Ethiopia 2019

September 15th to 30th

Caving Expedition Report

Fédération Française de Spéléologie

Date: December 2019
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GPS data is available on request.

Expedition CREI Id: 20 / 2019

Caving Expedition
ETHIOPIA 2019

Expédition spéléologique
ETHIOPIA 2019

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Thanks & Sponsor

Our main thanks must go to the people of Goro Muti and Malka Balo who made us feel welcome and were so very helpful. Special thanks to Nasir Ahmed - a member of the expedition who organized and managed everything quite brilliantly - once again. He has found solutions to all issues and preserved warm relations between cavers and local people.

Thanks also to Clément Dollinger for his hospitality in Addis Ababa and for the friendly time he shared with us.

All the expedition members of Ethiopia 2019 thank the associations which have supported the project:

- La Fédération Française de Spéléologie via la Commission des Relations aux Expéditions Internationales
- Le Groupe Spéléologique Vulcain
- Gloucestershire Cave Rescue Group
- Hades Caving Club

FRENCH

Les membres de l'expédition remercient Nasir Ahmed pour avoir préparé et organisé une fois de plus de manière efficace cette expédition. Il a su trouver des solutions aux difficultés, tout en préservant les relations entre les spéléologues et les communautés locales.

Des remerciements spéciaux sont adressés à Clément Dollinger pour nous avoir hébergés à Addis Abbeba et nous avoir consacré du temps et préparé de la mousse au chocolat au retour de l'expédition !

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- Le Groupe Spéléologique Vulcain
- Continent 8
- Hades Caving Club

Fédération Française de Spéléologie

C.R.E.I.

continent 8 EXPEDITION TEAM

Summary

Ethiopia 2019 was an international expedition consisting of an Ethiopian speleologist, a British speleologist and two French speleologists. A French speleologist, living in Ethiopia, joined for three days of the expedition. This has been the 7th Speleological Expedition since 2011.

From 15 to 30 September 2019, 13 caves were inventoried (1,160 m of passage) in the Goro Muti and Malka Balo woredas, during the end of the rainy season.

The 2nd and 3rd deepest caves in the country have been explored and a horizontal cave with remarkable formations has been surveyed for 500 m and exploration is to be continued.

The area around Djadja in particular seems speleologically very promising to the explorers.

FRENCH

Ethiopie 2019 est une expédition internationale composée d'un spéléologue éthiopien, un spéléologue anglais et deux spéléologues français. Un spéléologue français, habitant en Ethiopie, s'est joint durant trois jours à l'expédition. Elle est la 7ème expédition spéléologique depuis 2011.

Du 15 au 30 septembre 2019, 13 cavités ont été inventoriées (1 160 m de topographie) dans les régions de Goro Muti et Malka Balo, durant la fin de la saison des pluies.

Les 2ème et 3ème cavités les plus profondes du pays ont été explorées et une cavité horizontale aux concrétions remarquables a été topographiée sur 500 m et l'exploration est à poursuivre.

La région de Djadja semble spéléologiquement très prometteuse aux explorateurs.

Figure 1: Ethiopian Landscape

Introduction

The project Ethiopia 2019 arose from Robin's wish to return to Ethiopia to continue the ongoing exploration. Over the last ten years, several expeditions have been organized by British, French and Italian cavers. For safety reasons, it has not been possible to access the caving area since 2016. With the country becoming more stable in terms of politics and safety Robin contacted Nasir, an Ethiopian caver working at the tourism department, who had organized logistics in previous expeditions. Nasir was enthusiastic for the project but asked that numbers be limited to one car (3 cavers, a driver & himself).

The area to be visited comprises two adjacent woredas with much of the area located on high ridges where there are water shortages in the dry season. The authorities are hopeful that our explorations will help them to locate new wells. September in Ethiopia matches with the end of the rainy season. Ideally we should have visited in late October but we were not available then, so we took the risk! During the trip, rain proved to be a problem although it rained mostly at night and not very strongly. The roads on which we travelled were mainly of dirt and the majority were not at all dry, with some of them always in swimming mud mode!

We didn't really expect to find great caves during the expedition. Previous trips had seen few returns of long or deep caves. So why should it be different this time? But… it was. We explored and surveyed one very beautifully decorated cave stopping only for lack of time and 2 vertical caves of 141 m and 100 m have been descended. They become the second and third deepest caves in the country.

During expedition after expedition, a large quantity of caving data has been collected. One intention of this expedition was also to publish a first inventory of Ethiopia caves.

FRENCH

Ethiopie 2019 a vu le jour grâce à la volonté de Robin, spéléologue anglais qui a participé a six expéditions spéléologiques en Ethiopie au cours des dix dernières années, et qui souhaite poursuivre le travail. Depuis 2016, les conditions de sécurité en Oromia n'étaient plus suffisantes pour une telle expédition. A partir de 2019, la situation s'est stabilisée et Robin, en relation continue avec Nasir, un spéléologue Ethiopien, travaillant au bureau du tourisme ethiopien, lui a demandé si une nouvelle expédition pouvait être organisée. Nasir a validé avec enthousiasme le projet, à la condition que l'expédition soit restreinte à une seule voiture, soit trois explorateurs maximums.

La zone visitée est localisée entre deux woredas adjacentes dont la plus grande partie se trouve sur les hauteurs, où l'eau manque durant la saison sèche. Les autorités espèrent que nos explorations les aideront à trouver des réserves d'eau. Septembre en Ethiopie correspond à la fin de la saison des pluies. Une planification idéale d'expédition est pour Octobre, mais cette année, nos emplois du temps ne le permettaient pas. Aussi, nous avons pris le risque de la saison des pluies. Et finalement, c'est surtout la boue qui nous a impacté. Sur certaines routes, nous faisions du patinage artistique, à pied ou en voiture !

Nous sommes donc repartis pour l'Oromia, sans grand espoir de découverte mirobolante, au regard des résultats décroissants des expéditions précédentes. Nos objectifs étaient surtout de poursuivre le travail, affirmer notre partenariat avec Nasir, nous retrouver ensemble au milieu des Ethiopiens accueillants et déguster des injerras… ; Et finalement, nous avons eu des résultats très prometteurs pour de futures expéditions : une grotte horizontale magnifiquement concrétionnée a été topographiée sur 500 m avec arrêt sur manque de temps, deux grottes verticales de 141 m et 100 m de profondeur sont devenues les 2ème et 3ème cavités les plus profondes du pays.

Les données s'accumulent au cours des expéditions successives en Ethiopie : un des objectifs de ce rapport est de procéder à la synthèse de ces connaissances.

Ethiopia

Ethiopia, officially the Federal Democratic Republic of Ethiopia, is the second largest country in Africa by population (estimated at 108 million in 2018) and has the ninth largest area (1 127 127 km^2). The country has no access to the sea and shares borders with Somalia, Sudan, South Sudan, Kenya, Djibouti and Eritrea.

Since 1996 Ethiopia has been divided into nine ethnically based and politically autonomous regional states and two chartered cities (Addis Ababa and Dire Dawa). The states are subdivided into 68 zones which themselves are divided into 550 woredas. A woreda is equivalent to a unitary authority in the UK or agglomeration in France.

Ethiopia is one of the oldest locations of human life known to scientists and is widely considered to be the region from which Homo Sapiens emerged. Tracing its roots to the 2nd millennium BC, Ethiopia was a monarchy for most of its history until the ending of Haile Selassie's reign in 1974.

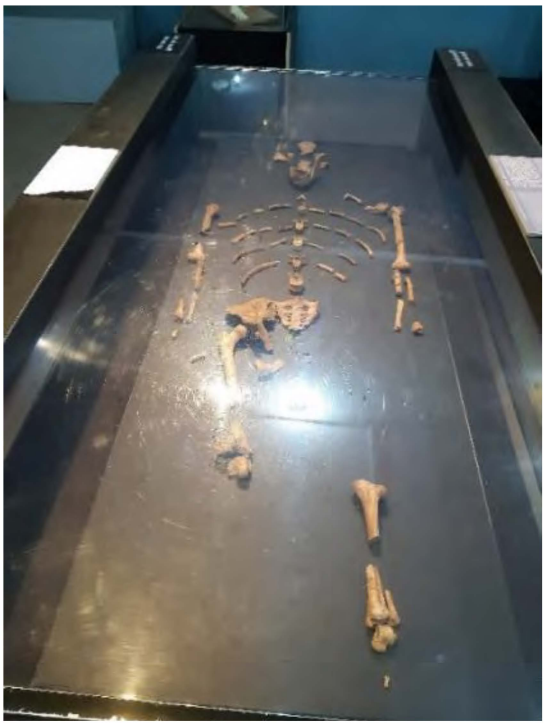


Figure 2: Lucie Skeleton

Within Ethiopia is a vast highland complex of mountains and dissected plateaux divided by the Great Rift Valley which runs generally southwest to northeast and is surrounded by lowlands, or semi-desert. The great diversity of terrain determines wide variations in climate, soils, natural vegetation, and settlement patterns.

It is an ecologically diverse country, ranging from the deserts along the eastern border, the tropical forests in the south and extensive mountain ranges in the northern and southwestern parts. Lake Tana in the north is the source of the Blue Nile. It has a large number of endemic species, notably the Gelada Baboon, the Walia Ibex and the Ethiopian Wolf (or Simien Fox). The wide range of altitude has given the country a variety of ecologically distinct areas; this has helped to encourage the evolution of endemic species in ecological isolation.

Figure 3: Trees

With fairly uniform year-round temperatures, the seasons are largely defined by rainfall, with a dry season from October to February, a light rainy season from March to May, and a heavy rainy season from June to September. The average annual rainfall is around 1,200 mm (47.2 in). There are on average 7 hours of sunshine per day, meaning it is sunny for around 60% of the available time. The dry season is the sunniest time of the year, though even at the height of the rainy season in July and August there are still usually several hours per day of bright sunshine. The average annual temperature in Addis Ababa is 16 °C (60.8 °F), with daily maximum temperatures averaging 20–25 °C (68–77 °F) throughout the year, and overnight lows averaging 5–10 °C (41–50 °F).

FRENCH

La république démocratique fédérale d'Éthiopie est le second pays le plus peuplé d'Afrique.
Depuis 1996, l'Ethiopie est divisée, sur une base ethnique, en neuf régions autonomes et 2 villes (Addis-Ababa et Dire Dawa). Chaque région est divisée en zones, 68 au total pour le pays, dont chaque zone est subdivisée en woredas.

Les températures fluctuent peu au cours de l'année. La température annuelle moyenne à Addis-Ababa est 16°C et en journée de 20–25 °C

La saison sèche s'étend d'octobre à février, puis vient une petite saison des pluies de mars à mai qui s'intensifie de juin à septembre. Il tombe en moyenne annuellement autour de 1 200 mm d'eau.

Oromia

Oromia is the most populous of the regional states having an estimated population in 2012 of over 31 million, living in an area of 298 164 km^2.

It is divided into a total of 14 administrative zones and 185 woredas. The 2019 expedition was based in the Goro Muti and Malka Balo woredas in the East Hararghe zone.

Goro Muti is a recently established woreda, having previously been the southern part of Deder woreda. It is bordered to the south by Malka Balo and both are bordered to the east by Bedeno, the home of Enkuftu Mohu - the deepest known cave in Ethiopia. The altitude ranges from around 1 000 m to 3 000 m above sea level with a series of north/south ridges intersected by valleys. Coffee, khat, fruit and vegetables are the main cash crops.

FRENCH

L'Oromia est la région la plus peuplée avec plus de 31 millions d'habitants en 2012 sur près de 300 000 km^2.

Elle est découpée en 14 zones administratives et 185 woredas. L'expédition 2019 s'est déroulée dans les waredas de Malka Balo et Goro Muti dans la zone Est Harar.

Figure 4: Typical Oromia house

Health Hazards

Histoplasmosis

All nine members of the 2011 expedition suffered from histoplasmosis with varying degrees of severity. Although everyone recovered, three were hospitalised and all were incapacitated for at least a short period.

The expeditions in 2011, 2012, 2013 and 2016 encountered high levels of CO_2. Thanks to early recognition of the problems followed by quick retreats there were no serious repercussions.

Histoplasmosis had not previously been encountered in East Africa, so no precautions were taken in 2011. Subsequent expeditions have used respirators.

Histoplasmosis is common in some parts of the USA and the US National Institute for Occupational Safety and Health has published guidance in a booklet entitled Histoplasmosis – Protecting Workers at Risk. This booklet is freely available on the internet.

It is explained in the booklet that Histoplasmosis is an infectious disease caused by inhaling the spores of a fungus called Histoplasma capsulatum. Histoplasmosis is not contagious; it cannot be transmitted from an infected person or animal to someone else.

Figure 5: Robin and his mask

Histoplasma capsulatum is a dimorphic fungus, which means it has two forms. It is a mould in soil at ambient temperatures, and after being inhaled by humans or animals, it produces a yeast phase when spores undergo genetic, biochemical, and physical alterations.

Histoplasmosis primarily affects a person's lungs, and its symptoms vary greatly. The great majority of infected people are asymptomatic (have no apparent ill effects), or they experience symptoms so mild they do not seek medical attention and may not even realize that their illness was histoplasmosis. If symptoms do occur, they will usually start within 3 to 17 days after exposure, with an average of 10 days.

Histoplasmosis can appear as a mild, flu-like respiratory illness and has a combination of symptoms, including malaise (a general ill feeling), fever, chest pain, dry or nonproductive cough, headache, loss of appetite, shortness of breath, joint and muscle pains, chills, and hoarseness.

Of all the preventative measures described in the booklet the only realistic option in the circumstances of a caving expedition is the use of a respirator and after careful consideration of the options and field trials in local caves we decided to continue to use disposable half face respirators with inhalation valves and again selected respirators which complied with the standards of EN149 of the class FFP3 (ie filters at least 99% of airborne particles with less than 2% inward leakage).

We had used respirators of this type during previous expeditions and found that they were satisfactory.

FRENCH

Tous les membres de l'expédition 2011 ont été atteints d'histoplasmose, à des degrés divers, allant jusqu'à l'hospitalisation. Il s'agit d'une affection des poumons, générée par des spores de champignons qui se développent sur le guano des chauves-souris dans certaines conditions. La maladie est développée par l'inhalation de ces spores.

