrological data (equipment was made available by the polytechnic University of Crete) (at -485m).
- To install Radon sensors to measure radiation levels.
- Precise sampling of calcite deposits in order to date them using U/Th stable isotope dating techniques.

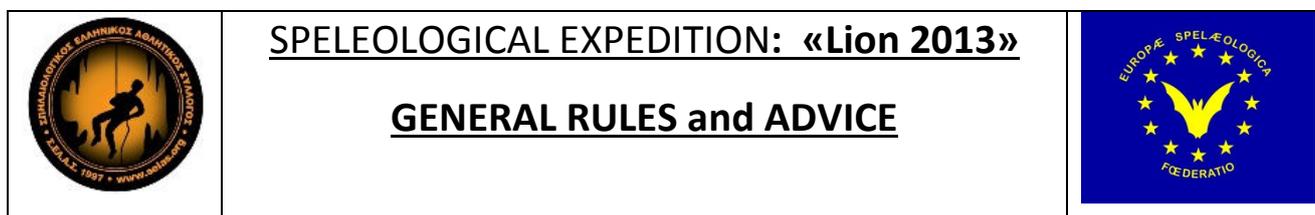
Financials

The financial of the expedition are listed below. Transportation costs for the members **are not included** but are estimated to exceed the amount of 3,000 Euro if we count all the 3 pre-expeditions, the post expedition, the main part and the travelling for the foreign cavers. Cost of the equipment used for rigging (offered by the S.E.L.A.S. caving club and E.O.S. Hanion) is also not included, nor is caving equipment offered / owned by the members of the expedition. This equipment returned to the clubs or the individuals who made it available.

		Actual figures	Budget
For calculation of per day costs	Expedition duration	11	14
	Members	24	26
Fixed costs	Power station	- €	250 €
	Consumable equipment (spit, rescue blankets, etc)	- 137 €	200 €
	Equipment (new rope)	- €	500 €
	Transfer of materiel	- €	- €
	Car rental on Crete	- €	300 €
	Rental of storage space	- €	150 €
	Car ferry tickets	- 130 €	200 €
	T-Shirts	- 370 €	- €
	Helicopter for movement of equipment	- €	2.500 €
	Water tanks	- 381 €	- €
Unforeseen	- €	- €	
Per day costs	Food	- 967 €	1.125 €
	Insurance	- 188 €	- €
	Fuel	- 96 €	100 €
	Carbon offset	- €	40 €
		-2.269 €	-5.365 €
Income	POA donation	150 €	
	Participant contributions	2.019 €	
	SELAS donation	100 €	
		2.269 €	
	Income less expenses	0 €	

Safety

For the safety and security of the expedition the following rules and recommendation were communicated to the members in advance:



IMPERATIVE RULES

1. Any team of cavers has to declare to the secretariat its planned time of departure, objective, and planned hour of return, and must come back to declare its exit.
2. In case of an unfavorable weather report, we might be obliged to forbid the descents to the cave beyond-400 m.

RECOMMENDATIONS TO BE FOLLOWED

- Enter the cave only if you are in very good health, and experienced in the techniques of alpine caving.
- Every caver must bring with him a rescue blanket, food, lighting, and means of heating in adequate quantity. Remember that the cave is cold (6 degrees Celsius) and wet.
- Moving in the cave will be done in groups of 3 or 2 people minimum, in particular when ropes are in use.
- In every group, some cavers must be able to help a member who may be in trouble on a rope.
- The rhythm of moving in the team, is the rhythm of the slowest.
- If you meet a team in trouble, it is essential to give assistance, even if it opposes your own objective.
- As a matter of courtesy, priority on ropes is given to those who go up (returning from lower parts of the cave)
- If your objective is the bottom, and if it takes you more than 2 hours to reach Camp 1 (-485m) please abort your trip and turn back
- The bivouac placed at -485 m is reserved for the teams which go up from the bottom
- Collect and take with you ALL your waste, and do not write on the walls of the cave.
- Indicate any defective equipment when you return: it will be quickly replaced.
- The area used as a campsite should be maintained clean, should not be altered and should be respected by all members.
- Be aware that electricity is limited.
- Mobile (cellular network) signal is available at campsite

DISCLAIMER: Everyone visiting caves during the Lion 2013 expedition is expected to behave in ways that are safe for him and for all other participants. It is also expected not to damage the caves or the land. The organisers of the expedition may ask participants to exit a cave, to leave the expedition or not to enter a cave, if they are acting in a way that threatens their safety or the safety of others or might damage the cave. Caving endeavours carry risks and dangers that may lead to fatal accidents. By participating in the Lion 2013 expedition you acknowledge these risks and you take responsibility for your own safety. Although the organizers have taken measures to ensure the safety of the team during Lion 2013 they cannot be hold accountable for your actions or choices during the expedition.

Water supply issues

Planning

While planning the expedition, keeping in mind that in August the spring in Keramos (LO23) does not provide water we made a calculation of the total expedition needs so as to make a plan to store water during the preparatory expeditions.

Water needs estimated during expedition preparation:

Number of participants:	25	People
Number of days:	10	Days
Daily water needs (drinking/cooking/washing) per person:	3.5	Litres
<hr/>		
Water needs for the whole expedition:	875	Litres

Goal:

To cover these needs we established as a goal to store water in collapsible water tanks in LO23. The water tanks put in place before the expedition have a total capacity of 1250 litres (2x 225 & 2x 400lt). If these are filled, the water should be sufficient for the duration of the expedition.

Alternative sources:

During the second preparatory expedition, water already gathered in the collapsible tanks was lost to spillage. The tanks were restored and refilled, but the capacity at the start of the expedition would only be 800 litres, with a minimum need of 875 litres. It was therefore necessary to plan for alternative sources of water. We estimated that the spring at LO23 would be able to give us about 200 litres yet. In addition it would be possible to carry water up from the spring at Hosses, 1.5 hours away, in trips of 15 litres. If every portage is 15 litres, only 10 trips would be necessary, meaning that one in three of the participants would need to make such a trip during the expedition.

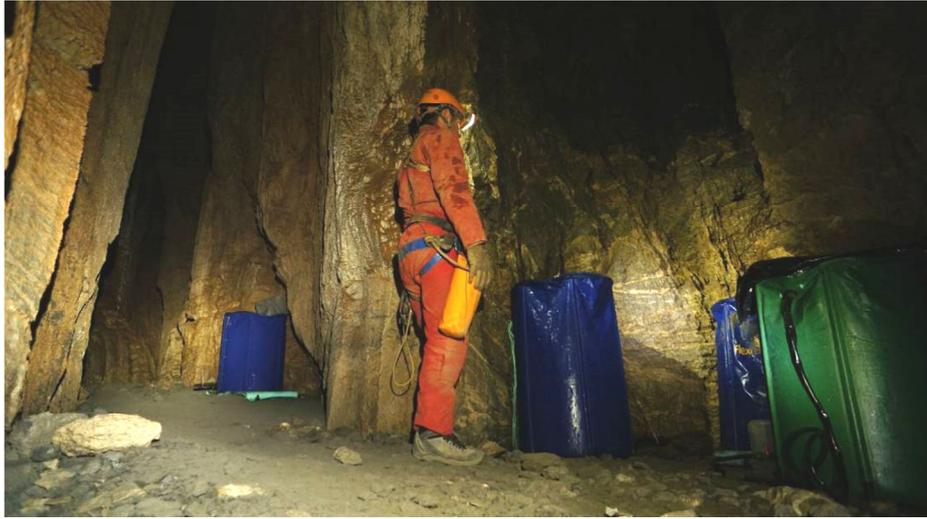
The contingency plan would allow the expedition to have available enough water, plus 30% extra in case of need:

