



## Application for Grant Aid

Submitted on: 28 Feb 2014

### Expedition details

<b>Expedition Name:</b> Cambridge University Caving Club Austria Expedition (Cambridge University Caving Club (CUCC))	
<b>Country:</b> Austria	<b>Region:</b> Loser Plateau
<b>Leader:</b> Dr Matthew Watson	<b>Contact:</b> ☎ 07801580965 ✉ matthew.watson@cantab.net
<b>Contact address:</b> 44 Dudley Rd Cambridge Cambridgeshire CB5 8PJ	
<b>Lat:</b> 47.6165 <b>Long:</b> 13.812	<b>Date of departure from UK:</b> 19-07-2014 <b>Date of return to UK:</b> 24-08-2014 <b>Duration (days):</b> 37
<b>Man-days in field:</b> 500 <b>Man-days travelling:</b> 48	

#### Brief Expedition objectives:

List a short summary of the main Expedition objectives.

The main target will be connecting last year's major finds in one of our plateau caves (107) to the main Schwarzmooskogelhoehle system extending the total system length to over 100 km. Pushing Tunnockshacht (mostly the best leads are between -200 and -400 m). The SMK system is currently 99.6km long and about 1.5km less surveyed length than Hiraltz. We expect to pass 100km this year, and hopefully overtake Hiraltz to be the 2nd longest system in Austria.

We also plan to run a pilot scientific study looking at the feasibility of extracting and analysing DNA from sediment samples. If successful further research would give us valuable insights into the communities of microorganisms (both contemporary and ancient) that inhabit this unique environment.

#### How can the GPF support your Expedition?:

Please explain the aspects of the trip which make it eligible for Ghar Parau funding.

The GPF is the primary source of UK expedition funding. The Expedition is moving to a more independent (from CUCC) organisational model in order to encourage and provide more opportunities to students and cavers from other clubs. This year we have CUCC, ULSA and UBSS students. Ultimately, Expo plans to own more of its own rope/gear so that, for example, rigging can be left in situ, where leads are being actively pushed over multiple Expos, simplifying logistics and allowing more time to be spent on exploration. Many of our experienced cavers are no longer students and have limited time: This would allow them to spend more time pushing and teaching/supervising the next generation of cavers. Many of these people use the skills learned on Expo and get involved in other caving projects around the world (Mulu, Picos, China), so the Expo is a valuable asset to the caving community in general, training young enthusiastic cavers the skills needed for expedition caving.

#### Detailed description of objectives:

Give a more detailed account of the purpose of the trip, including any particular known caves you intend to visit, specific areas where you will explore for new cave, and scientific experiments you will attempt.

During the 2013 some members revisited an old plateau cave (107), that had not been explored for some years, but had recently become interesting due to big finds in the main Schwarzmooskogelhoehle system. An additional 2km of passage taking the cave to within 30m of the main system, in an area near the 2012 Kaninchenhoehle/Steinbrucken connection where drafting passage leading off under the plateau beyond the usual ridge area where most of the large finds have been. This connection would add several km to the system and prove that major cave development does exist below the plateau, and is not just restricted to the ridge. The 107 entrance is a long way from our "top camp" bivvy site, so we will use the sub-camp set up near that entrance. It may well be necessary to push from the other side of the connection, in which case Kaninchenhöhle will need to be rigged.

In 2012/2013 Tunnockshacht, was pushed to over -400 m with lots of big leads between -200 and -400 m still going that need pushing further this year. There is a big pitch prone to taking lots of water after thunderstorms, which means trips here are getting serious and an emergency bivvy will have to be set up to allow waiting-out the rain.

For the less experienced cavers, there is a large amount of less challenging caving filling in the gaps in the large collection of noted sites that need exploring and documenting, so that they can be logged in the Austrian cave database. This is an ideal way for people new to expo to learn the basics of bolting rigging and surveying, before moving on to the more challenging deep leads. Good progress was made last year on working through the backlog of entrances and we hope to continue this.

#### Science activities

A pilot study is planned to investigate the feasibility of extracting analysable DNA samples from sediments in the newly explored fossil passages, some of which are believed to have been undisturbed since the end of the last ice age. Initially, we would like to establish whether plants (chloroplast DNA), animals (mitochondrial DNA) or microbes (ribosomal DNA) can be detected by polymerase chain reaction (PCR). If DNA from bacteria, animals or plants is successfully detected, in a subsequent step beyond the scope of this initial pilot experiment, we would like to date the sampled layers and use the most interesting of the recovered DNA libraries for high-throughput-sequencing to identify individual species.

Microbial ecosystems have been reconstructed using DNA isolated from environmental samples, and therefore in principle, follow up studies may allow us to reconstruct the communities of microorganisms living in this unique deep alpine cave environment. The cave may also provide a suitable environment for the preservation of "ancient DNA" which in conjunction with dating of sediment layers would afford us an insight into the evolution of these cave communities. DNA sampling has been chosen as the method of choice as it is able to detect to cultivate organisms and preserved DNA from ancient sources, which evade traditional sampling methods.