Depuis son identification, dans les cavités poussiéreuses, les spéléologues portent des

masques et aucune nouvelle affection n'a été développée.

Stale Air in Caves

Low Oxygen or high Carbon dioxide levels have been regularly encountered in Ethiopian caves and since 2013 we have taken and used a gas monitor.

Exposure to high levels of Carbon dioxide (or to the resultant low levels of oxygen) could have serious consequences in a cave environment.

In both cases the onset of effects is more rapid if effort is being expended. Most of the caves explored in Ethiopia are at over 2000 m and it is likely that the effects of low oxygen are made worse by the lower air pressure at that altitude.

Our preventative action included the use of a gas monitor, lowering it down any pitch before descending. We are grateful to Gloucestershire Cave Rescue Group for the use of one of their gas monitors during the expedition.

This monitor gave us readings of Hydrogen Sulphide, Carbon Dioxide and Oxygen. A useful facility allowed us to see the lowest oxygen reading recorded before deciding whether to descend a pitch.

FRENCH

Des taux faibles d'oxygène et élevés de dioxyde de carbone sont fréquents dans les cavités éthiopiennes. Ces taux peuvent très vite varier dans les cavités non ventilées. Il est primordial que le spéléologue de tête ait un analyseur de gaz. Avant de descendre un puits, l'appareil doit être descendu au bout d'une corde afin de s'assurer de l'absence d'air vicié. Nous remercions Gloucestershire Cave Rescue Group pour le prêt de l'analyseur.

Other

The participants took advance health precautions by pre trip vaccinations against Hepatitis A, Typhoid, Influenza, Meningococcal meningitis, Diphtheria, Yellow Fever, Rabies, Hepatitis B and Measles.

The more basic health hazards encountered during an expedition such as this relate to stomach disorders. We countered that by drinking only bottled water and ensured that the medicine chest was well stocked with remedies for use if required. We carried hand sanitizer and used it whenever appropriate and always immediately before eating.

The only health problems encountered on this occasion were from insect bites.

FRENCH

Avant l'expédition, en plus des vaccins classiques il est conseillé d'être vacciné contre l'hépatite A et B, Diphtérie, Tétanos, Poliomyélite, Méningites A et C et Typhoïde. Attention le vaccin contre la fièvre jaune est obligatoire pour rentrer sur le territoire.

Sur place, des problèmes intestinaux sont fréquents. Il est conseillé de boire uniquement de l'eau en bouteille et de bien se laver les mains avant les repas.

Figure 6: At least one person is happy to eat injera

The Team

To cave alone is not possible! The team was composed of 5 cavers coming from Britain, Ethiopia and France:

- **Nasir Ahmed**, Ethiopian caver
- **Antoine Aigueperse**, G.S Vulcain / Continent 8, France
- **Clément Dollinger**, an independent caver from France but living with his family at Addis Ababa for 2 years,
- **Patricia Gentil**, G.S Vulcain / Continent 8, France,
- **Robin Weare,** Hades Caving Club, UK

Figure 7: The caving team

But each day, Nasir organized a team to guide us to the caves. Our tackle bags were carried for us and they were very insistent to do it.

Finally, the team was completed by people who didn't really know what we were doing. The only thing they knew was that they were here to help us and to help Nasir to organize. When you wake up, they are already present and they stay until the end of day. Special big thanks to them!

Figure 9: One of our very active organizers

FRENCH

L'équipe était composée de 5 spéléologues : Nasir Ahmed (Ethiopie), Antoine Aigueperse & Patricia Gentil (France), Clément Dollinger (France expatrié en Ethiopie) et Robin Weare (Royaume-Uni).

Figure 8:The daily team almost complete

Background to the Expedition

This expedition was the latest of a series of visits to Oromia by British, French and joint teams in the period since their first combined visit in 2011. All have been accompanied by Nasir.

The 2011 expedition explored 23 caves in the regions of Gurawa, Gursum and Bedeno. The longest cave explored was Rako Barzala at 437 m and the deepest Enkuftu Mitata at 66 m. After the departure of the main part of the expedition Nasir & Robin visited the Gelemso area and explored Holqa Warabesa to a length of 1 400 m, stopping due to lack of time. Every member of this expedition succumbed to histoplasmosis and several were hospitalised. This was the first recorded incident of histoplasmosis in Ethiopia.

A team of French cavers returned in 2012 and, together with Nasir, completed the exploration of Holqa Warabesa, at 3.1 km the 4th longest cave in Ethiopia, and in total surveyed 7.2 km of cave passage.

There were two expeditions in 2013, both located in the area between Gelemso and Mechara. In April, Nasir and cavers from France explored 44 mainly modest caves. In October, Nasir & Robin together with two British cavers explored 18 mostly vertical caves, the deepest being -80 m.

In 2014, Nasir, Antoine, Patricia, Robin and three other cavers from Britain and France visited the area around Bedeno and then, after a call for assistance to search for missing villagers, around Bedessa where they remained for the last few days of the expedition.

In 2016 Nasir, Robin and another British caver visited the area around Gelemso, exploring 10 caves

Figure 10: Robin and a future Ethiopian caver?

FRENCH

Cette expédition s'inscrit dans une série de collaboration entre Français et Anglais démarrée en 2011. Nasir est le dénominateur commun de toutes les expéditions.

L'édition 2011 avait exploré 23 cavités dans les régions de Gurawa, Gursum et Bedeno. La cavité la plus longue mesure 437 m (Rako Barzala) et la plus profonde est Enkuftu Mitata (66 m). Robin, resté avec Nasir à la fin de cette expédition a exploré Holga Warabesa dans la région de Gelemso, sur 1 400 m et se sont arrêtés par manque de temps. Chaque membre de l'expédition a été atteint d'histoplasmose à des degrés divers allant jusqu'à l'hospitalisation. Ce furent les 1ers cas d'histoplasmose enregistrés en Ethiopie.

Une équipe française est repartie en 2012 et a complété avec Nasir l'exploration de Holga Warabesa, portant le réseau à 7,2 km, soit le 4ème le plus long du pays.

En 2013, deux expéditions ont eu lieu entre les régions de Gelemso et Mechara. En avril, Nasir et des spéléologues français ont inventorié 44 cavités moyennes. En octobre, Robin, Nasir et deux spéléologues anglais ont exploré 18 cavités, majoritairement verticales, dont la plus profonde atteint 80 m.

En 2014, l'équipe composée de Nasir, Antoine, Patricia, Robin et trois autres spéléologues français et anglais avaient pour objectif la région de Bedeno. Suite à un secours organisé pour rechercher des villageois perdus, l'expédition s'est déplacée vers Bedessa.

En 2016, Nasir, Robin et un spéléologue anglais ont inventorié une dizaine de cavités dans la région de Gelemso.

Equipment

Caving Equipment

Nothing very special was used during this expedition:

- 1 small Ryobi Drill and 2 batteries
- 3 drill bits diam 8 mm
- 1 drill bits diam 12 mm
- 1 hand bolting equipment + hooks
- 50 kwik bolts
- 15 self-drilling extension bolts
- 10 hangers & light karabiners
- 35 hangers & karabiners
- 10 Ammarages Souples
- 10 karabiners
- 10 slings
- 10 dyneema diam 5 mm
- 300 m of rope diam 9 mm
- 4 rope protectors
- 3 tackle sacks
- 1 Surveying Kit
- 1 rescue equipment
- 40 dust masks

Figure 11: Sorting operation

Specialist Equipment

Dust Masks

As Robin and others had been hospitalized due to histoplasmosis problems experienced in 2011 prevention of a recurrence was at the very top of the list. With the benefit of the advisory documentation produced in the USA and after careful consideration of the options and field trials in local caves, we used disposable half face respirators with inhalation valves and selected respirators which complied with the standards of EN149 of the class FFP3 (ie filters at least 99% of airborne particles with less than 2% inward leakage). They fitted snugly and despite having explored several caves with large bat populations there was no repeat of previous problems.

Prior experience of team members and the past experience of other expeditions told us that low oxygen/high carbon dioxide levels were a regular problem in Oromia.

We used a GMI PS500 Gas Monitor owned by Gloucestershire Cave Rescue Group which performed perfectly.

Medical Equipment

We took a comprehensive medical kit, including sterile needles & syringes, with the addition of Amoxicillin & Ciprofloxacin antibiotics, and Co Codamol pain killers, together with a smaller first aid kit that was taken into the caves. Deet insect repellant & bite relief spray were also taken, together with hand sanitizing gels.

Pitch Hauling Equipment

In case of unforeseen problems or mistakes we ensured that we had available and sufficient spare equipment to allow an unconscious caver to be hauled up a pitch if necessary.

Surveying

We used a Leica Disto X310 for measurements, initially recorded via a PDA which was damaged on the third day of the expedition. Subsequently measurements were recorded by traditional methods.

GPS

Cave locations were established by GPS. We used a Garmin 62S.

Expedition day by day

By Patricia

Friday 13th and Saturday 14th September: aeroplane and arrival days

Robin starts his journey when he leaves home at 10am on Friday 13th. He travels to Gatwick airport to join an evening flight, spending a few sunny hours in the garden of a nearby country house whilst *en route*. The flight with Emirates takes him first to Dubai and then after a few hours in the airport on to Addis Ababa where he is greeted on arrival in the car park by Nasir and Clement and taken to Clement's house.

We start early on Saturday with a flight from Lyon to Frankfurt with Lufthansa and then on to Addis Ababa. We arrive late on Saturday and are joined by Clement.

For all of us the arrival process is made easier by having taken advantage of the new (to us) online visa system, which allows us to avoid the normal "visa on arrival" queues.

Sunday 15th September: car day

The meeting is at 6 in the morning with Nasir arriving at Clement's house.

We leave Addis at around 6:30am. Our driver is called Hailé. We give a lift to a lady who is head of Nasir's bureau for the Hararghe Region. She has the front seat, so Nasir sits on the luggage and we are four people in the back seats of the car.
We stop at 8:30 to take breakfast at Adama (fatira = eggs and sort of pancake, with sugar) and withdraw money from an ATM.

We continue on the road until we reach Chiro at 12:30, the weather is hot and we need to walk after a cramped journey.

A small plate of rice is sufficient for us, as we are not very hungry. The Ethiopian people eat a large portion with meat, rice, and a pancake.

Figure 13: Gravel roads are not dry

We restart after talking for 30 minutes near the car. Our first child come to see us.
The rain arrives at around 3pm. We leave the tarmac road and the dirt road becomes muddy in places. We reach the town of Goro Muti (the name of both town and woreda) at 5pm. We meet the local officials in a room with flowers and cushions for reclining around the walls. They offer us khat and there is a welcoming coffee ceremony. We walk a little in the village, meet some people. Four soldiers come with us.

Figure 12: Green landscape

The meal arrives at 10:45: injerra and goat in different forms. They brought us a crate of beer, we just drink a beer each, and when we arrive in our sleeping room, we find some men finishing the beers. We go to bed at midnight.

Monday 16th September: some caves on a walk

We wake up at 8 and go to breakfast with chai in a canteen. On the way back, we stop for coffee. A lot of sugar in all things: chai, coffee…

Figure 14: Breakfast

We pack our equipment and enter the car at 10:30. The army and official people are in the ambulance, but we are unable to follow the road which is a lake of mud. So we return to Goro Muti and visit four caves near the town by walking. At 11:30 we arrive at a vertical cave which Antoine rigs and enters. Clement, Nasir and Robin follow when he announces it is worthwhile. After a 14 m pitch, there is a 14 m horizontal gallery to finish.

We go to another location, Antoine descends a 14 m pitch and it ends. No-one follows. It is 12:30.

Nasir talks about a resurgence and we take a very steep descent to the bottom of the valley. With mud, it is not easy. We arrive at a porcupine cave at 2:45. It is short and goes nowhere. We traverse the cliffs to reach another location at 4:15. Clement bolts and descends, but this is just a 7 m deep rift. We follow the path to return to the village, arriving at 5:30. We change our clothes and go to eat. The meal is ready. We return to our room at 7:00 to drink a coffee. The coffee needs a long time of preparation. We talk and go to bed at 10:00.

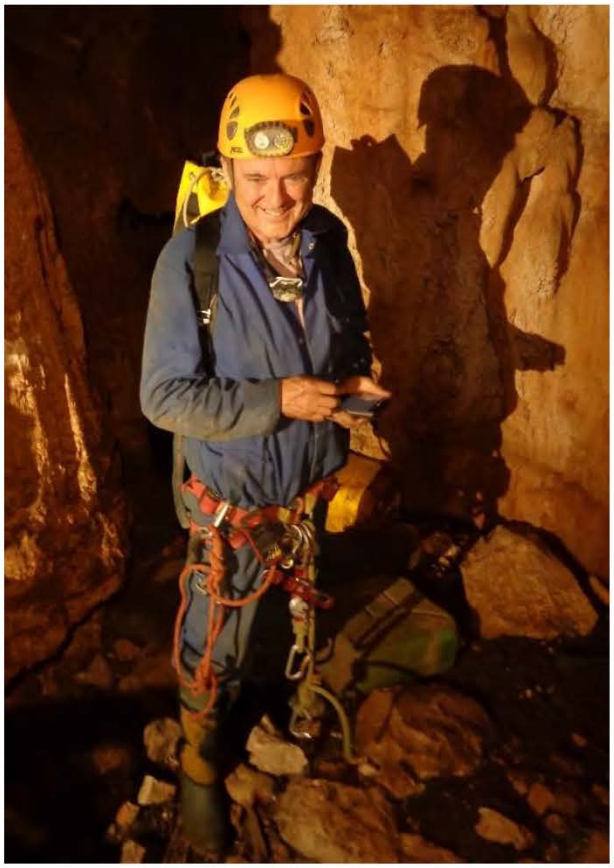


Figure 15:Robin in Enkuftu Debe

It is raining all night long, very loud on the tin roof.

Tuesday 17th September: car day

Wake up at 8:00, go to breakfast through the muddy street. Nasir says that because of the rain, We will move to another region. So we go by car at 10:00 after taking fuel and checking the tyre (goma).