LO23 storage:	800	Litres
Drawing of new water from the spring in LO23:	200	Litres
Carrying of water from Hosses:	150	Litres
	1,150	Litres

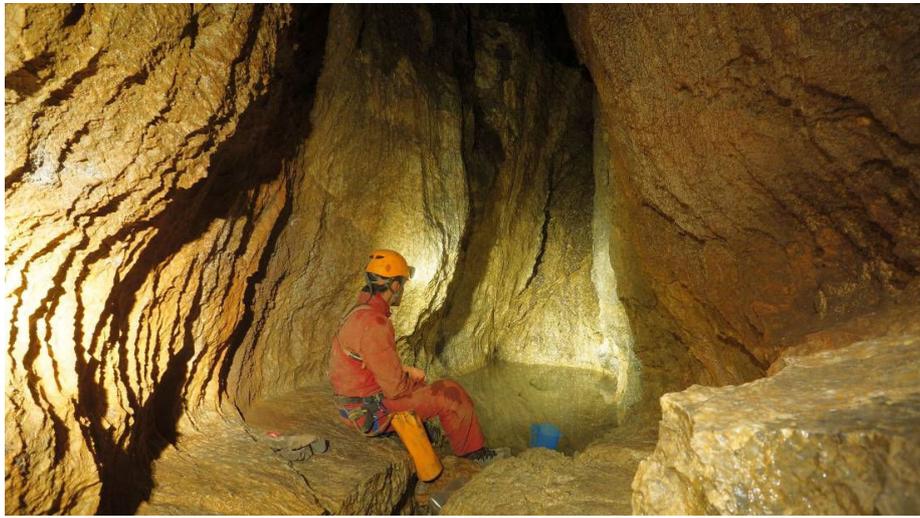
Central water storage – LO23 procedures

To draw water from the four collapsible water tanks at LO23, we prepared the following protocol. The materials needed are: water container for transfer, jug, funnel, coffee filters, antiseptic baby wipes. These were provided next to the tanks.

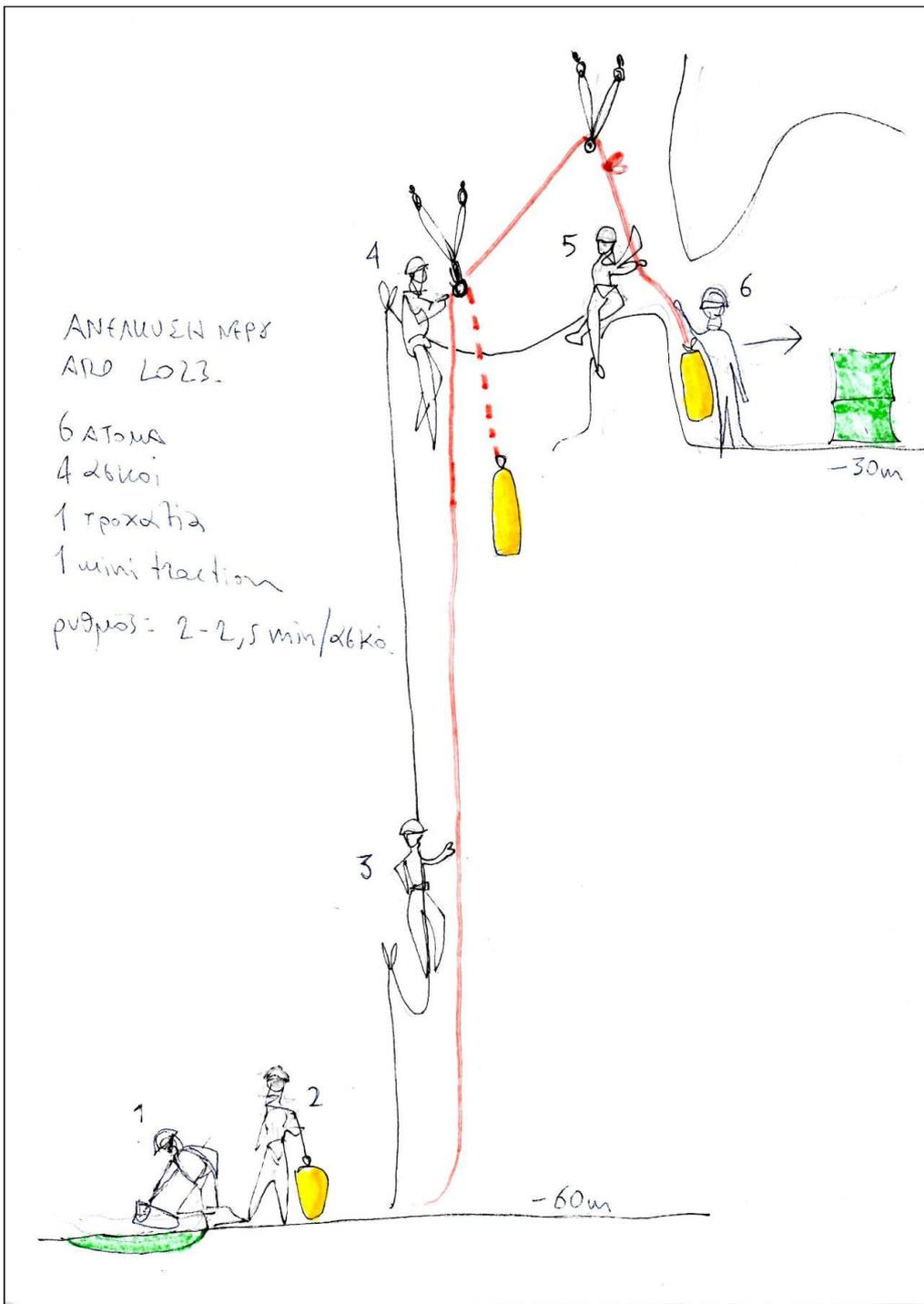
- Procedure:
- 1) clean hands on the baby wipes
 - 2) place a clean filter over the funnel
 - 3) transfer water with the jug to the funnel, which should be placed over the water container for transfer.
 - 4) care should be taken not to upset the water and not to spill it. Every drop is precious.