Two of the expedition members are experienced molecular biologists with access to lab facilities, while the choice of sampling sites and the description of the surrounding geology will be done in conjunction with geologically experienced expedition members. Positive control samples will be taken from the surface of the Loser Plateau above the caves, for comparison.

The estimated cost of this pilot study is £750 is requested for sampling and chilled transport of samples back to Cambridge, laboratory consumables, kits for DNA extraction for environmental samples (FastDNA SPIN Kit for Soil - QBIogene, £360 - as has been recommended) and PCR amplification of DNA.

#### Previous work in this area:

*Give details of any previous work in this area by your own and other teams. Include references to reports and articles published on the area, and the names of any local cavers or academics with whom you have discussed the Expedition.*

For well over three decades, Cambridge University Caving Club, CUCC, have been exploring and mapping cave systems on the Loser Plateau, about 80 km east of Salzburg in Austria. Currently the largest system, the Schwarzmoooskogelhoehle system has been explored to a length of almost 100 km and is almost 1 km deep. Over the years, we have fostered good relationships with the other Caving groups exploring the area, for example, The ARGE Grabenstetten from Germany who hold regular expeditions in the adjoining kataster area on the Loser Plateau, and members of the expedition have helped various Austrian groups with exploration of caves on the Dachstein. In 2013, we also received an award from the Mayor of Bad Aussee in recognition of the many years we have spent exploring the caves of the area.

CUCC maintains a huge website detailing this exploration: <http://expo.survex.com/>

It continues to work on better software for maintaining such project cave databases via the troggle project and the UIS informatics commission. (This is proving to be a slow process - troggle did not really succeed in its goals, and troggle2 is currently being designed using what we learned).

Last Descent article <http://expo.survex.com/years/2011/descentarticle.html>

Speleo Austria Proceedings Article <http://expo.survex.com/years/2012/SpeleoAustria.html>

Hidden Earth Presentation 2013

We contributed to a book on the area published in 2012:

<http://www.arge-grabenstetten.de/www2/publikationen/grabenstetter-hohlenkundliche-hefte/die-hohlen-des-toten-gebirges/>

Cave weather, caver stress and radon testing research was undertaken in 2007.

Hidden Earth Presentations:

<http://expo.survex.com/expoimages/presentations/HiddenEarth/2007/expo07%20Aaron%27s%20science%20talk.ppt>

<http://expo.survex.com/expoimages/presentations/HiddenEarth/2007/expo07%20Djoke%27s%20hidden%20earth%20presentation1.ppt>

Die Höhle Article: [http://expo.survex.com/years/2007/reports/die\\_hoehle\\_article.pdf](http://expo.survex.com/years/2007/reports/die_hoehle_article.pdf)

Spelothem samples were taken for dating in 2011 (Christopher Smith)

## List of Expedition Personnel

#	Name	Age	Nationality	Status/Occupation	Caving years	Experience	AXP
1	Matthew Watson	35	UK	Employed (Researcher)	5	Regular UK caving 4 weeks on previous expedition (CUCC)	
2	Michael Seargent	24	UK	Student (Postgrad)	3	1st expedition (CUCC)	
3	Anya Ermakova	25	RU	Student (PhD)	4	1st expedition (CUCC)	
4	Aiora Zabala	27	ES	Student (Phd)	4	1 Austria expo (CUCC)	
5	Wookey	46	UK	Employed (Geek)	27	17 Austria expos, China, Mulu, Picos, Matienzo (CUCC)	
6	Jess Stirrups	27	UK	Employed (Vet)	6	4 Austria expos (CUCC)	
7	David Walker	19	UK	Student	1	1 year of UK caving. 1st expedition. (CUCC)	Y
8	Fleur Loveridge	40s	UK	Employed	20+	OUCS Picos, China, Austria	
9	Pete Talling	40s	UK	Employed	20+	OUCS Picos, China, Austria (LUSS and CUCC)	
10	Sophie Draper	20	UK	Student	0	Started caving with the club this academic year. 1st expedition. (CUCC)	Y
11	Rebecca Lawson	47	UK	Employed (Lecturer)	28	18 Austria Expos, China (CUCC)	
12	Julian Todd	46	UK	Employed (Programmer)	28	16 Austria Expos, China (CUCC)	
13	Andrew Atkinson	45	UK	Unemployed	26	14 Austria Expos (UBSS)	
14	Sam Wenham	27	UK	Employed (Computer Support)	2	1st expedition (CUCC)	

15	Joe Bache	35	UK	Employed (Arborist)		1 Austria Expo
16	Adam Henry	23	UK	Student	3	1 Austria Expo. (UBSS)
17	Mandy Fu					(UBSS)
18	Holly Bradly	28	UK	Employed	7	4 Austria Expos (ULSA)
19	Noel Snape	28	UK	Employed (Geotechnical)	7	3 Austria expos (ULSA)
20	Gina Moseley		UK	Employed (Academic)		Mulu
21	Robert Adams	31	UK	Employed (Programmer)	3	2 Austria expos (UBSS)
22	Mike Futrell	45	US	Employed (Surveyor)	20+	1 Austria Expo, China, US, Mexico
23	Andrea Futrell	43	US	Employed	20+	1 Austria Expo, China, US, Mexico
24	Sophie Hentschel	24				(ULSA)

## Alex Pitcher details

#	Name	Age	Nationality	Status/Profession	Experience
1	David Walker	19	UK	Student	1 year of UK caving. 1st expedition. (CUCC)

**Justification:** David is an active CUCC caver and member of the committee (Secretary, and standing for President next academic year). He is in the second year of his course and is attending his first expedition. He will be a vital member of the team and has volunteered to organise the gear order and make sure that our surveying kits are in good working order. Cavers are required to have their own personal gear for Expo and as a student, the extra money would be very helpful.