We leave Clement at 12:00 in Karamile town, at a bus to Dire Dawa. He'll stay with Nasir's cousin overnight and go to the airport the day after. Later on, he will tell us that his journey had been very easy thanks to Nasir. Indeed, one person was here to escort him at every step. The final stage will be by motorbike.

We stop at 1:00 to eat an injerra without meat with Nasir and Hailé. Nice moment.

We continue until we reach Djadja town at 5:00, meeting the head of the culture and tourism bureau to explain what we do. He gives us the use of a house in a quiet part of the town.

Figure 16: Definitely the road is not dry!

Ladies conduct a coffee ceremony. Then at 9 :00, we eat pasta with vegetables prepared by the same ladies. The Ethiopian men finish their khat and eat the meal. We go to bed at 10:00.

Wednesday 18th September: 2nd deepest cave of Ethiopia

Wake up at 7:00, prepare our equipment and go to breakfast at 8:00: chaï, scrambled eggs with big pancakes. Then a stop for coffee where we are also offered a bowl of beans.

We discover that we leave our house today so we pack all our stuff. We rush and by 9:00 we are in the car. We stop at the tyre repair shop. We wait for electricity and oil for the compressor.

We arrive at 10:45 at the parking place. Just a 10-minute walk and we see a big pothole. Antoine enters first at 11:30. Bats and birds live here: they make noises. There is a 110 m pitch, much of which is free hanging, leading to a platform at 20 m before what we imagine to be the bottom. Actually, it is not the bottom, it continues with another pitch.

Figure 17: Antoine almost ready

I join Antoine at 12:30. The rock is not good, bolts are not safe. Antoine finds a place to put 2 bolts and we go to the bottom. It continues a little, through the stones and a nice cylindrical pitch, but only mud and stones at the end.

Figure 18: The Pitch

We return. During this time, Robin has surveyed down to the end of the big pitch. Antoine ascends first to install something to help Robin during the return. I wait, seeing alive mice and a dead bat. Finally I reach the surface at 5:00, just as a rainstorm appears likely.

At arrival, people give us Fanta to drink, Robin says that he has lost the disto. So we leave the ropes in place and run to the car

under some little rain. We'll come back tomorrow.

When we arrive at the town, there is no place for us. Eventually, we are given a room at the army/police barracks. We succeed in taking a shower in the garden of the barracks. At 7:00, we go to a place to eat and drink a beer. At 8:00 it's time to go to our room, wondering what we do last evening to cause this decrease in accommodation category… but we appreciate the local effort to install electricity for us, in this barrack office. It is like being in an aquarium with the windows …

We block the large window with a mattress. 9:00, nice time to go to bed after this unexpectedly hard day in this so strange and not quiet place. During the night, we are attacked by mosquitoes…

Tuesday 19th September: end of the 2nd deepest

Wake up at 7:00 for Robin and I. Antoine wait until 7:20 for a *rendez-vous* at 7:30.

We find Nasir and Hailé and go to a place for breakfast with "beignet" (Robin says that this doesn't exist in England because they have no proper food). Unfortunately, it's too late at 7:45 so we go at the same place as the previous day. The only difference is the place we sit: we choose nearby near to the cook woman. There are potato with eggs inside. We bring with us the farenji dynar (fruits). As an extra, a man brings us beignet! not the best form, but the taste is here… After that, it is coffee time.

Patou's beignet is a doughnut – but in fritter form. We later found a "round" version with no jam in the middle and without the normal coating of sugar. *I much prefer British doughnuts!* [Robin]

Figure 20: Nasir at the first rebelay

We return to our room, prepare our equipment and travel to the cave at 9:10. No tyre problem this morning, we just buy a school notebook and water.

We suggest that Nasir should go to the first rebelay, but he wishes he could go to the bottom with a cameraman to film him… As it is technically difficult and we cannot spare the time, Robin persuades him. Antoine enters to find the disto, then finishes the derig and hauls out the tackle.

Figure 19:Walking….

During this time, we have a look at the second cave: a vertical one again. Antoine comes back with the disto. We eat bananas, and go to the other cave, called Enkuftu Wachu II. I begin to put the rope and there is a 40 m pitch, so Antoine continues. Nasir comes to the bottom, with Antoine and me. It is a big chamber and that's all. Antoine and I make the survey while Nasir goes out. We are out around at 5:00. Corn has been cooked on a fire near the cave. When we change our clothes, Robin puts a foot in the embers and is shocked!

We return to the town at 6:30, go to the same place as yesterday to eat and drink a beer. We have pasta and vegetables. We eat with a fork and a spoon! We are visited by the head of the woreda. We go to our room for the coffee ceremony. Popcorn is already cooked when we arrived. People are coming, like for a party, including the senior officer of the army.

When Robin thanks him and says that the soldiers have been very efficient, he answers that they will always be with us. Some women are very well dressed, and we have fun with a little man wanting to buy 4 French wives and the yellow dress woman eating popcorn whilst looking at Robin with insistence and Robin commenting that she has a nice smile. Suddenly, they all leave at 8:30. The three of us stay talking until 10:00.

Figure 21: Party at the police station

Friday 20th September: walk and caves

Wake up at 7 for Robin and I, Antoine waits until 7:29 for the 7:30 meeting. He's not very well. Nor are Nasir and Hailé. They think that yesterday's pasta is the cause. Nasir says that we can move to a better room but we decide to stay, the soldiers are a good company. We go to breakfast at the same place as the other days. Beignets come in first. Then we go to coffee place. We leave at 9:15 by car, setting out in the wrong direction, but turning around after 30 m.

We arrive at a place to park, walk on a level path which finally becomes a climb. We reach Holqa Beke which is a nearly dry resurgence at 11:00. Robin, Nasir and I enter. After a 5 m crawl, we reach a small chamber in a 1 m high bedding plane which continues in a damp streamway with the occasional puddle. It becomes too tight after 15 m but continues.

Figure 22: Entrance of Holga Beke

We return to the car and eat at the same place as the morning. We have rice and injera with vegetables and salad at 12:30. We give what is left to a homeless man, and a crazy naked man comes. They fight and the homeless takes all the food in his clothes.

We drive in a new direction, then walk in the mountain to reach Holqa Halele. We wait while people clear the entrance for us and then enter the horizontal cave. There is a long chamber, then a climb over boulders to reach another chamber which is followed by a narrow connection to a final chamber, well decorated but with bats and low oxygen. Robin is alone in it.

We return to the car at 4:00, stop on the road and, after a long walk, go to Holqa Gola. It is impossible to see throught undergrowth which is cleared by machete. The small entrance leads to a muddy stream. Robin enters first, then Nasir. I have no time to go inside: we hear the alarm and Robin, wet until the middle of his body comes back announcing that the stream sumps in both directions and that the downstream sump is nearly blocked by silt. We return to the car and when the Ethiopians see the impact of mosquito bites on Robin's body, they decide to give us mosquito nets for the night!

Figure 23: The Daily team

We arrive at 5:00 at the barracks. Coffee is coming very quickly, we have just time to order and eat samosa from the market. As we drink the coffee, a man comes with a meal and beers. People come, more and more, we share the food and Nasir plays music: Robin is invited to dance by an army girl. A young guy of army is very good – we all learn Ethiopian dancing.

At 8:30, the party ends and everyone leaves. Nasir explains to us that tomorrow, we will drive 25 km and explore a cave. If we have enough time, we will also explore an enkuftu.

We do our homework at 9:00. Then we go to bed under mosquito nets. It rains during the night, while our newly washed clothes are outside…

Saturday 21st September: the most beautiful cave

As the other morning, we have breakfast at the same place. The difference is that there are fewer people, as it is a day off. Our coffee place is closed, but they are relaxing outside and kindly served us.

We leave by car at 9:30 on a difficult road. 25 km in 2 hours. We arrive at 11:30 in Kuma Billisouma village. We first sit under the meeting tree, and then go with the village headman and the army the direction of the hills on the far side of the valley. Nasir explains us that nialas live in the forest in these hills. People come specially here to see or to kill them, if they pay.

2 hours and 6 kms later, we are near a cliff, with a horizontal cave entrance (Holqa Boira). We are not confident. Nasir and Robin go inside, and come back after 30 minutes: they stopped because a corner in a passage is too narrow. Antoine takes a hammer and goes back with Nasir. I am ill and sleep at the entrance: soldiers prepare me a grass bed. At 3:40, Robin goes to see what happens. He comes back at 3:55 saying he passed the corner but that there are more narrow passages beyond. Antoine and Nasir come back 10 minutes after Robin. "it is Orgnac" says Antoine: chambers with huge formations …

We go all together just to see the beginning. We come back at 4:45, leave our bags in a house at the end of the hills and continue walking. When we reach the wider path, we are joined by motorcycles to finish the journey, probably the most dangerous thing we did.

Figure 24: Robin in the tight passage protecting the cave

We arrive at 6:00 and are installed in a house near the school. Hailé has gone to another village to buy something to cook. Nasir arranges rooms for the 9 soldiers and finds khat for them. We eat some pasta with tuna and tomato in this place. We wait for a coffee, but at 8:30, Robin and I are asleep. So we go to bed. It rains all night long.

Sunday 22nd September: survey of the most beautiful cave

Difficult to wake up at 8 for Antoine and I: we are not well. We eat rice at 8:30, then drink coffee and leave at 9 to walk to the cave. We arrive at 11:00. Antoine and I make the survey,

Robin and Nasir go ahead to check the air and take photos.
We meet them at 2:30. They are coming back, still taking photos. We go with them to their stop Point. Then we return and continue surveying for 2 hours. In the final chamber we find a hidden continuation but must stop at 4:15.

When leaving the cave, Robin tells the Head of Culture & Tourism that this is the most beautiful cave he has ever seen in Ethiopia. He reports that to the villagers and the soldiers assembled outside. They burst into spontaneous applause and decide to rename it Holqa Naasiol (most beautiful cave).

We are ready to go back to the village at 5:00. We finish the journey on motorcycles. We want to return the next day to complete the exploration. Unfortunately, the army can't stay, so we have to leave with them. We drive from 7:00 to 9:00 in the dark. Our car gets stuck in a muddy section of the road. Army guys use one of our ropes to pull the car out.

When we arrive at 9:00, a meal of spaghetti is ready. And the coffee ceremony is waiting for us. Guys come to see the photos, talk… we go to bed at 11:00.

Figure 25: We return by motor bike

Monday 23th September: car day

Wake up as usual, but meet at 8:00. Go to the same places for breakfast and coffee. Then, we meet the deputy head of administration (the head was attending a conference) and the head of Culture & Tourism to explain what we had found and say thank you. After waiting for administrative papers we say good-bye to everyone, take pictures and leave at 11:00. We stop at 2:00 to eat injerra at the same place in Karamilé town. We are joined at Chalenko by a car from the woreda, because Hailé needs to remain there to check the car.

We arrive at 4:30 at Goro Muti. Antoine has a stomach problem probably due to the injerra. Robin and I visit the town with a retired teacher. We walk with many children,

seeing samosa and beignet being cooked in the street.

Figure 26: We goodbye to the Djadja team

Back at the house, we have the coffee ceremony. Antoine is ill and sleeps. Robin and I read our books. People of the village talk a long time; it seems to be about politics.

We have spaghetti at 9:30, finish at 9:45 and go to bed. It rains during the night.

Tuesday 24th September: another deep cave

We go to breakfast at 8 (eggs), then for coffee and to the administrative office give a call to the army. As nobody answers, we leave and wait in our room. We are not comfortable with the atmosphere in this town nor to the cave potential.

When the new driver is awake, we are driven at 10:00 towards the caves which were intended for the first day. There are some muddy patches in the road but the journey is only 30 minutes by car. The driver drives very fast, even when there are children on the road.

Army guys carry our caving bags. We reach a vertical cave, Enkuftu Kure 1 after about 20 minutes which I descend and finish, from 11:00 to 12:00.

Figure 27: Robin & Ethiopian

We then go to another vertical cave, Enkuftu Kure 2. We arrive at 12:30. Big entrance, big pitch… I go in first and it takes time as I am a beginner at drilling. I put a 60 m rope, arrive to a little ledge, and Antoine joins me with more ropes. It is 4:00, and we estimate that it remains at least 40 m more to rig. We go back to the town. In the opposite direction, we meet a lot of people with cows and goats: it is market day and many people have new animals. We have a walk in the market: there are a lot of plastic shoes and Chinese clothes. We eat spaghetti, prepared for our lunch. We have samosa and round beignets as well. We finish with a coffee. We order beers, but they do not arrive until 9:00. We talk and go to bed at 10:00. Rain during the night.

Figure 28: Robin and children

Wednesday 25th September: end of the 3rd deepest cave and travel to Harar

We do the same things as all other mornings and we are ready at 8:45. We travel to the cave in the car. For safety Antoine removes large stones from the top of the pot and enters at 10:30. At 11:15, he says: "wait another 45 min". At 12:00, I go to talk with him. We decide that Nasir can go to the second rebelay. It takes time, because it isn't easy. At 1:30, Nasir comes back. Antoine returns at 2:30 having bottomed the cave. We return to the car park at 3:00 and wait for the car. We have the yesterday's evening beers!

The car comes at 4:00. The young driver is khating and drives through the lake of mud. At Goro Muti, he decides to clean the car. We leave at 5:00 and arrive at 8:30 in Harar.

The journey is long and hard because we are 4 at the back of the car with some bags. The traditional hotel is full so we find another. There are bathrooms but the plumbing doesn't work – water is provided in 25 litre yellow drums. We go to a pizzeria to eat. We talk a long time about how to return to Addis as we have no car, and big bags. We have no information about the prices and way. Wait for the day after. We go at 10:00 at the hotel. It is quiet at the beginning and after one moment, dogs start barking.

Figure 29: Last beer before a long trip to return home

Thursday 26th September: Harar day

Meeting at 8:00, we breakfast in a service station cafe on the nearby roundabout. We take coffee, chaï and cakes. We return to the hotel at 9:15, and clean the equipment whilst talking with young Ethiopians, some of whom helped. They seem to be very impressed by the fact that we could go into water in a cave. We stay outside, in front of the hotel, write diary, drink draught beers, and wait for information on the journey to Addis the next day.