The four tanks in LO23



Collection of water from the gour in LO23

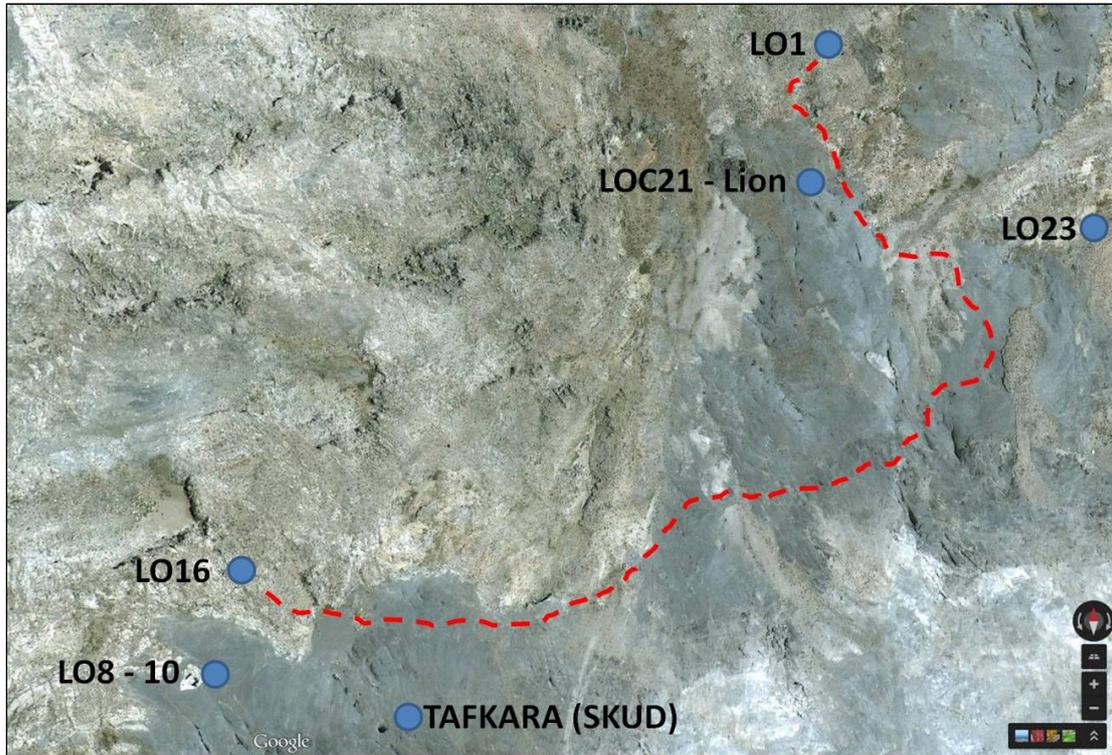


Process of raising the water from the gour at -60m to the tanks at -20m is illustrated above. The time needed to raise 150-200 litres when six people are involved lasts only a few hours. The illustration is by Nikos Haritos from P.O.A. and Hellenic Speleological Society.

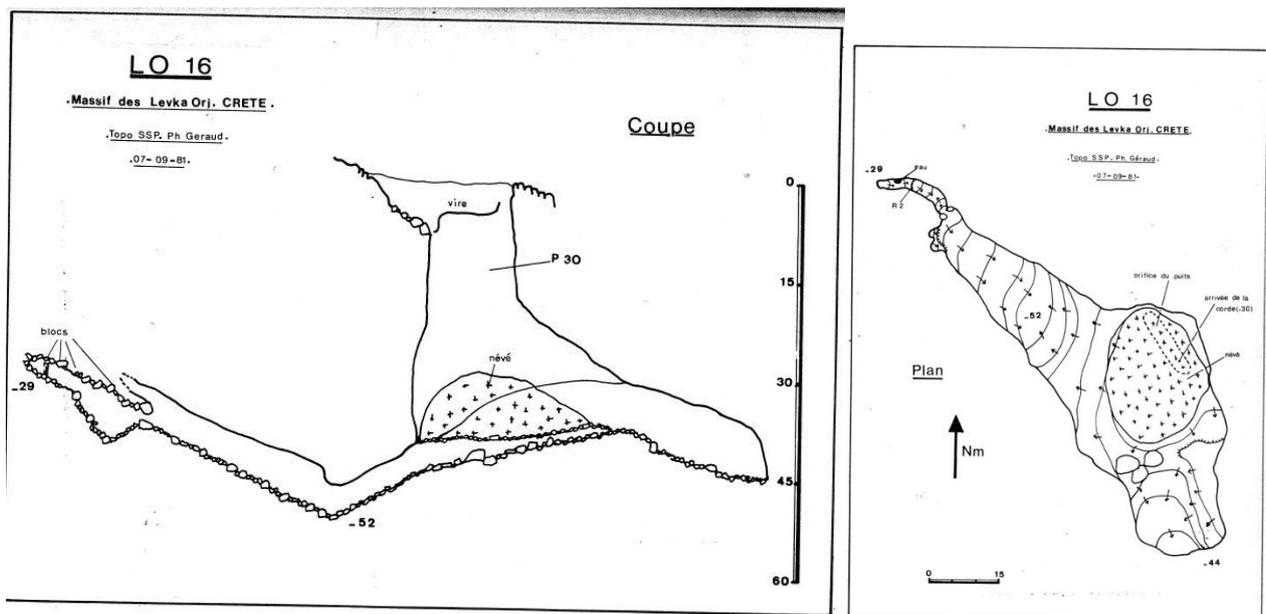
An overview of other potential sources (apart from LO23 and Hosses)

LO16 – untested

The cave LO16 lies at an altitude of 200m higher than basecamp and contains a snow plug and a water source. It is 52m deep and could provide water with a smaller time investment than the spring at Hosses. It is only 30 minutes away, **but it has not been tried and the capacity is unknown.**



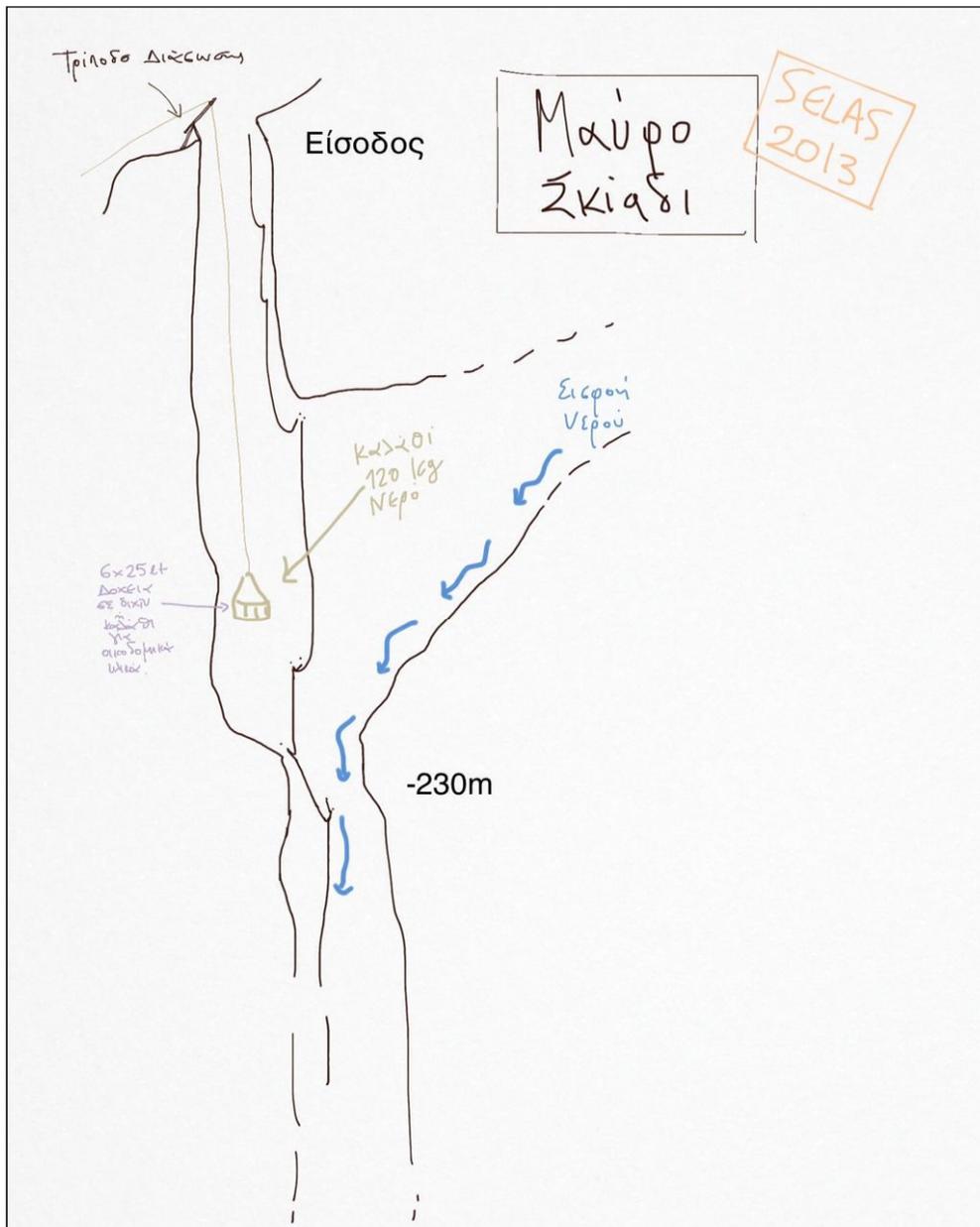
Route to LO16 overlaid with some other notable caves in the area