2	Sophie Draper	20	UK	Student	Started caving with the club this academic year. 1st expedition. (CUCC)
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**Justification:** Sophie joined us this academic year as a new caver and is proving to be very keen having been on nearly every trip, and organised the club's annual New Year caving trip to Yorkshire. She is also planning to stand for a position on the committee next year. This is her first expo, and she has jumped straight in, offering to do the formidable task of organising the transport logistics. Due to personal reasons she's had to take an extra year for her course, and so money is a bit tight, and being new to caving does not yet own any of her own gear; Therefore, any financial assistance you could provide her would be a great help.

**Total UK cavers: 18**  
**Total non UK cavers: 4**

**Total Cavers: 24**  
**Alex Pitcher nominations: 2**

## Expedition Finances

### Travel

#### Travel plans:

Majority of people and equipment will be transported to and from the UK to the Loser Plateau by road using personal cars and vans. We now store a lot of our equipment in Austria to keep transport manageable and plan to increase this as expo gradually moves to a more independent running model.

N.B. communal costs on Expo are worked out on a per-person-per-day split as the majority of people do not attend the whole expedition, rather than a per person cost.

**# from UK:** 22  
**Cost p.p. from UK:** £3,500

#### Travel costs breakdown (for personnel leaving from the UK):

Estimated fuel and tunnel/ferry costs, based on an average of three people per car and a share of the communal gear.

**# from outside UK:** 2  
**Cost p.p. from outside UK:** £1,000

#### Travel costs breakdown (for personnel leaving from elsewhere):

International flights from US

**Travel total:** £4,500

**Travel p.p. from UK:** £159

**Travel p.p. from outside UK:** £500

### Subsistence

<b>Total:</b>		<b>Comments:</b>
Subsistence cost	£4,700	Accommodation - £2500
p.p.:	£195.83	Food - £1300
		Camping consumables - £300
		Local travel - £500
		Permissions and fees - £100

## Gear

<b>Total:</b>	£2,000	<b>Comments:</b>
Gear cost p.p.:	£83.33	This is slightly higher than usual, due to the larger than average expected participation, Expo buying more of it's own equipment and the need to replace some of the first aid and rescue supplies.

## Special 1

<b>Total:</b>	£750	<b>Comments:</b>
Special 1 cost p.p.:	£31.25	Soil sampling and preliminary DNA analysis from samples taken from various cave sediments.
		a) soil sampling and transport tools (~£100) as far as they cannot be borrowed from University of Cambridge institutes,
		b) laboratory consumables (micropipette tips, centrifuge tubes, gloves, PCR tubes, general chemistry, etc. ~£100) and
		c) chemistry for DNA extraction, amplification (PCR enzyme mix, primers ~£150) and detection (gel electrophoresis ~£30). For extraction the preliminary plan is to use the FastDNA SPIN Kit for Soil (QBIogene, £360)

## Special 2

<b>Total:</b>	£0	<b>Comments:</b>
Special 2 cost p.p.:	£0.00	

<b>Exped Total:</b>	£11,950	<b>Exped cost p.p. travelling from UK:</b>	£469
		<b>Exped cost p.p. travelling from outside UK:</b>	£810
		<b>Mean Exped cost per person:</b>	£497

## Other Funding

<b>Total:</b>	£500	<b>Comments:</b>
		Expo regularly receives sponsorship from food and equipment manufacturers, as well as significant discounts, which will hopefully reduce the overall costs.

<b>Total shortfall:</b>	£11,450	<b>Mean shortfall per person:</b>	£477
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## Referees and Report

Please give the names, addresses and phone numbers of two suitably qualified people whom the Committee can contact. You should ensure that they are aware of the objectives of your trip, and that you have their permission for the Committee to contact them.

<p><b>Referee 1:</b> Mr Wookey  <b>Phone:</b> 01223 400980  <b>Email:</b> wookey@wookware.org  <b>Affiliation:</b> CUCC</p> <p><b>Reason:</b> He's been coming on expo for donkey's years and generally knows what's what.</p> <p><b>Permission obtained?:</b> Yes</p>	<p><b>Referee 2:</b> Dr James Hickson  <b>Phone:</b>  <b>Email:</b> jcdh1@cam.ac.uk  <b>Affiliation:</b> CUCC Senior Treasurer</p> <p><b>Reason:</b> Long-time Senior Treasurer of CUCC. Can vouch for members.</p> <p><b>Permission obtained?:</b> Yes</p>
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<b>Expedition report author:</b> Matthew Watson (matthew.watson@cantab.net)
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## Attachments