Nasir calls his boss who contacts the car company and insists that we are provided with a car. Haile will return overnight and will be with us in the morning.

We organise the cave data for surveys. We go into Harar town to buy some fabric (100 birr for a dress length) and watch a tailor sew the dresses (20 birr each).

We eat typical pieces of beef for the evening meal. Robin watches.

Return at 9:00 at the hotel.

Figure 30: Have you ever tried to eat spaghetti by hand?

Friday 27th September: car day

Meeting point at 7. All our stuff is ready! We first go for a coffee at the same place as the day before. We take time and I understands the time shown by the clock on the wall! At the end of the 2nd trip!! Hailé calls Nasir during the walk back. Happy to see him again. We put all the stuff in the car. It is difficult, because Nasir bought some pasta,

oil, carpets…. At 9, Hailé takes a breakfast and we finally go at 9:30.

A long long car day! difficult for I who has problem with pressure in ears.

The check point is not so horrible and long, compared to the other travellers. We stop to eat pasta in a place where Nasir says that water is not good. Indeed, people seems have tooth problems.

We reach Addis, just at the beginning of the Meskel festivity. We stay in Clement's house for the evening, eating some food he prepared for us (*mousse au chocolat* and *chouquettes*). We update him on our last days. Re-connection to internet, plane check in….

Saturday 28th September: Addis day

Rain during the night. The day is cloudy. We want to visit a museum, but as it is a special day, the museum is closed. We go to visit a market, but as it is a special day, there is nobody and all is closed…. We go finally to the Lucy museum and we meet Lucy and Selam, our ancestors.

We join Nasir and go to the pizza restaurant: we are alone! Clement drives Robin to the airport at 1 in the afternoon and we spend the afternoon working on data, pictures, international caving strategy with Nasir. In the evening, we go to a nice place to listen traditional music with Clément and his son, Raphaël. Then Clement drives Antoine and me to the airport.

End of this 2019 episode. To be continued.

Figure 31: Vine and karst

Expedition Accounts

Total cost of the expedition was supported by the European cavers. Moreover, we gave some euros to Nasir for his job.

As the other years, the major part was the car. Food and accommodation were not important in the total. Especially as we stayed in places without tourist accommodation.
Note the khat army part.

Category	Detail	Price (€)	Price/Person (3)
Transport	Plane ticket (France)	880 €	462 €
	Plane ticket (UK)	505 €	
Visa		180 €	60 €
Life on Ethiopia		1 312, 50€	437,50 €
Equipment		100 €	33 €
Total		**2 977, 50 €**	**992,50 €**

Cost details of the *life in Ethiopia*:

Category	Detail	Price (beer)
Food	Daily food	5 500
	Water	500
	Soft drinks, beer & coffee	1 040
	Fruits	300
	Breakfast	140
	Restaurant	460
Accommodation	Army Khat	1 200
	Village	1 600
	Hotel at Harar	1 200
Transport	Car & driver	27 000
Nasir		2 750
Total		42 000 br 1 312, 50€

In 2014, the visa was 15 € and it is 60 € (4 times more than 5 years ago).

Figure 32: Extentrics Valse

Ethiopia's longest and deepest caves

There are only 36 known caves in Ethiopia over 100 m long and together they have 39 km of passages, of which 15.1 km are to be found in Sof Omar. The series of Anglo/French expeditions conducted since 2011 have added 27 caves and 11 km to this list.

	Cave	Zone	Province	Len.	Expedition	Year
1	Sof Omar	Bale	Oromia	15,100	Various	1897-1972
2	Holqa Achere	W Hararghe	Oromia	3,830	Huddersfield Uni SS	1995-1996
3	Holqa Ayanage	W Hararghe	Oromia	3,308	Huddersfield Uni SS	1995-1996
4	Holqa Warabesa	W Hararghe	Oromia	3,108	Ethiopia 2011 & 2012	2011-2012
5	Nur Mohaned	Bale	Oromia	2,500	BSEE	1972
6	Holqa Oromo	E Hararghe	Oromia	1,500	Italian Expedition	2008-2009
7	Holqa Rukiessa	W Hararghe	Oromia	1,071	Club Alpino Italiano	2006
8	Holqa Bero	W Hararghe	Oromia	884	Ethiopia 2012	2012
9	Holqa Naasïol	E Hararghe	Oromia	483	Oromia 2019	2019
10	Goma Sadaa	Bale	Oromia	489	SS Suisse	2004
11	Holqa Nanoo	W Hararghe	Oromia	457	Ethiopia 2012	2012
12	Holqa Danzuriyaa	Bale	Oromia	450	SS Suisse	2004
13	Rako Barzala	E Hararghe	Oromia	437	Ethiopia 2011	2011
14	Holqa Chafe	W Hararghe	Oromia	414	Ethiopia 2013	2013
15	Enkuftu Kabanawa	W Hararghe	Oromia	405	Ethiopia 2012	2012
16	Goda Mea	W Hararghe	Oromia	374	Millennium BC	2007
17	Holqa Ijafavitee	W Hararghe	Oromia	362	Ethiopia 2012	2012
18	Holqa Zayei	S Tigray	Tigray	330	D Causer	1962
19	Enkuftu Abonyu	W Hararghe	Oromia	306	Ethiopia 2013	2013
20	Melkay Mana	Bale	Oromia	294	BSEE	1972

[1] Length is as surveyed by the Ethiopia 2012 expedition (Holqa Dollys in their expedition report).

Deep caves are even less well known but, with the addition of those explored during this expedition, there are now 17 going below 50 m and three which exceed 100 m.

	Cave	Zone	Province	Len.	Expedition	Year
1	Enkuftu Mohu	E Hararghe	Oromia	-192	W Morton	1973-75
2	Enkuftu Wachu I	E Hararghe	Oromia	-141	Oromia 2019	2019
3	Enkuftu Kure 2	E Hararghe	Oromia	-100	Oromia 2019	2019
4	Enkuftu Abonyu	W Hararghe	Oromia	-94	Ethiopia 2013	2013
5	Enkuftu Dideesa	E Hararghe	Oromia	-80	W Morton	1973
6	Enkuftu Diblo	W Hararghe	Oromia	-80	Oromia 2013	2013
7	Holqa Rukiessa	W Hararghe	Oromia	-72	Club Alpino Italiano	2006
8	Holqa Warabesa	W Hararghe	Oromia	-70	Ethiopia 2011 & 2012	2011-12
9	Enkuftu Mitata	E Hararghe	Oromia	-68	Ethiopia 2011	2011
10	Enkuftu Hade Kure	E Hararghe	Oromia	-66	W Morton	1973
11	Enkuftu Gusa 2	W Hararghe	Oromia	-65	Oromia 2013	2013
12	Tula Kuliwasa 1	E Hararghe	Oromia	-64	W Morton	1971
13	Enkuftu Wenday Darge	E Hararghe	Oromia	-59	BSEE	1972
14	Enkuftu Wachu II	E Hararghe	Oromia	-58	Oromia 2019	2019
15	Enkuftu Kabanawa	W Hararghe	Oromia	-54	Ethiopia 2012	2012
16	Holqa Haro	W Hararghe	Oromia	-53	Ethiopia 2013	2013
17	Enkuftu Uttee	E Hararghe	Oromia	-50	Ethiopia 2013	2013

Explored caves

In total in 10 days of exploration, we have explored and mapped 13 caves and surveyed 1 126 m of passage. All caves are located in the East Haraghe zone in the Oromia region

Cave Name	Wareda	Village	Lat / Long / Alti	Length	Depth
Enkuftu Debe	Goro Muti	Debe	9.20650 / 41.56887 / 2226	33	-22
Enkuftu Nole	Goro Muti	Nole	9.20849 / 41.56503 / 2204	15	-15
Goda Warabessa	Goro Muti	Nole	9.20986 / 41.55801 / 2040	18	0
Enkuftu Bube (Rift cave)	Goro Muti	Goro Muti	9.20685 / 41.55571 / 2074	15	-7
Enkuftu Wachu I	Goro Muti	Jajaa	9.050369 / 41.342076 / 2022	180	-141
Enkuftu Wachu II	Malkabalo	Jajaa	9.05100 / 41.34278 / 2039	168	-58
Holqa Beke	Malkabalo	Makanise	9.05199 / 41.39750 / 1720	30	0
Holqa Halele	Malkabalo	Ala	9.13088 / 41.35282 / 1920	60	0
Holqa Gola	Malkabalo	Tokkuma Gelela	9.10948 / 41.34791 / 1840	20	-2
Holqa Naasïol (Former Boira)	Malkabalo	Tokkuma Jalaala	8.87938 / 41.31052 / 1801	483	-10
Enkuftu Kure I	Goro Muti	Kure	9.14006 / 41.55460 / 2071	21	-21
Enkuftu Kure II	Goro Muti	Kure	9.14238 / 41.55621 / 2089	100	-100
Enkuftu Kure III	Goro Muti	Kure	9.14566 / 41.55434 / 2091	-17	-17

Enkuftu Debe

15 m pot leading to a rift shaped chamber with formations. There is a continuation into a downward sloping narrow gallery and a short easy climb allows access to the upper part of the chamber.

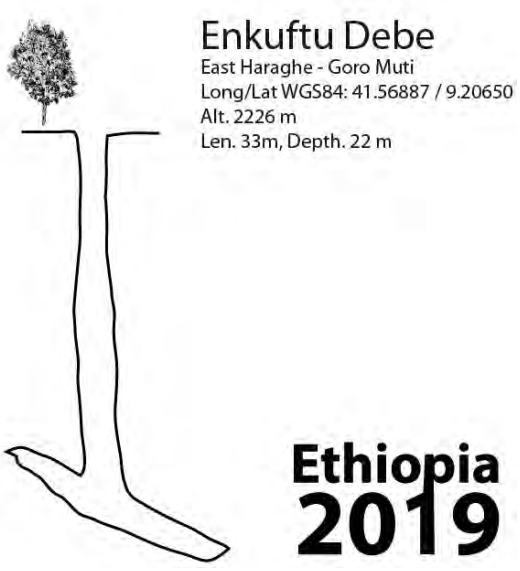


Figure 33: Clement at the entrance to Enkuftu Debe

Enkuftu Nole

Single 15 m blind pot with no continuation. No interest. The entrance is hidden by vegetation.

Enkuftu Nole

East Haraghe - Goro Muti
Lat/Long WGS84: 41.56503 / 9.20849
Alt. 2204 m
Len. 15m, Depth. 15 m

Ethiopia 2019

Figure 34: Antoine in gardening action

Goda Warabessa

Horizontal cave in a dusty bedding plane with porcupine quills, tracks and nest. No interest.

Figure 35: No body is very exicting to explore Goda Warabesse

Goda Warabessa

East Haraghe - Goro Muti
Lat/Long WGS84: 41.55801 / 9.20986
Alt. 2040 m
Len. 18 m

Ethiopia 2019

Enkuftu Bube

Small rift close to the cliff 7 meters deep, 15 meters long, going down and narrow to the north and up to the south.

Enkuftu Wachu I

It is a big pothole where light comes inside. 7 m a handline reaches the pitch head where a tree is used as the main belay. Rebelays at 1.5 m and 10 m are followed by a 70 m free hang to a slope slippery with guano and mud. The rope is used as a safety line to reach the second pitch of 15 m into a big chamber having oval shape, with a cone at its centre. There is another pitch of 8 m at the extremity. No evident continuation. No draught.

Figure 36: The 96 m pitch

At the main rebelay, we hear a sound like a river and during the descent we feel wind but both phenomena are due to the big colonies of bats and birds that are in the roof!

FRENCH

Une entrée impressionnante dans laquelle pénètre la lumière du zénith ! La main courante est attachée autour d'un arbre, et deux relais plus loin, le puits plein vide de 70 m démarre. Au pied, c'est un cône déversant recouvert de guano qui nous conduit à gauche vers un relais dans des concrétions mouldmincheuses pour prendre pied, 15 m plus bas, sur un petit monticule qui conduit à droite vers un puits de 8 m, bouché. A noter qu'au sommet du P15, on a eu la sensation d'entendre une rivière au débit fantastique avant de comprendre qu'il s'agissait en fait du cri des chauves-souris. Le courant d'air que nous avions senti était, en fait, l'air brassé par leurs ailes. Affolées par nos lumières ; elles tournoyaient en-dessous de nous.

Enkuftu Wachu II

The pot is very close to Wachu I and its configuration is very similar but smaller. The entrance is 20 m x 10 m with trees growing from inside. A 7 m handline from a tree at -3 m allows access to the pitch head, then the main rebelay is 4 m below. The descent is free hanging for 40 meters arriving on the top of a cone. The chamber is circular and the ground is muddy. No evident continuation, no draught.

FRENCH

L'entrée se trouve à 5 min à pied de Wachu I. La configuration est comparable, mais les dimensions sont moindres. L'entrée mesure 10 m * 20 m, la main courante de 7 m attachée à un arbre permet d'atteindre un relais à – 3 m qui est le sommet d'un puits plein vide de 40 m. On prend pied sur un cône d'éboulis dans une salle circulaire, au sol boueux. Pas de suite, pas de courant d'air.

Holqa Beke

Resurgence cave with a 5 m crawl from the entrance to a connection with a small chamber 10 m long in a 1 m high bedding plane. The cave continues in a damp streamway with the occasional puddle until it becomes too tight after 15 m. The cave continues beyond the constriction. The air is good. Bats are seen. Not surveyed.

Figure 37: Patou coming up Wachu II

Holqa Halele

A narrow entrance passage leads to a 30 m long well decorated chamber, 8 m high and 9 m wide. Connections to right and left both lead to a second chamber 4 m above. This chamber (6 m long, 7 m wide and 4.5 m high) contains stalactites, cauliflower formations and gour pools. It connects via a 4 m passage to the final chamber (16 m long, 5.5 m wide) which is very well decorated with gour pools and flowstone to the left and large formations to the right. It contains a large colony of bats and very deep guano. Oxygen is 19% and Carbon dioxide 1.3 %. Entry to this chamber is not advised.