Survey of LO16 from the Plantaurel report of 1982

Mavro Skiadi (-342m) - untested

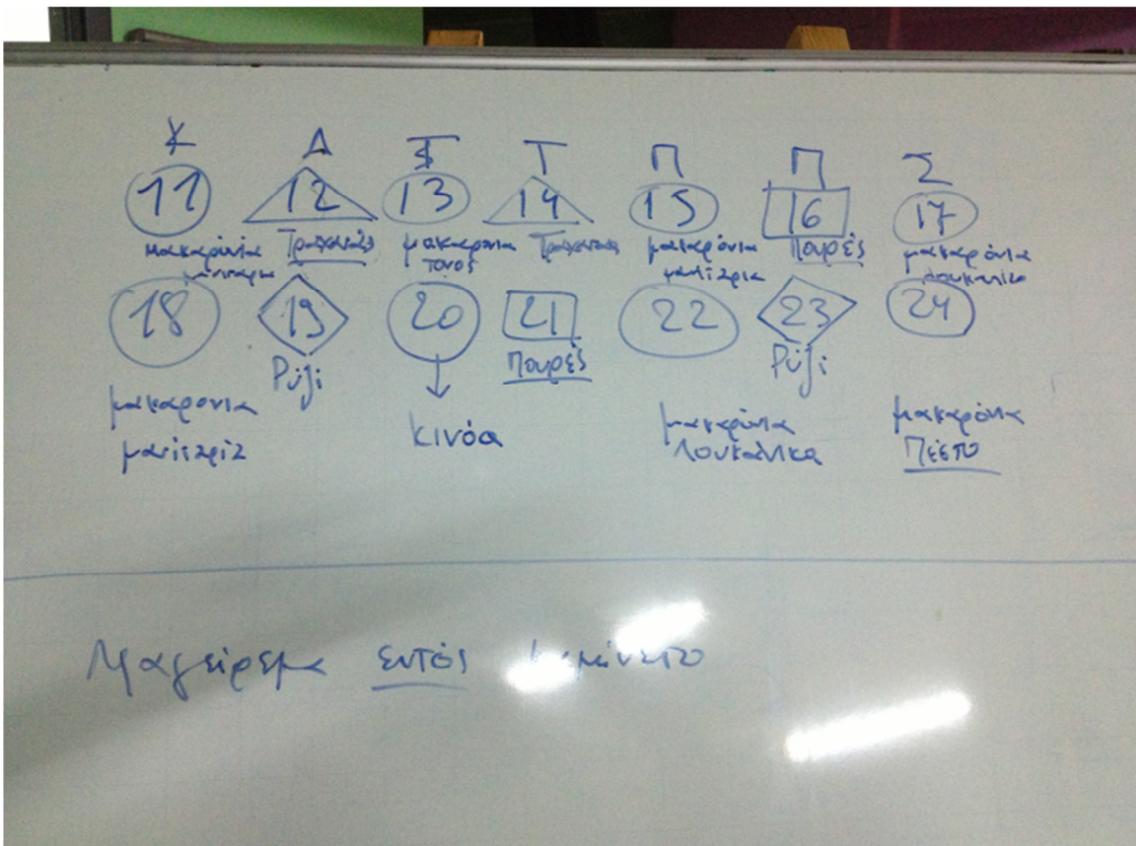
The Mavro Skiadi pothole (-342m) has a very large water flow between -130m and -230m depth which could in theory be utilized. The negative is the great depth and the difficulty to approach the entrance from basecamp.



Sketch showing potential method for drawing water from Mavro Skiadi drawn by Kostas Adamopoulos (using a rescue tripod to haul 6x25 litres jerry cans, filled so as to give a total weight of 120Kg)

Food and equipment:

The weight of the equipment and the food exceeded 800 kg. As we were unable to secure a helicopter, everything was carried by foot from the end of the dirt road to base camp (2.9km, 550m difference in altitude between dirt road and base camp). This was done through a number of portages spanning the whole duration of the expedition, with non-biodegradable waste being returned to civilization for proper disposal.



A carefully balanced diet was planned to reduce boredom but also ensure proper intake of calories and other significant dietary elements while also catering for the vegetarians in the team.

Diary of exploration

Kostas Adamopoulos until 16 August, then Stelios Zacharias (unless otherwise noted)

10-8-2013

George Mazonakis climbs to basecamp with Alain and Alexandre and two members of E.O.S. Hanion. In the night Thomas D., Dimitris B. and Michail T arrive with the morning boat from Athens. The first two start the climb by night with their personal equipment and Michail early in the morning of next day. The rest of the first wave make the climb on the afternoon of next day. We are carrying personal equipment and the Scenic's load of 360Kg of equipment and food.

11-8-2013

We meet Panagiotis Georgakakis at Vrysses together with Magda. Panagiotis is a biologist specializing in chiroptera. We make the climb with our personal equipment in 2:15. On the way up, we meet Thomas and Dimitris B who are on the way down to make a portage with communal equipment. A short rest, and then a trip to the Mavro Skiadi. George Mazonakis is in the Lion with one other of the E.O.S. Hanion team. Very little water has been brought out of LO23 by Alain and the others.

In the afternoon, nine of us come down from basecamp, (Panagiotis Georgakakis, who has to leave and Magda with us) with the intent to sleep at Hosses (1050m altitude). Panos Georgopoulos remains with Thomas, Michael, Alain and Alexandre. A little later the EOS team also descends.

12-8-2013

Panos Georgopoulos, Thomas and Michail enter the Lion for rigging with a goal to read the river. Alain, Alexandre and Dimitris enter for acclimatization to -220m. Six members of the team start the climb with 20-23 Kg each of food and equipment. Kostas and Apostolis go to Vrysses to buy water containers and other items. They then make the climb with a 50 Kg load, including the battery and the secretariat equipment.

Giannis and Magda undertake the cooking. The rest go for water. We fill all the bidons and at about 1 a.m. the rigging team exits the Lion, having reached the river!

13-8-2013

The 3rd day of the expedition. Panos Georgopoulos, Michail and Dimitris B. bring up a left over bag and other equipment. In meantime there are 3 teams inside the lion cave:

- Kostas and Giannis Kaisas carried the material needed for the bivouac by the river (-485m)
- Miltos & Giannis Georgiadis reached the depth of -210m for acclimatization
- Magda, Giorgos Sotiriadis and Christos Pennos reached the depth of -240m for acclimatization and left water and sweets at the hotspot.

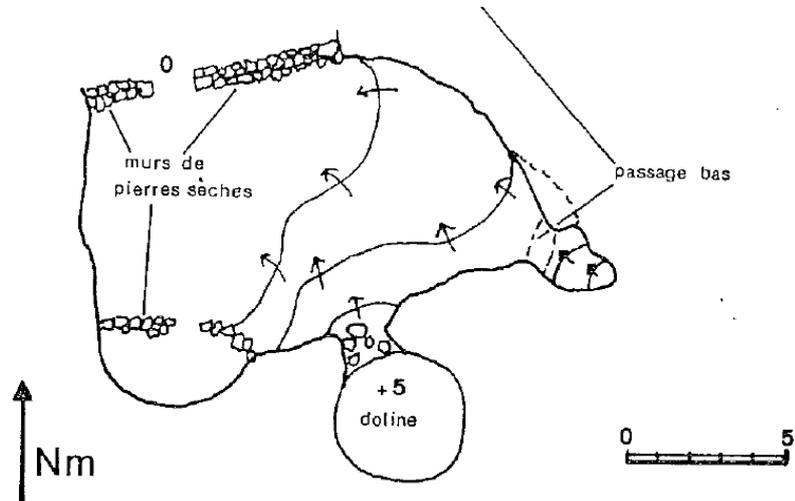
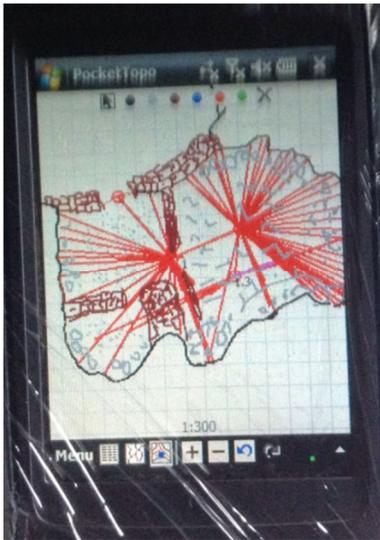
After its destruction following around twenty years of fatigue, Alain and Alexandre were responsible for bringing an artistic item to the expedition, a small installation which everybody can touch... We've got a new toilet! (the new installation, at right)



14-8-2013

3 teams in the lion:

- Alain & Alexandre install the camp at the river and prepare for the upstream exploration of the river (see below)
- Panos and Michail forward material to the camp (2 x 5mm neoprene trousers M & L size & 5 ropes 10m each)
- Miltos, Apostolis & Dimitris Bourdas enter for acclimatization (with a target to reach the river)



Thomas, Giorgos S. and Yiannis Geo brought 39lt of water to the base camp and also brought 4x13lt from the source gour to the water tanks. Kostas & Chris Pennos calibrate the two distox and as part of their calibration exercise they re-surveyed the base camp cave LO1 (above left pocket topo, above right the original survey from the 1981 expedition of Plantaurel).

The “French report” on the Exploration of 14th of August (first day at the collector)
(by Alain SOUBIRANE)

This day, we planned to go down to Lion “collecteur” in order to:

- find a good place to install the bivouac,
- find a way to past the first basin upstream because it seems deep.

We went down in 2 hours and 15 mn, I remember some passages but not all... I have forgotten since 2008 expedition. In the collecteur, first impression it is very windy, so we need to find a bivouac place with a wind protection. We go down to first rope emplacement. We don't want to install the bivouac after a rope. We go up and find a good place far up from the river, with flat stone. We work 2 hours to move stones and sand to do a flat surface adapted to 3 persons. Remark: the sand is very humid and spits are full off sand. We think that the bivouac can't be permanent. We think that, in spring the water can come on the place. Our 2 friends came after... We were eating. We go to the second objective ->upstream.

As Kostas said, it is not difficult to pass the first lake on the right. There is around 80cm of water. After the river runs on a beautiful gallery with blocs with some cascades and escalade. After 150m approximately, we see 2 affluent on the lefts. We decide to have a look.

The two affluent are two nice galleries. The first goes in a big room we can climb easily. It is big and 2 or 3 big escalades are visible. One seems not difficult to climb. The second one is mounting more and goes after 50m on a big escalade with water. The main upstream is easy to walk in. Little basins, escalades, rock are on the way. What is interesting is that the air flow is changing when we cross affluents, so it is important to explore everything. The “terminal lake” is reached, Alexandre thinks that is deep. He tries to pass in escalade. Unfortunately he falls into water: “PLOUF” after an amarrage breaks (it will be the “Lake of the

Plouf"). In fact the lake is 120 cm deep. We put a rope to traverse it faster and decide to push a little bit more in order to estimate the next obstacle. After 15-20m of the water, you turn right and follow a beautiful meander. It is height (15-20m or more) and black & white like some parts of the collector (before puits Kiphil (P70)).

Some small basins are on the way. We encounter so bigger parts (rooms) due to affluents or superior galleries to escalate. In general the width of the gallery is 1 or 1.2m. It's very nice to walk in it. We walk around 250m (I count my steps). We arrive in a mounting part and stop on an easy 4 m escalade. The wind of the gallery seems to be the same after. A rope is needed. We decide to go back, a nice "première" is on track!! On the crossing with arrival galleries from the surface, we see lots of lamps. We are around 10. We take some pictures with water. I am wet (I have fallen in the first basin!), Alexandre too...

We have to go up. After 4 hours, we are outside in the camp around "pasta & mushrooms party" explaining what we have found.

A good day!

15-8-2013

Two teams in the Lion, one team for water, one team making a portage from Vrysses and one team visiting the entrance of "Scud".

Lion: Kostas and Thomas descended first to explore further and survey the explored sections and overnight in the cave. Giorgos S. then entered with Magda to leave food at the bivouac and water at the hotspot at -240m. Thomas injured his arm and could not continue and so returned with Magda. Giorgos and Kostas continued the exploration going about 350m further than Alain and Alexandre. Two of the cascades were rigged as was a narrow section above water.

Giannis Georgiadis, Panos Georgopoulos, Dimitris Bourdas and Christos Pennos went for water, Miltos went to Vrysses with Apostolis and Giannis to make some purchases and then brought up the generator. Alain and Alexandre went to descend Scud (an entrance first recorded in 2008) but turned back unsuccessfully.

16-8-2013

Michail and Panos descended into the Lion to continue exploration. Alain and Alexandre left with Dimitris, Katerina, Roë, Maria, Panos Georgiou and Daniel who brought the sensors and left the same day. Daniel first made a geological excursion with Thomas, Magda, Christos P. and Roë. Panos Georgiou, Katerina and Maria made an acclimatization trip to -240m and forwarded more food and drink to the hotspot. In the afternoon Kostas exited with Giorgos Sotiriadis.

17-8-2013

Arrival of Stelios, Tellis, Alexandros, Margarita, Xenia and Oana from Athens. They are met by Alexandros from E.O.S. Hanion at Souda and by Panagiotis Georgiakakis at Melidoni, who helps again with the portage. The weather is rainy and overcast, perfect for making the ascent to basecamp. Giannis K., Giannis G. and Maria enter the lion to collect the Radon sensors and place pressure/temperature sensors. They are followed by Gregor and Korina, and then Thomas, Panos Georgiou, Christos and Roë enter the Lion for photography in the first pitch. Kostas, Magda, Katerina, Apostolis and Miltos set off for a portage to Hosses, the last two help the new arrivals with their ascent. No one overnights in the cave and the camp has its largest group and a celebratory meal.

18-8-2013

Early morning group-photo of the whole team, followed by departure of Thomas. Magda, Panos and Alexandros set off for an overnight and exploration / survey work in the collector which results in the surveying of all the newly explored passages and some investigation of waterfalls. At one such waterfall the exploration ended, for this year. At some points, the DistoX gives readings of more than 50m for the ceiling. Margarita, Stelios and Efsaia enter the lion for acclimatisation.