Figure 38: The English duck & the solder

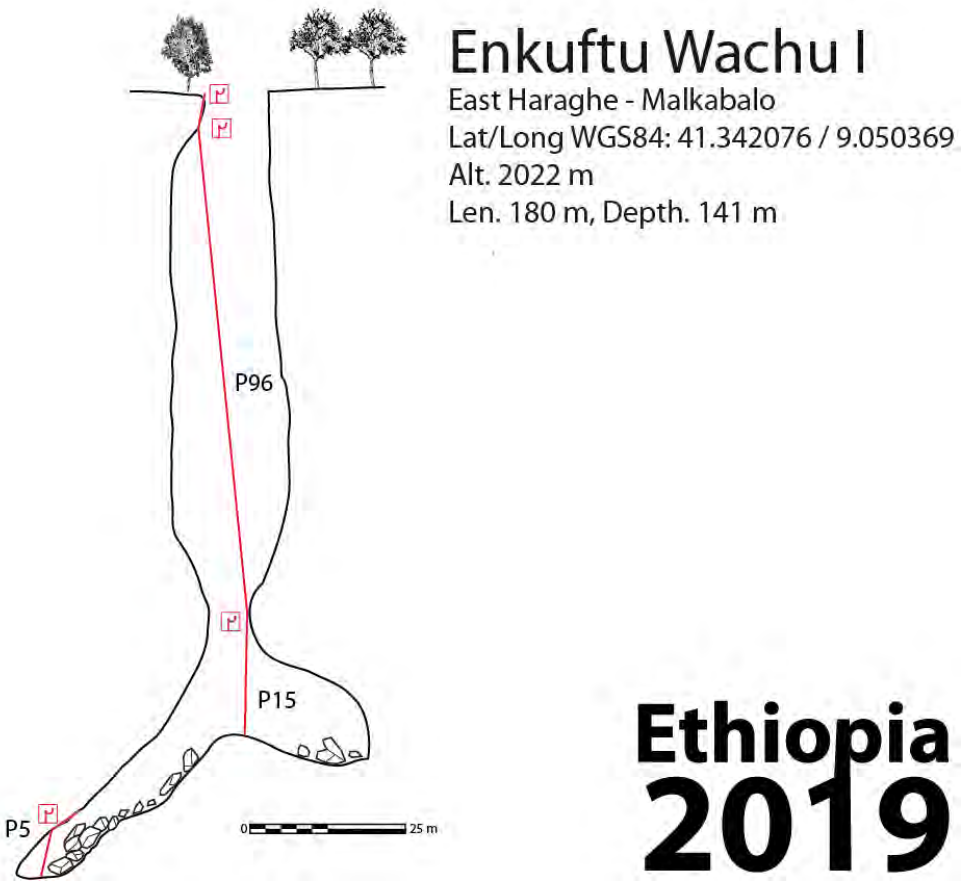
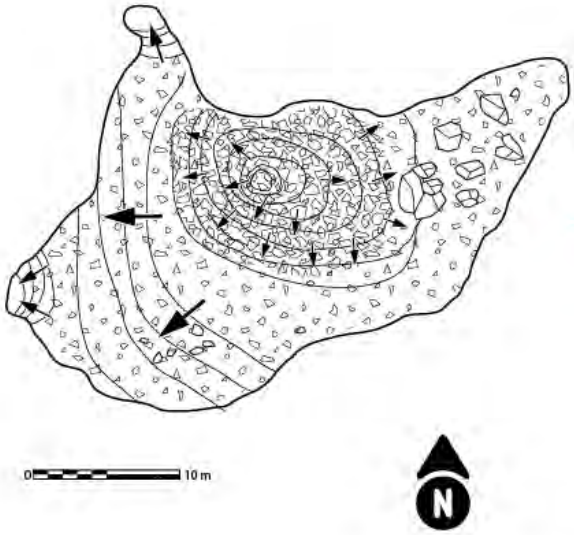
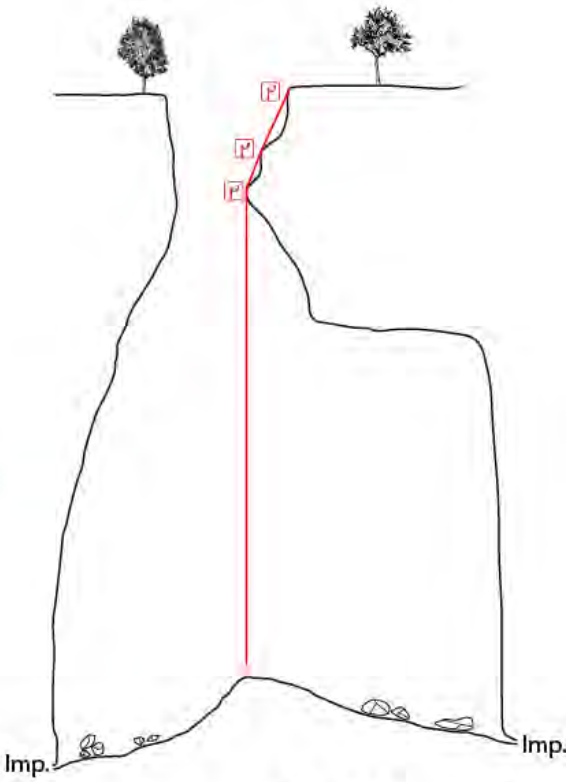


Figure 39: The P96 in Wachu I

Enkuftu Wachu II

Long/Lat WGS84: 41.34278 / 9.05100
Alt. 2039 m
Len. 168m, Depth. 58 m



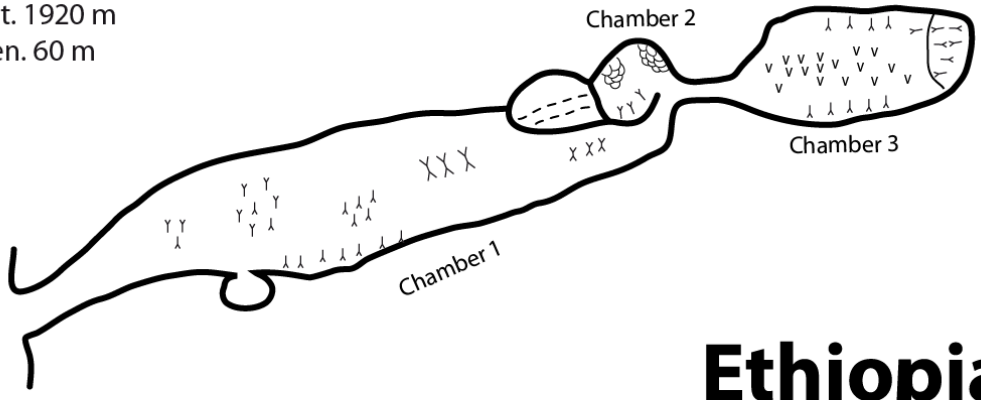


0 10 m

Ethiopia 2019

Holqa Halele

East Haraghe - Malkabalo
Lat/Long WGS84: 41.35282 / 9.13088
Alt. 1920 m
Len. 60 m



Ethiopia 2019

Holqa Gola

A 2 m descent over muddy boulders leads to a 1.5 m wide stream. Downstream sumped immediately. Upstream flows well over deep silt to a duck at 20 m then, 10 m further on, reaches a sump (which may be open in the dry season).

The downstream sump was investigated and found to be nearly blocked by silt.

Not photographed or surveyed.

Enkuftu Kure I

Small entrance (2.5 m x 1.6 m) rigged from a tree and a tree stump on opposite sides.

Figure 40: Patou rigging Enk. Kure I

Enkuftu Kure II

Entrance pothole 11 m x 8 m. Traverse line from a tree, then 1st rebelay at – 3 m and 30 m free hanging pitch. Then, a succession of three rebelays to reach a ledge, 60 m from the top. A lot of loose stones. Traverse line to the left to re-angle the rope for the 40 m last pitch. No passage, no draught.

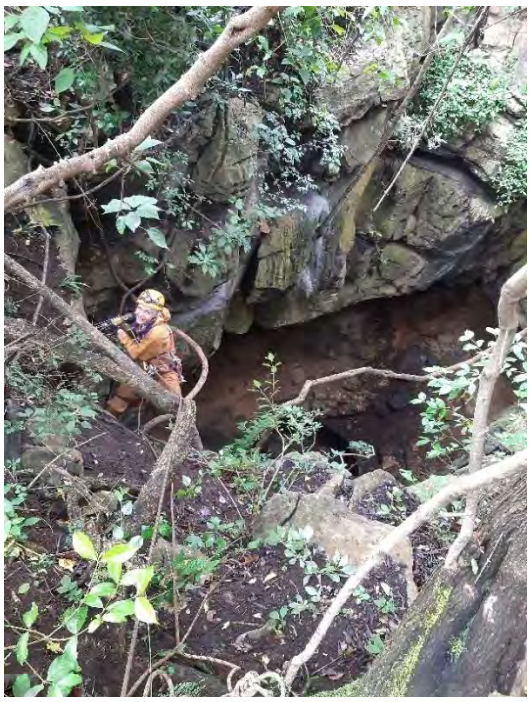
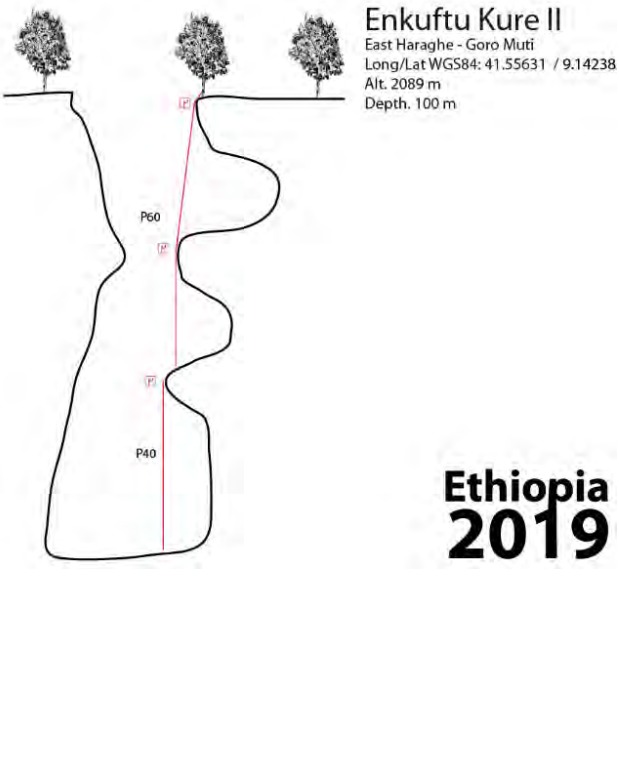


Figure 41: Patou equiping Enk. Kure II



FRENCH

L'entée, au milieu des champs de maïs, sur un plateau, mesure 11 * 8 m. Un mur de pierre a été réalisé pour éviter les chutes d'animaux dans le gouffre. La main courante est attachée à un arbre, puis un relais 3 m plus bas permet une première descente de 30 m plein vide. Une suite de trois relais sont ensuite installés pour éviter les frottements. Il n'est pas possible de s'ancrer dans la coulée stalagmitique en face, car de trop mauvaise qualité. Le 2ème relais de cette série est plein vide, particulièrement inconfortable et bon exercice de pratique pour Nasir. Au bout de 60 m depuis le 1er relais, une plateforme permet d'équiper une main courante pour se déplacer à droite dans l'axe de la suite. La suite est un puits de 40 m, bouché au fond. Pas de suite, pas de courant d'air.

Enkuftu Kure III

Entrance pothole 5 m x 3 m was clearly seen to be blind from above so was not entered or surveyed. Depth 17 m.

FRENCH

La dernière avant de partir : sur le chemin de retour à la voiture, en bordure de sentier. Une entrée de 5 * 3 m, d'une profondeur de 17 m, non équipée, non descendue. Semble borgne et sans suite.

Holqa Naasiol

A 2 hour walk from Tokkuma jalaala passes a farmhouse and eventually reaches a blind valley at the end of which is a cliff with an obvious entrance at the foot.

A dusty hands and knees crawl for 20 m reaches a narrow passage which descends to the left as a flat out crawl to reach a sharp right hand bend. Beyond is a small chamber with a choice of narrow passages. The way on is through a body size hole in the roof of the chamber.

After squeezing through the hole the first of a series of beautifully decorated chambers is reached. These chambers continue for nearly 500 m of mostly easy walking passage containing mind blowing formations ranging from 20 m high pillars through clouds of straws to delicate helictites.

Figure 42: Decorations in Naasiol

FRENCH

Une marche de deux heures depuis Tokkuma, jalaala, nous fait passer devant une ferme et finit par atteindre une vallée borgne au bout de laquelle se trouve une falaise avec une entrée évidente au pied.