19-8-2013

Margarita enters with Katerina to go to the Frigo at -140m. Miltos sets off with Apostolis and Xenia with an aim to sleep at the bivouac and bring up the neoprene suits, preparing the bivouac for being dismantled. Miltos returns with Margarita after losing his pantin. Katerina continues with Xenia and Apostolis. Panos Georgopoulos descends with Kostas, Alexandros and Giannis Kaisas. Stelios, Oana, Miltos and Efsaia make a tour to Gourgouthakas, LOC1 (-1208m). Stelios, Oana and Miltos then go for water to LO23 while Efsaia prepares supper. Kostas and Alexandros return.

20-8-2013

Margarita leaves the camp with Kostas. Alexandros makes the trip to Hosses with equipment to be returned. Oana and Miltos descend to -140m (Frigo) for photography. Apostolis, Xenia and Katerina return. Preparations commence for striking camp the next day.

21-8-2013

Katerina descends at dawn, the remaining group commence the descent between 11:00 and 13:00. The camp is gathered, remaining food is inventoried and hidden for later. The materials at Hosses are gathered and loaded onto the Scenic and the E.O.S. Hanion jeep. We pause briefly at Tzitzifes for a meal before going to the harbour for the return.



*Kostas coordinates Alexandros, Panos and Magda
18/8/2013*



*Miltos at LO23at moonrise
19/8/2013*



*Packing up LO1 on the last day
21/8/2013*

Daily movements of personnel

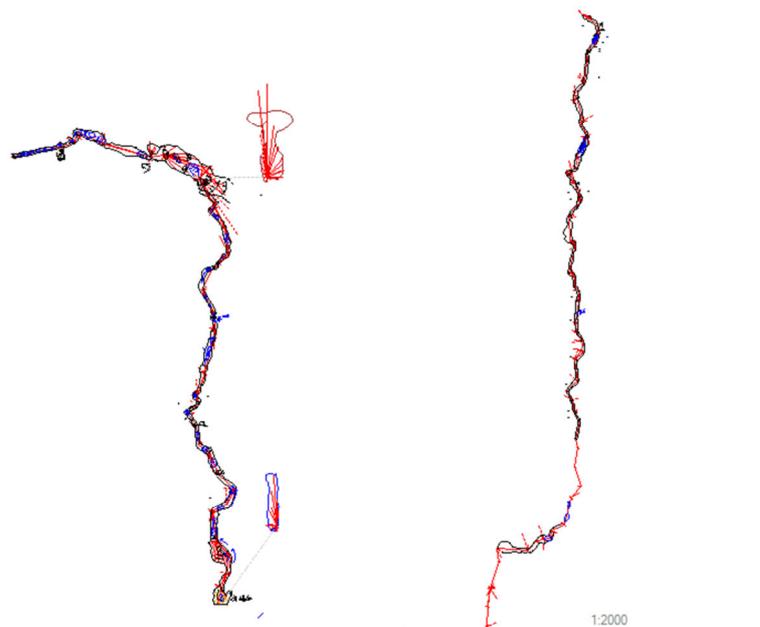
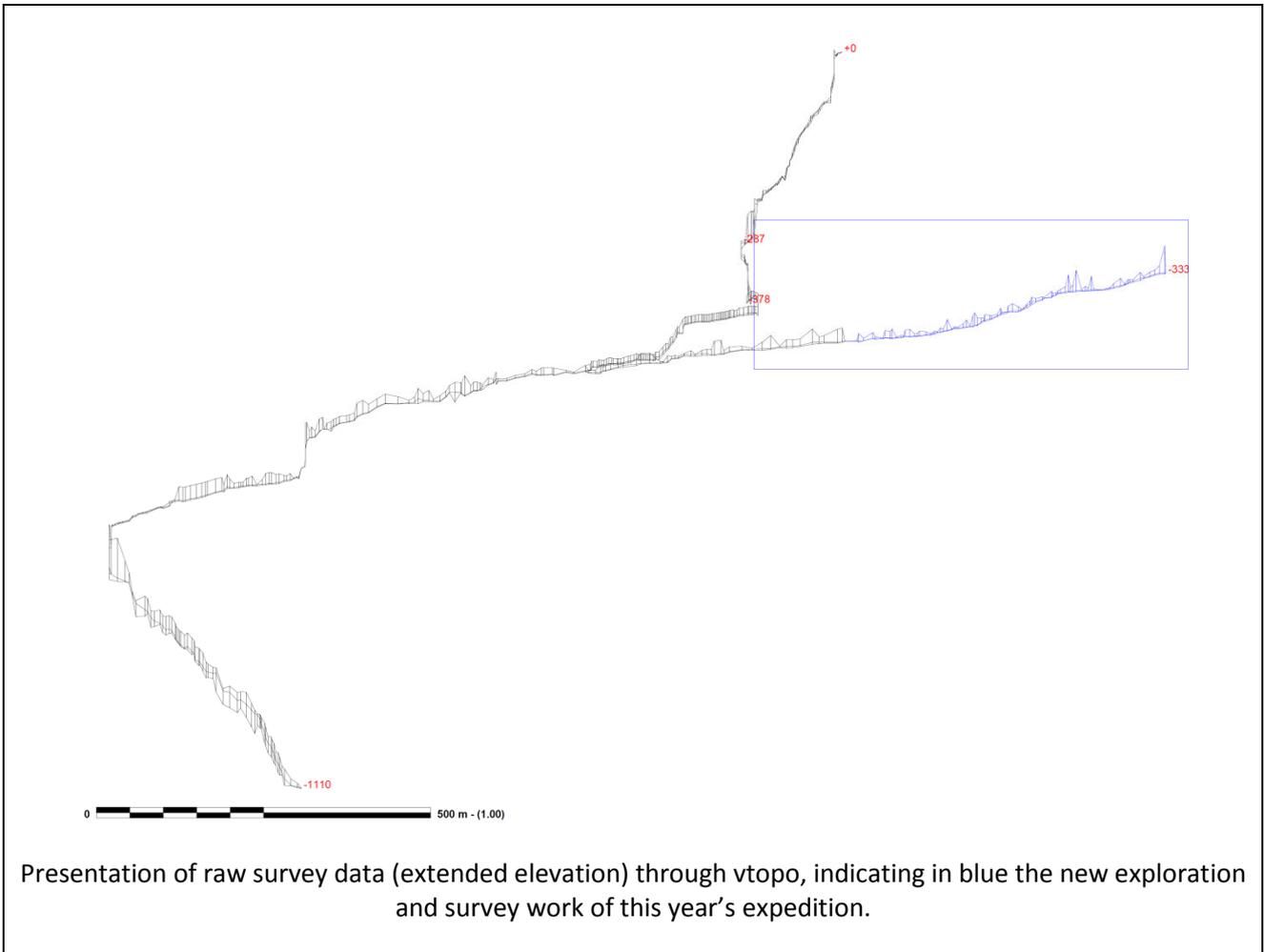
Nr	Team composition	Where / what	Depart (day/time)	Estimated return (day/time)	Return	Notes
1	Alex Le Fevre Alain Soubiraine	Around camp to find wood for the toilet	10:30 13/8/2013	12:00	12:30	OK
2	Miltos Hasialis Giannis Georgiadis	Acclimatisation to -240m	11:30 13/8/2013	18:00	17:00	OK
3	P. Georgopoulos M. Tsopeles D. Bourdas	Transfer of equipment from Hosses	12:00 13/8/2013	20:00	19:30	OK
4	Kostas Adamopoulos Yiannis Kaisas	Advancement of the Bivouac to -500m	12:45 13/8/2013	23:45	01:10	OK (next day)
5	G. Sotiriadis Ch. Pennos Magda Wrona	Acclimatisation to -240m	13:30 13/8/2013	19:30	20:10	OK
6	Apostolis Kourtis Alex Le Fevre Alain Soubiraine	LO23 – Water	15:30 13/8/2013	17:00	16:55	OK
7	Alex Le Fevre Alain Soubiraine	Walk	18:00 13/8/2013	19:00	19:00	OK
8	Alex Le Fevre Alain Soubiraine	Lion to install bivouac	10:30 14/8/2013	24:00	21:00	OK
9	P. Georgopoulos M. Tsopeles	Lion to the river to prepare bivouac	11:30 14/8/2013	24:00	00:40	OK
10	Miltos Hasialis Apostolis Kourtis Dimitris Bourdas	Lion to -480m	12:00 14/8/2013	01:00	23:40	OK
11	Thomas Ditsas G. Sotiriadis G. Kaisas	LO23 – Water	15:20 14/8/2013	19:30	19:30	OK
12	G. Sotiropoulos Magda Wrona	Food to the bivouac site at -480m / hotspot at -240m	11:30 15/8/2013	02:00	20:30	OK (George stayed with Kostas)
13	Thomas Ditsas K. Adamopoulos	Lion, rigging in new section, survey, exploration	11:15 15/8/2013	14:00 16/8/2013	16:30	OK (Thomas exited with Magda)
14	Alex Le Fevre Alain Soubiraine Chris Pennos	Scud – exploration	11:15 15/8/2013	14:15	15:00	OK
15	Giannis Georgiadis P. Georgopoulos D. Bourdas Ch. Pennos	LO23 for water	15:45 15/8/2013	18:00	18:00	OK
16	Miltos Hasialis Apostolis Kourtis Giannis Kaisas	Portage from Hosses	10:00 15/8/2013	21:00	21:00	OK
17	Michail Tsopeles Panos Georgopoulos	Lion / collector to continue exploration	11:30 16/8/2013	16:00 17/8/2013	15:30	OK
18	Daniel Moraitis Thomas Ditsas Magda Wrona Christos Pennos Roë Sergentani	Geological tour	13:00 16/8/2013	-	-	OK