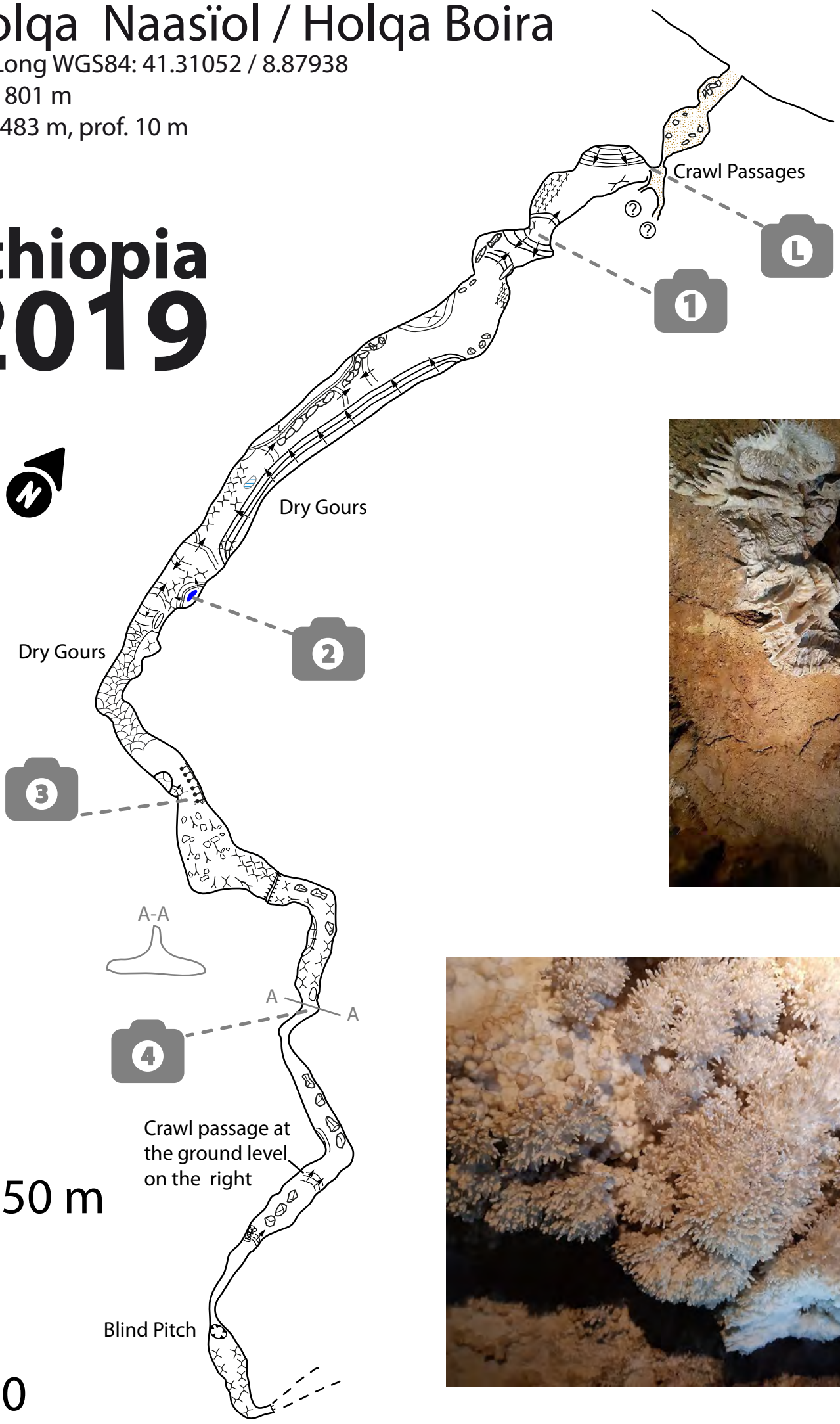
Après un ramping de 20 m à quatre pattes dans la poussière, on aboutit à un passage étroit qui descend à gauche, nous obligeant à s'allonger, pour atteindre un virage serré à droite. Au-delà une petite chambre avec une patte d'oie. La suite se passe par un trou de la taille du corps situé en hauteur et invisible au premier abord.

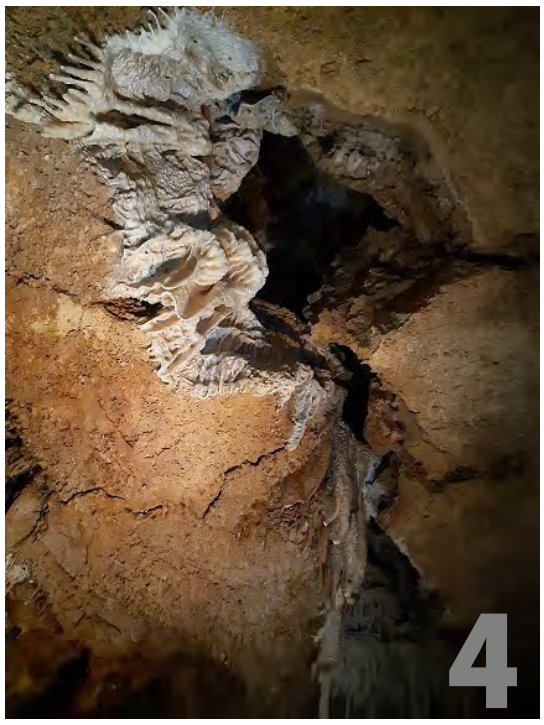
Après avoir franchi le trou, on atteint la première d'une série de chambres joliment décorées. Ces chambres continuent sur près de 500 m sans aucune difficulté de progression. Elles contiennent toutes des formations époustouflantes allant de piliers de 20 m de haut en passant par des excentriques fine et délicates, sur plusieurs niveaux.

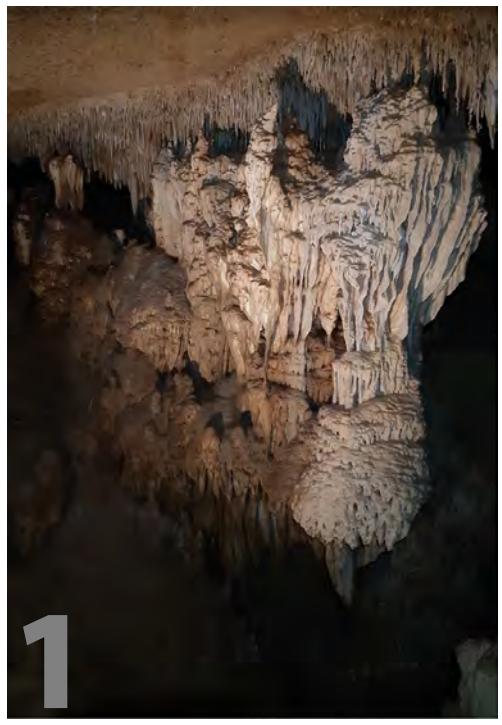
Holqa Naasïol / Holqa Boira

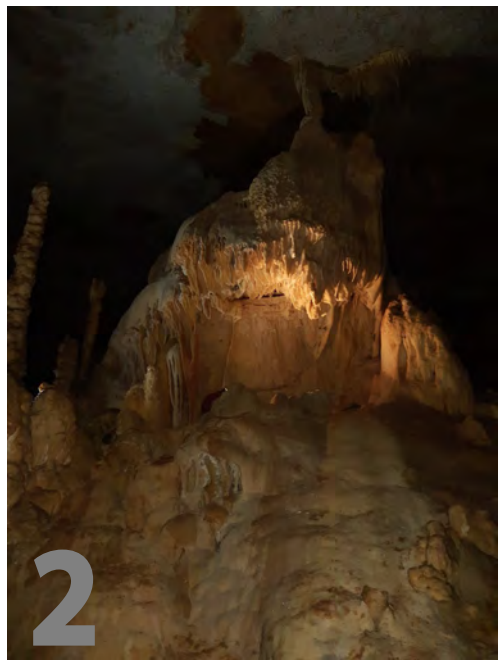
Lat/Long WGS84: 41.31052 / 8.87938
Alt. 1801 m
dev. 483 m, prof. 10 m

Ethiopia
2019









Cave inventory

As explained in previous sections, serious caving exploration has been conducted in Ethiopia since 1972. In 2016, Robin Weare started to concentrate all cave records. His database can be consulted online (https://ethiopian-caving.org.uk).

Major problems have arisen from the fact that the alphabet is not the Latin one. Spelling and/or translation mistakes occur very frequently between reports. One aim of this expedition was to produce a unified inventory of the Ethiopian caves. All records will be uploaded in GrottoCenter.

By 2019, more than 200 caves have been recorded in Ethiopia. These are mainly located in the Oromia region.

The geological maps, next following pages, show that the Somali region, not to be confused with the neighboring country, is also very karstic. Unfortunately, the security conditions are not favorable to expeditions

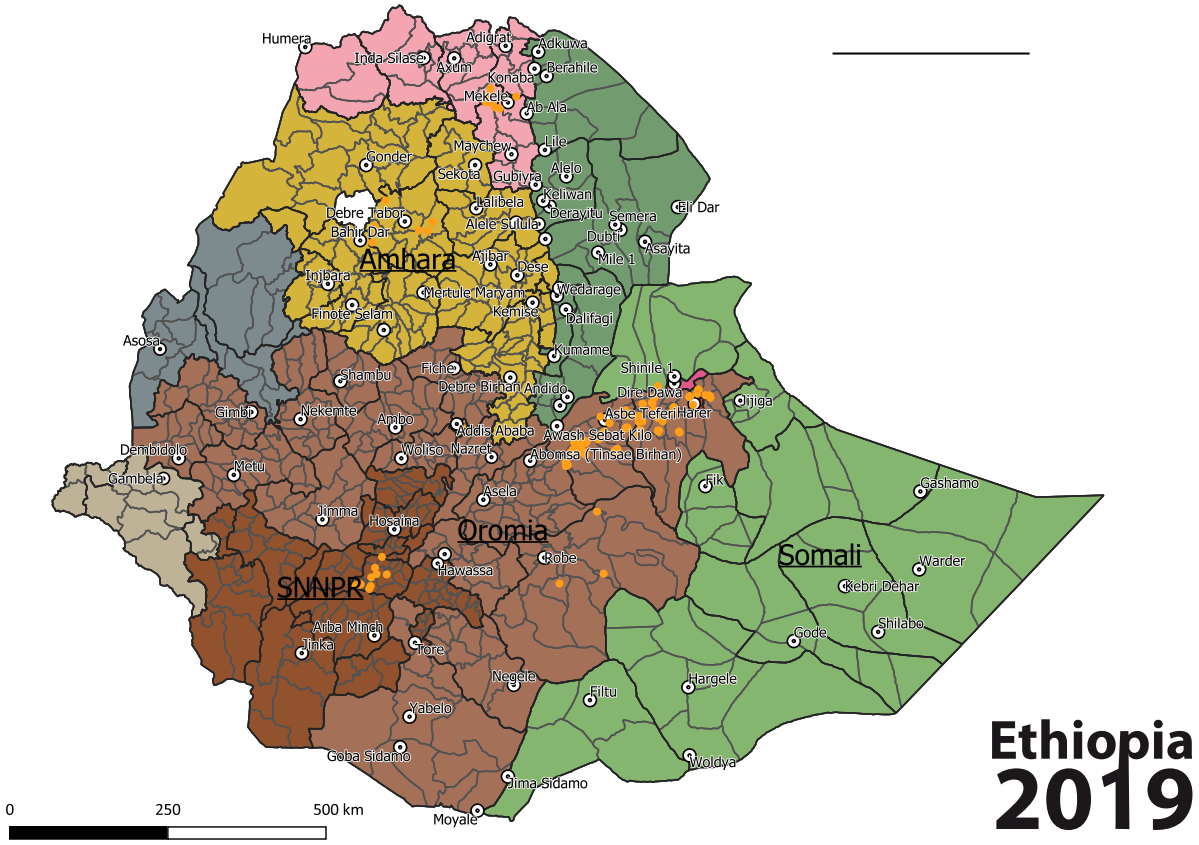
FRENCH

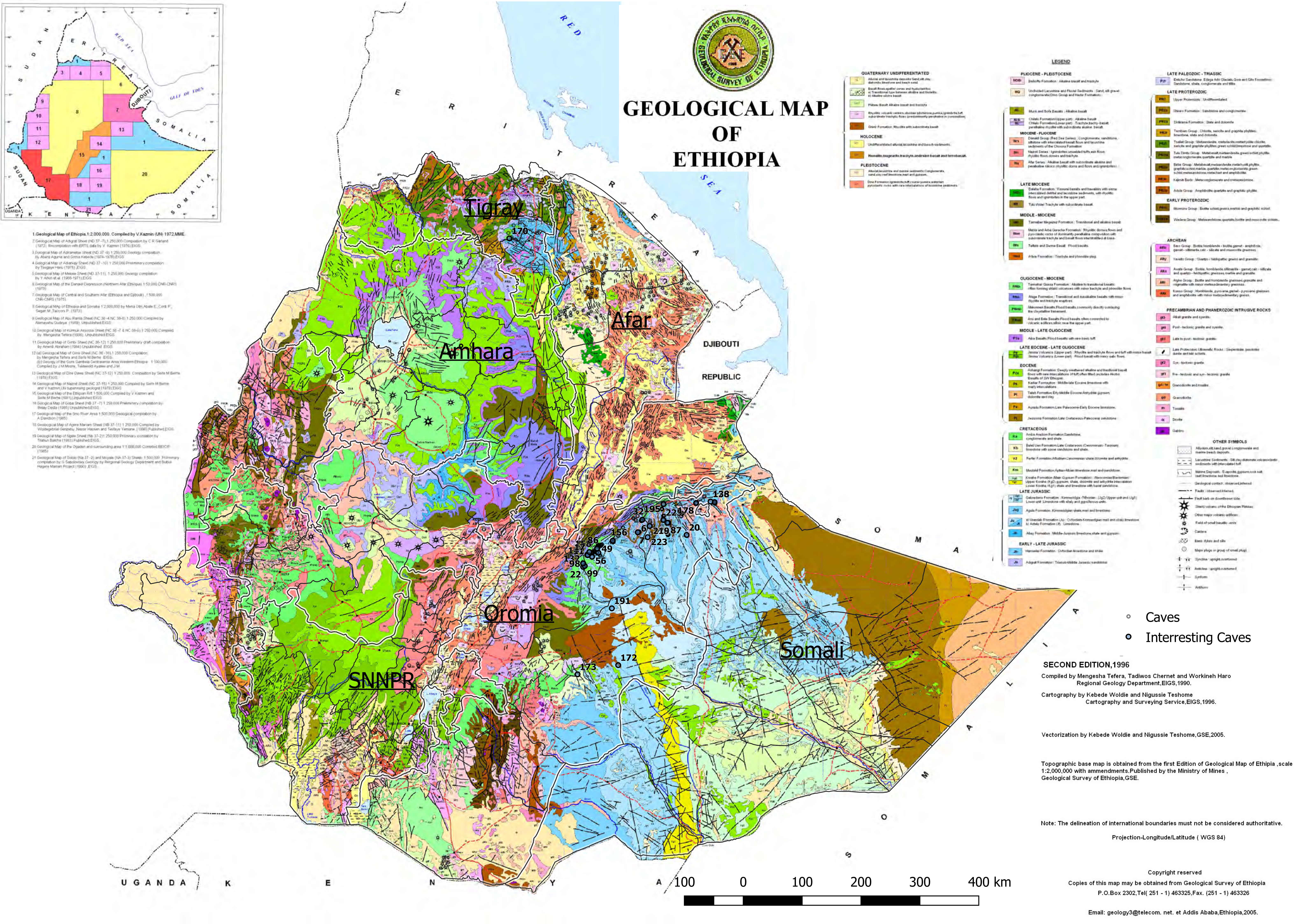
Comme indiqué dans le paragraphe précèdent, les explorations karstiques ont démarré en 1972. En 2016, Robin Weare a commencé un travail de synthèse des données sur les cavités. Sa base de données est accessible en ligne (https://ethiopian-caving.org.uk).

La difficulté majeure en Ethiopie réside dans les erreurs générées par la traduction d'alphabet, qui apparaissent entre les rapports d'expéditions. L'un des objectifs de cette expédition est aussi de produire une base unique de l'inventaire des cavités éthiopiennes recensées. Toutes les données sont consultables sur GrottoCenter.

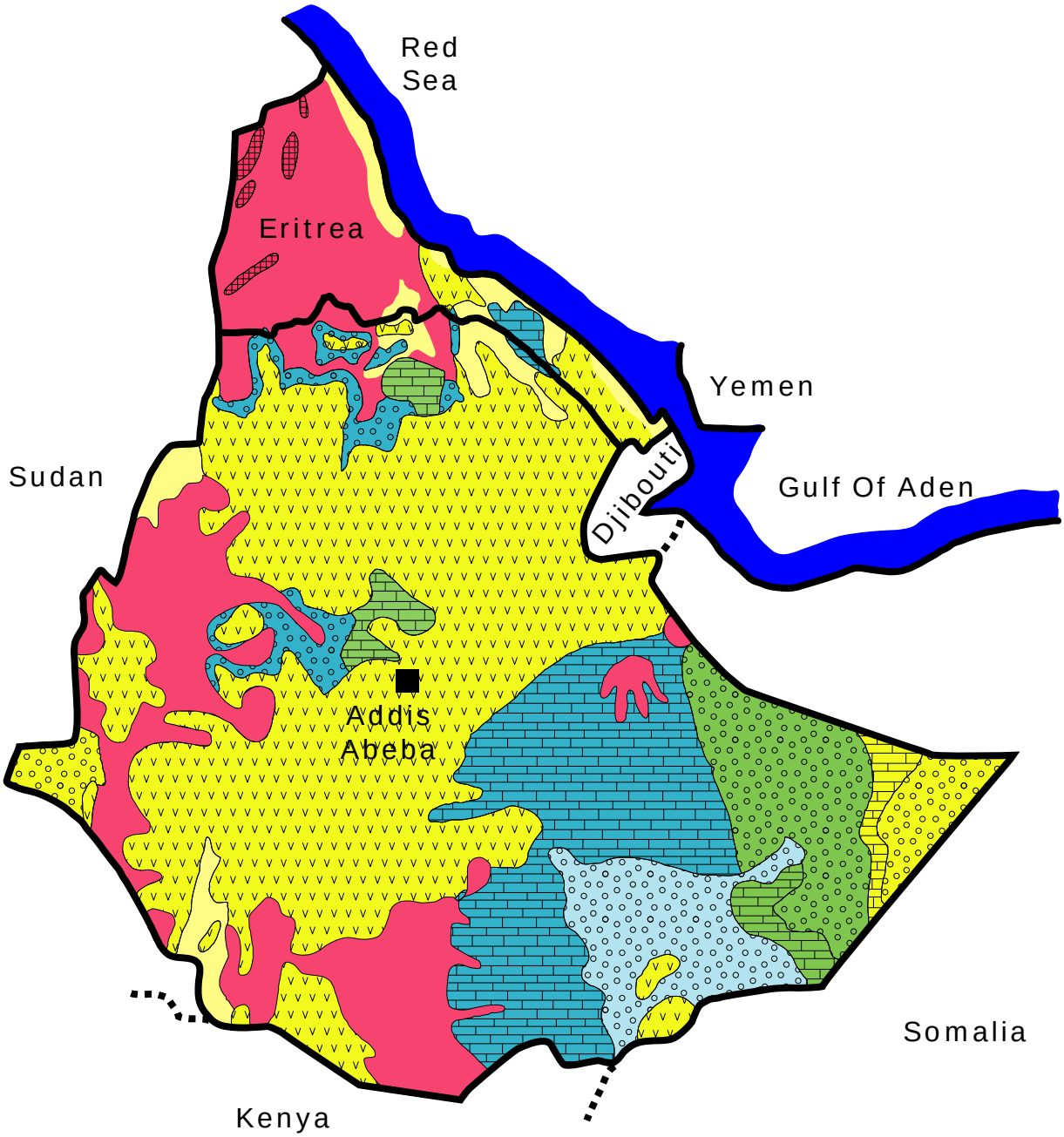
En 2019, ce sont plus de 200 cavités qui ont été inventoriées en Ethiopie. Elles sont majoritairement localisées dans la province d'Oromia.

Les cartes géologiques, pages suivantes, montrent que la région Somali, à ne pas confondre avec le pays voisin, est également très karstique. Malheureusement les conditions de sécurité ne sont favorables aux expéditions.




GEOLOGICAL MAP
OF
ETHIOPIA
LEGEND
Tigray
Afar
Amhara
Oromia
SNNPR
Somali
DJIBOUTI
REPUBLIC
RED SEA
ERITREA
SOMALIA
KENYA
UGANDA
Caves
Interresting Caves
170
138
156
191
172
173
22
99
56
49
86
98
20
223
87
78
SECOND EDITION,1996
Compiled by Mengesha Tefera, Tadiwos Chernet and Workineh Haro
Regional Geology Department,EIGS,1990.
Cartography by Kebede Woldie and Nigussie Teshome
Cartography and Surveying Service,EIGS,1996.
Vectorization by Kebede Woldie and Nigussie Teshome,GSE,2005.
Topographic base map is obtained from the first Edition of Geological Map of Ethipia ,scale 1:2,000,000 with ammendments.Published by the Ministry of Mines ,
Geological Survey of Ethiopia,GSE.
Note: The delineation of international boundaries must not be considered authoritative.
Projection-Longitude/Latitude (WGS 84)
100 0 100 200 300 400 km
Copyright reserved
Copies of this map may be obtained from Geological Survey of Ethiopia
P.O.Box 2302,Tel(251 - 1) 463325,Fax. (251 - 1) 463326
Email: geology3@telecom. net. et Addis Ababa,Ethiopia,2005.

Simplified Geological Map



Legende

- Quaternary
- Tertiary - Quaternary Volcanics
- Tertiary - Sediments
- Tertiary - Limestone
- Cretaceous- Sediment
- Cretaceous- Limestone
- Jurassic/Cretaceous- Limestone
- Upper Jurassic/ Lower Cretaceous- Sediment
- Jurassic - Sediments
- Jurassic - Limestone
- Upper Proterozoic- Marbre
- Precambrian

According to Bosse et al. 1996

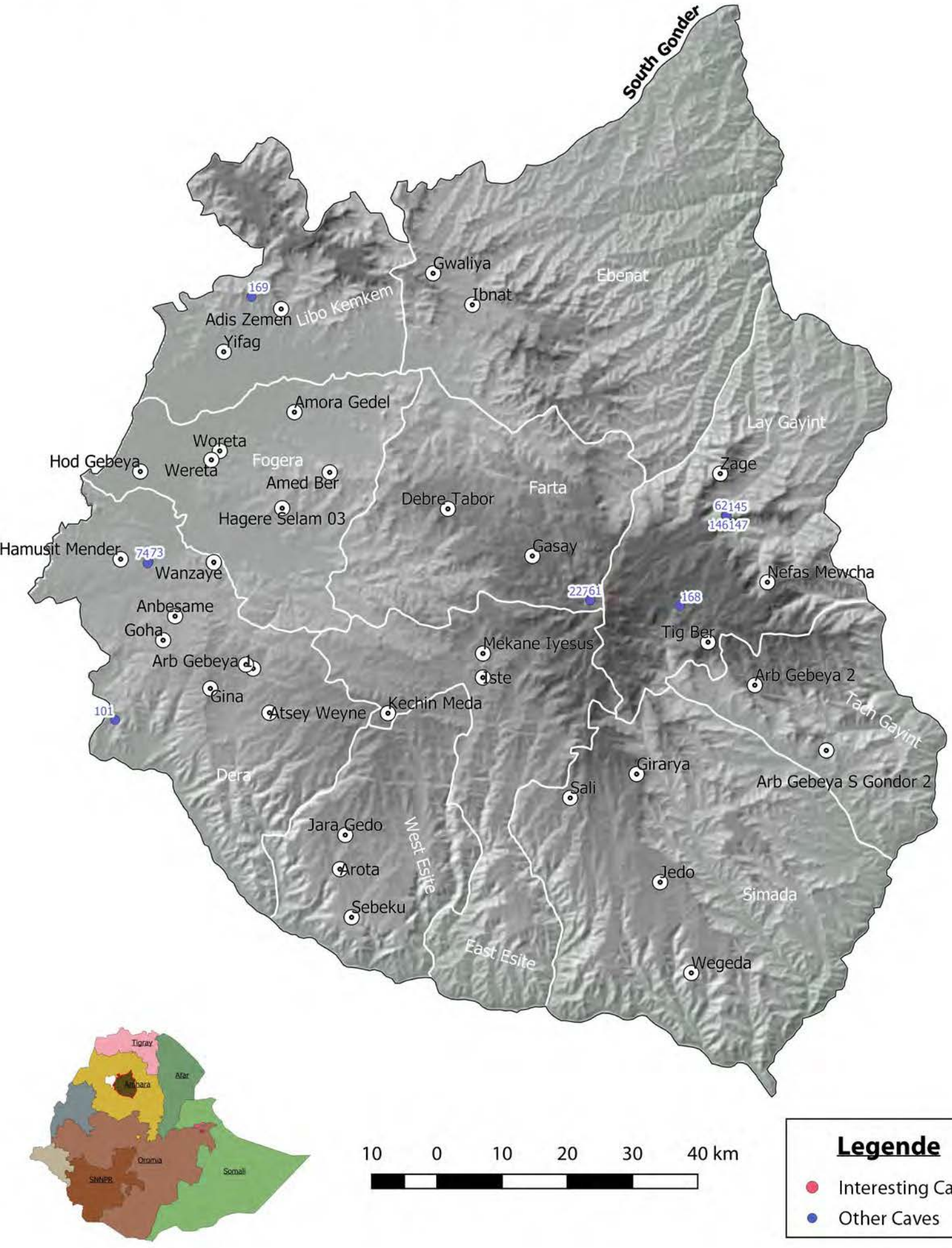
Amhara

South Gondar

Id	Type	Name (Alternate Name)	District	Length (m)	Depth (m)	Long (WGS 84)	Lat (WGS 84)	Alti (m)	Expe
73		Gibitsawit Washa 1	Dera	>83	1	37.5958	11.77561	1798	2016 [60]
74		Gibitsawit Washa 2	Dera	37	3	37.59424	11.77316	1865	2016 [60]
101		Kassi Washa	Dera	145	12	37.54963	11.55575	1899	2016 [60]
61		Eregib Church Washa	Farita	n/k	n/k	38.21752	11.72461	3555	2016 [60]
227		Eregib Collapse Washa	Farita	n/k		38.21752	11.72461	3550	2016 [60]
63		Eregib Lake Washa	Farta	65	2	38.21752	11.72461	3573	2016 [60]
62		Setila Mariyam Church Washa	Lay Gayint	10	n/k	38.40836	11.84277	n/k	2016 [60]
145		Setila Mariyam Bahir Washa	Lay Gayint	16	2	38.40841	11.84168	2864	2016 [60]
146		Setila Mariyam Holy Water Washa	Lay Gayint	155	n/k	38.40812	11.84201	2882	2016 [60]
147		Setila Mariyam Monks Washa	Lay Gayint	105	3	38.40934	11.8408	2882	2016 [60]
168		Wofe Church Washa	Lay Gayint	n/k	n/k	38.34331	11.71714	2874	2016 [60]
169		Yeweyin Washa Tekilehaimanot	Lay Gayint	91	n/k	37.73867	12.14314	2196	2016 [60]