Nr	Team composition	Where / what	Depart (day/time)	Estimated return (day/time)	Return	Notes
19	Panos Georgiou Katerina Hobitaki Maria Stathaki	Lion for acclimatisation	13:00 16/8/2013	21:00	18:30	OK
20	Alex Le Fevre Alain Soubiraine Miltos Hasialis Apostolis Kourtis G. Anastasopoulos Korina from SP.O.K. Giannis Kaisas	LO23 for water	12:00 16/8/2013	14:00	14:30	OK
21	Giannis Kaisas Giannis Georgiadis Maria Stathaki	Lion to collect Radon dosimeters and place pressure/temperature sensors down to -480m	12:15 17/8/2013	01:00	00:20	OK
22	G. Anastasopoulos Korina from SP.O.K.	Lion to -380m	13:27 17/8/2013	21:30	22:30	OK
23	Thomas Ditsas Panos Georgiou Christos Pennos Roë Sergentani	Lion to P.70 for photography LO23 for photography	15:30 17/8/2013	19:00	20:00	OK
24	K. Adamopoulos Magda Wrona Katerina Hobitaki Apostolis Kourtis Miltos Hasialis	Hosses for portage of foods	13:00 17/8/2013	19:00	19:00	OK
25	Magda Wrona Panos Georgiou Alex Margiolis	River, camp, exploration and survey	12:30 18/8/2013	18:00 19/8/2103	21:00	OK
26	Margarita Kanellidou Stelios Zacharias EfsaiaVardoulaki	Lion - acclimatisation to -80m	15:00 18/8/2013	22:00	20:45	OK
27	Margarita Kanellidou Katerina Hobitaki	Lion - acclimatisation to -140m	10:00 19/8/2013	23:00	14:00 (Katerina remainedwith h team 28)	OK
28	Miltos Hasialis Apostolis Kourtis Xenia Georgopouou	Lion – camp for overnight	12:00 19/8/2013	17:00 20/8/2013	20:00 (Miltos exited with team 27)	OK
29	Oana Chachula Miltos Hasialis Stelios Zacharias	LO23 for water	15:30 19/8/2013	19:30	21:00	OK
30	Oana Chachula Miltos Hasialis	Lion to -140m (Frigo)	13:00 20/8/2013	17:00	16:00	OK

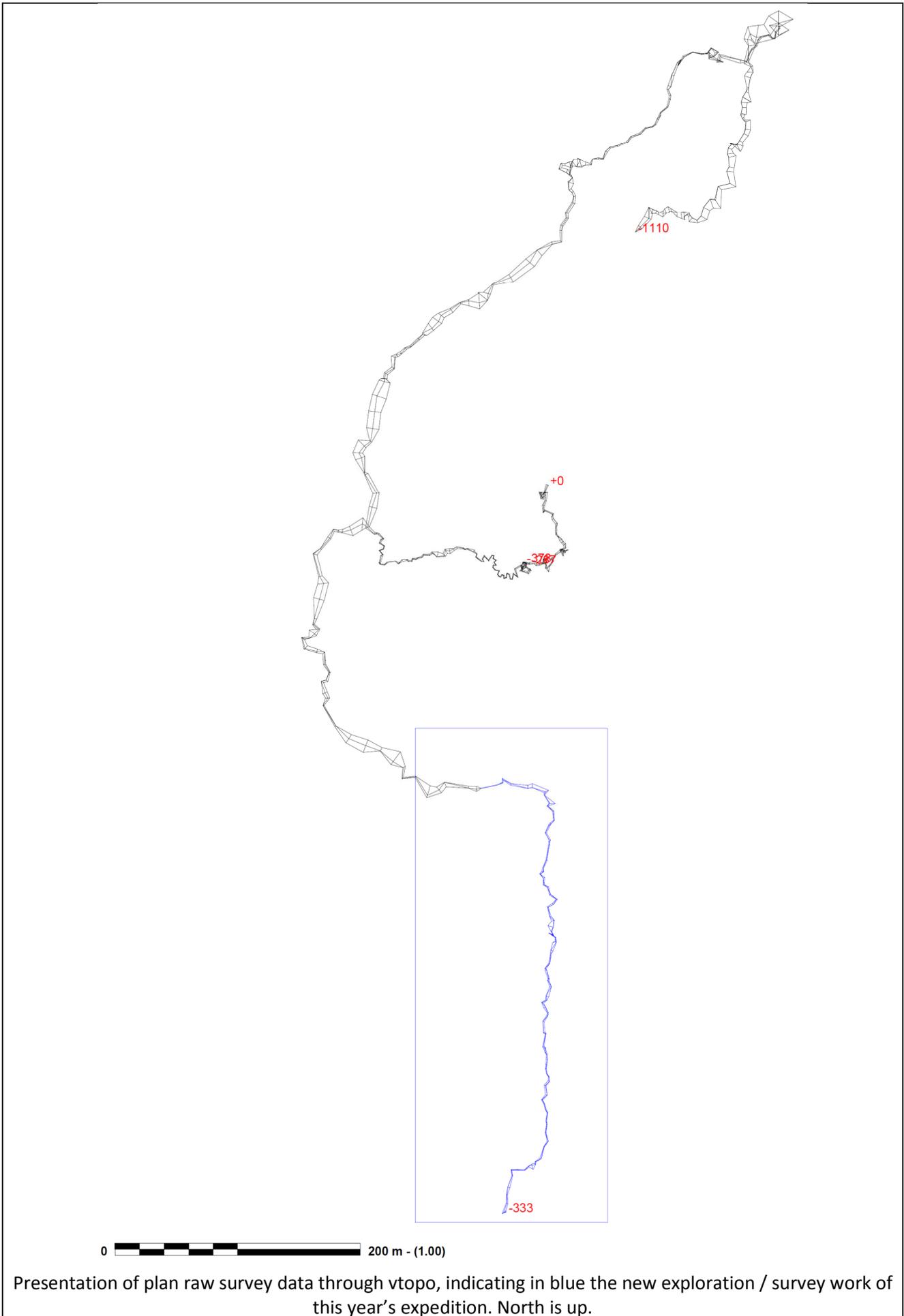
The above information is taken from the handwritten tables of personnel movements kept by the expedition secretariat.

Preliminary survey results

The survey was conducted using DistoX equipment connected to Pocket Topo software on palm hardware. This is then exported in .tro format for preliminary processing in vtopo.



Screengrabs from pocket topo (plan)



Some geological observations

Dr. Daniel Moraetis and Chris Pennos (doctoral candidate)

At the bottom of the first pit in the Lion, there is a breccia formed of various sizes of inclusions, of both limestone and dolomitic rock. The origin of the breccia is very likely to be connected to glacial deposition (moraines). These moraines were likely deposited in an existing cavity (this is supported by the observation that the breccia is found only on one side of the pit. Further down, and until -240m, the cave has the typical profile of a vadose canyon with plenty of meanders and many canyon-like passages. The entrance of the Lion is situated on an almost horizontal joint which is probably connected to the removal of a large burden from above (most likely the melting of an ice-covering following the last würm glacial).

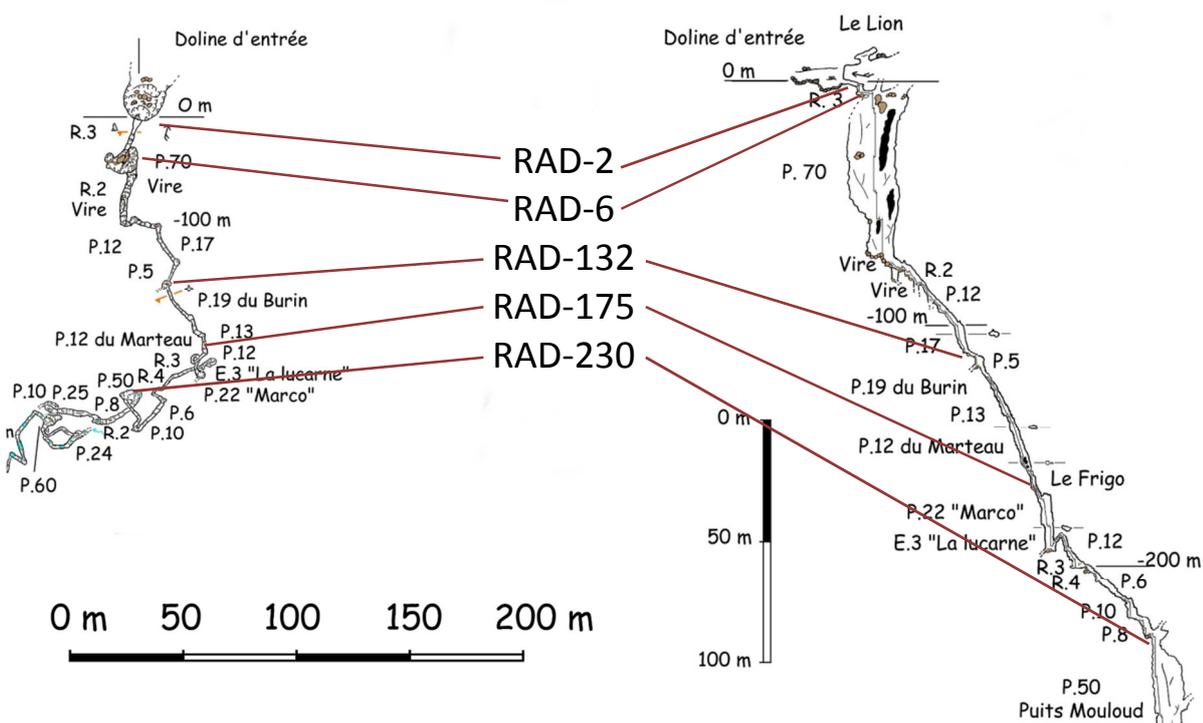
Radon concentration measurements – preliminary findings

Ioannis Kaisas MSc,

Environmental Radioactivity Monitoring Department, Greek Atomic Energy Commission

Five passive dosimeters (i.e. Solid State Nuclear Track Detector, SSNTD), within appropriate housing, were placed in the cave on 13th May 2013 and recovered on 17th August 2013, implying an integration time of measurements of almost three months. Radon's ionizing radiation etches the surface of the SSNTD, thus the number of etchings on each dosimeter allows a calculation of the corresponding radon concentration in the specific spatial point of measurement.

Chemical procedures were followed at the Environmental Radioactivity Monitoring Department of the Greek Atomic Energy Commission, in order to reveal the etchings, formed on the surface of the SSNTD. The following table presents the depth of each dosimeter and the radon concentration measured by each one. In addition, the chart presents the measured concentration with the respective error of the measurement.



The above excerpts from the 2008 survey by the GS Catamaran indicates the positions in which the Radon sensors were installed (at -2m, -6m, -132m, -175m and -230m). Plan on the left, section on the right.

The following table presents the depth each dosimeter had been placed on and radon concentration measured by each dosimeter.

Dosimeter	Radon Concentration (Bq/m ³)	Depth (m)	Position Description
RAD-2	612	-2	At the first anchor in the entrance squeeze
RAD-6	734	-6	At the first rebelay in the first pit (P.70)
RAD-132	698	-132	On a rock chocked in a hole
RAD-175	511	-175	At a rebelay in the Le Frigo squeeze
RAD-230	628	-230	At the first rebelay in the Puits Mouloud (P.50)

A more convenient representation is the following table. Radon concentration altered into effective dose rate and effective dose for staying at the exact depth for 24hrs. A number of radiographies that poses the same risk as staying in the cave for 24hrs, is also presented. Considering the annual dose from the environment as 2mSv, a speleologist who stayed in Lion for 24hrs, receive the same dose that would receive by living in the environment for thirteen days.

Depth (m)	Dose Rate (μSv/hr)	Dose in 24hr (μSv)	Equivalent number of chest radiography
-2	2,91	69,94	1,54
-6	3,50	83,89	1,84
-132	3,32	79,77	1,75
-175	2,43	58,40	1,28
-230	2,99	71,77	1,58
Mean Value:	3,03	72,75	1,60

Measurements reveal that LOC21 has a mean value of radon concentration of $637 \pm 25 \text{ Bq/m}^3$. Differences of concentration in different depths are connected to air circulation inside the specific cave complex, the meteorology and the concentration of Uranium and Radium in the underground rocks. Extended investigation of radon concentration in deeper sites within LOC21, and especially at the depth of the collector might reveal more conclusions about the air circulation and the air capacity of the cave complex.



Group photo