Ethiopia 2019

South Gondar



SNNPR

Wolayta

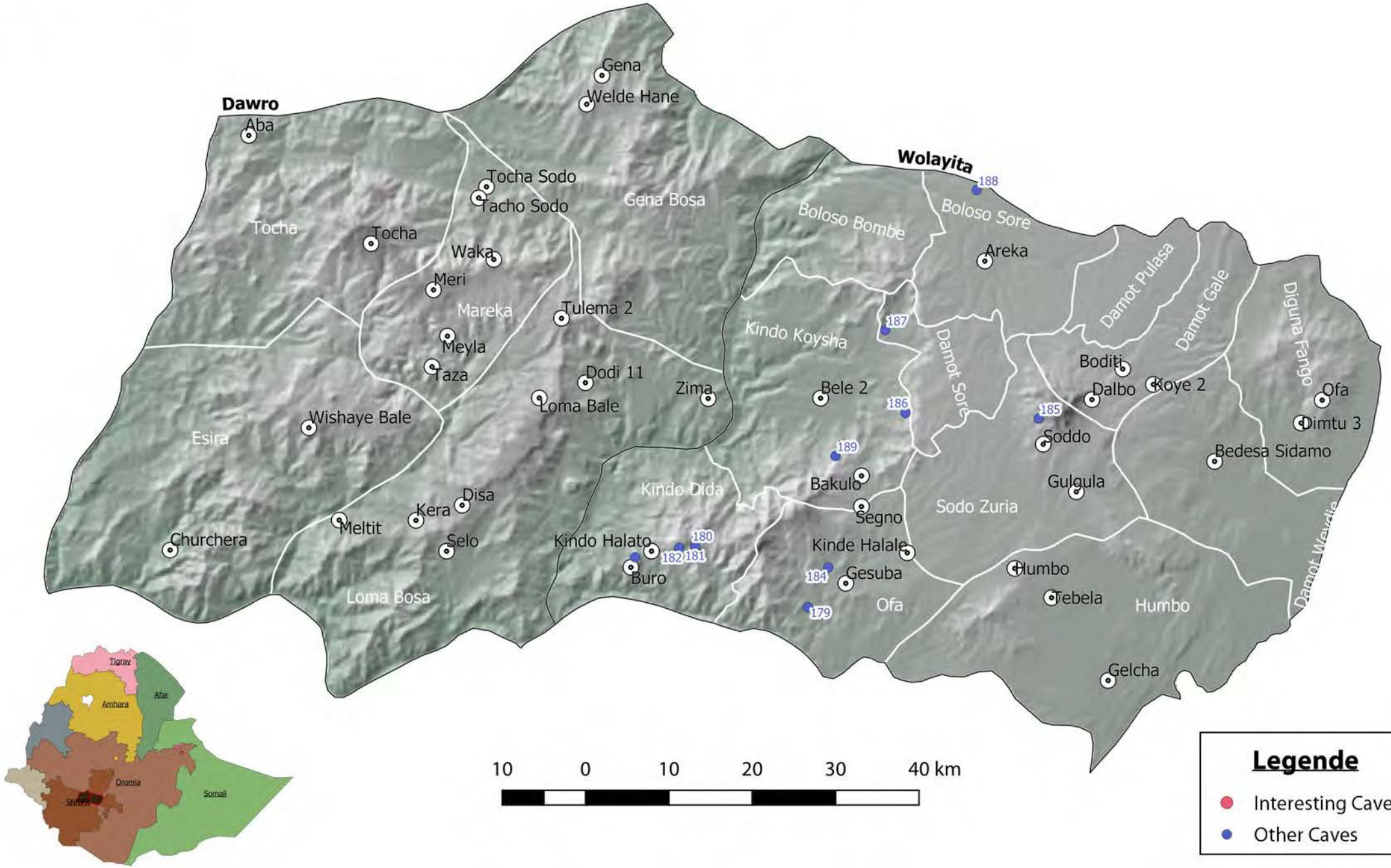
Id	Type	Name (Alternate Name)	District	Length (m)	Depth (m)	Long (WGS 84)	Lat (WGS 84)	Alti (m)	Expe
188		Galato Gongolo	Boloso Sore	n/k	n/k	37.69094	7.14378	1640	2003 [43]
187		Akirsa	Damot Sore	n/k	n/k	37.59218	6.99149	1340	2003 [43]
180		Aruya	Kindo Dida	n/k	n/k	37.38628	6.75659	2180	2003 [43]
181		Zuliya	Kindo Dida	n/k	n/k	37.38628	6.75660	2190	2003 [43]
182		Sanna	Kindo Dida	n/k	n/k	37.36930	6.75444	2020	2003 [43]
183		Caw Garo	Kindo Dida	n/k	n/k	37.32120	6.74428	1820	2003 [43]
186		Black Stone	Kindo Koysha	n/k	n/k	37.61428	6.90165	1800	2003 [43]
189		Kindo Koyisha	Kindo Koysha	n/k	n/k	37.53841	6.85485	2010	2003 [43]
179		Harurona	Ofa	n/k	n/k	37.50915	6.69063	1320	2007 [43]
184		Zuriya	Ofa	n/k	n/k	37.53089	6.73387	1460	2003 [43]
185		Moche Borago Gongolo	Sodo Zuria	n/k	n/k	37.75883	6.89612	2340	2003 [43]

Dawro

Id	Type	Name (Alternate Name)	District	Length (m)	Depth (m)	Long (WGS 84)	Lat (WGS 84)	Alti (m)	Expe
190		Ulluco	Boloso Sore	n/k	n/k	n/k	n/k	n/k	2007 [43]

Ethiopia 2019

Wolayta / Dawro



Tigray

Central Tigray

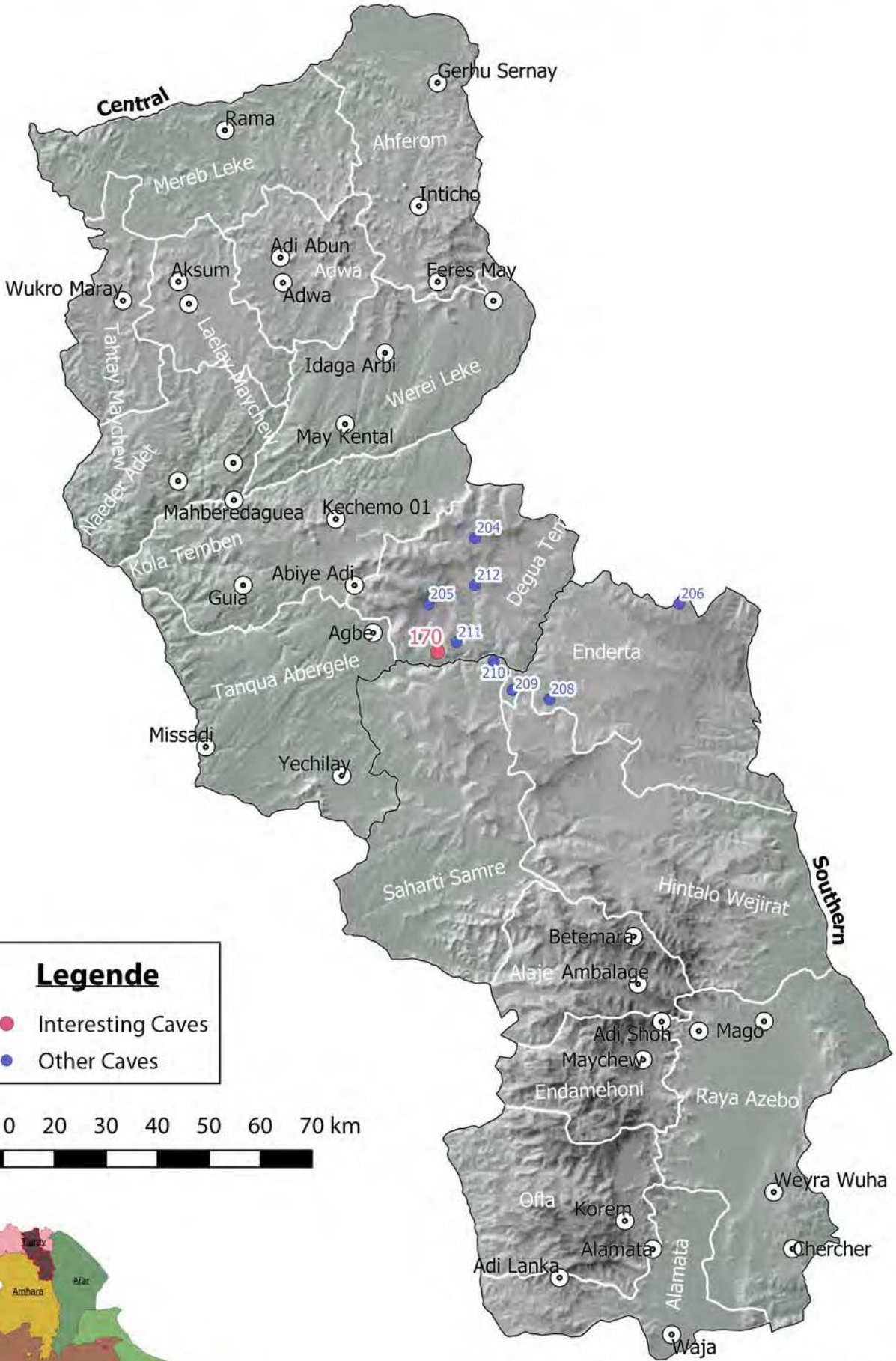
Id	Type	Name (Alternate Name)	District	Length (m)	Depth (m)	Long (WGS 84)	Lat (WGS 84)	Alti (m)	Expe
170	Holqa	Zayei (Giva K)	Degua Temben	370	0	39.16666	13.5	n/k	1962 [5]
205		Vase Cave	Degua Temben	145	n/k	39.15	13.58333	n/k	BSEE 1972 [7]
204		Berki Beati	Degua Temben	100	n/k	39.23333	13.70000	n/k	BSEE 1972 [7]
211		Giva L	Degua Temben	15	n/k	39.2	13.51666	n/k	BSEE 1972 [7]
212		Giva M	Degua Temben	5	n/k	39.23333	13.61666	n/k	BSEE 1972 [7]

Southem Tigray

Id	Type	Name (Alternate Name)	District	Length (m)	Depth (m)	Long (WGS 84)	Lat (WGS 84)	Alti (m)	Expe
206		Makden Beati	Enderta	38	n/k	39.6	13.58333	n/k	BSEE 1972 [7]
208		Giva B	Enderta	20	n/k	39.36666	13.41666	n/k	BSEE 1972 [7]
209		Giva D	Enderta	17	n/k	39.3	13.43333	n/k	BSEE 1972 [7]
210		Giva J	Saharti Samre	10	9	39.26666	13.48333	n/k	BSEE 1972 [7]

Ethiopia 2019

Central Tigray / Southern Tigray



Legende

- Interesting Caves
- Other Caves

10 0 10 20 30 40 50 60 70 km

ID	Type	Cave Name	District	Length	Depth	Expe
170	Holqa	Zayei	Degua Temben	370	0	1962 [5]

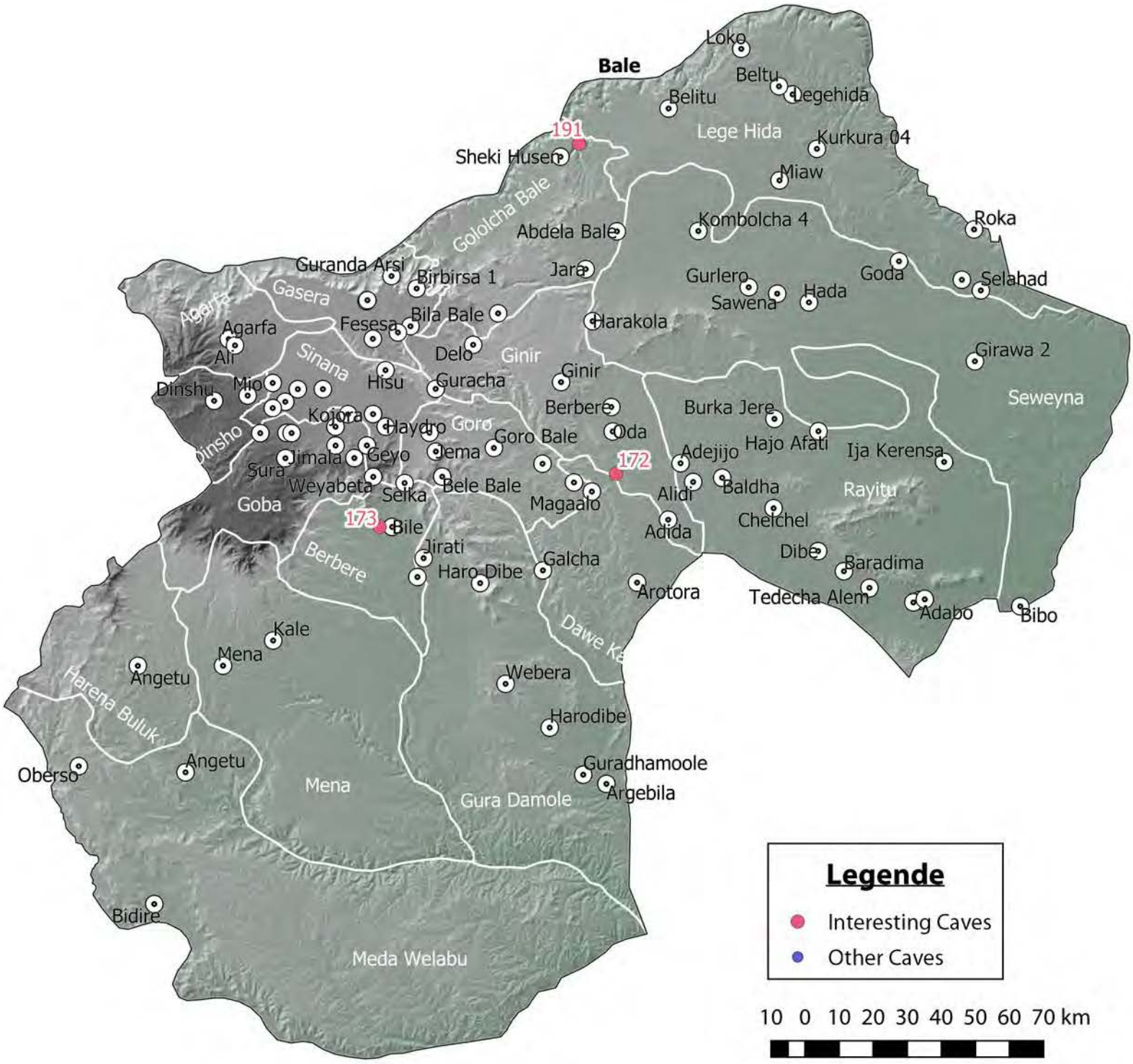
Oromia

Bale

Id	Type	Name (Alternate Name)	District	Length (m)	Depth (m)	Long (WGS 84)	Lat (WGS 84)	Alti (m)	Expe
172		Sof Omar	Golocha Bale	15100	n/k	40.844889	6.906306	n/k	BSEE 1972 [10]
191		Melkay Mana	Gora		n/k	40.75	7.783333	n/k	BSEE 1972 [10]
173		Nur Mahaned (Nur Mohaned)	Sof Omar	2800	n/k	40.216667	6.766667	n/k	BSEE 1972 [10]
174		Goma Saada		489	n/k	n/k	n/k	n/k	2004 [52]
175	Holqa	Danzuriyaa		n/k	n/k	n/k	n/k	n/k	2004 [52]

Ethiopia 2019

Bale



Legende

- Interesting Caves
- Other Caves

10 0 10 20 30 40 50 60 70 km

ID	Type	Cave Name	District	Length	Depth	Expe
172		Sof Omar	Ginir	15100		BSEE 1972 [10]
173		Nur Mahaned	Gora	2800		BSEE 1972 [10]
174		Goma Saada		489		2004
175	Holqa	Danzuriyaa				2004
191		Melkay Mana	Golocha Bale			BSEE 1972 [7]

East Hararghe

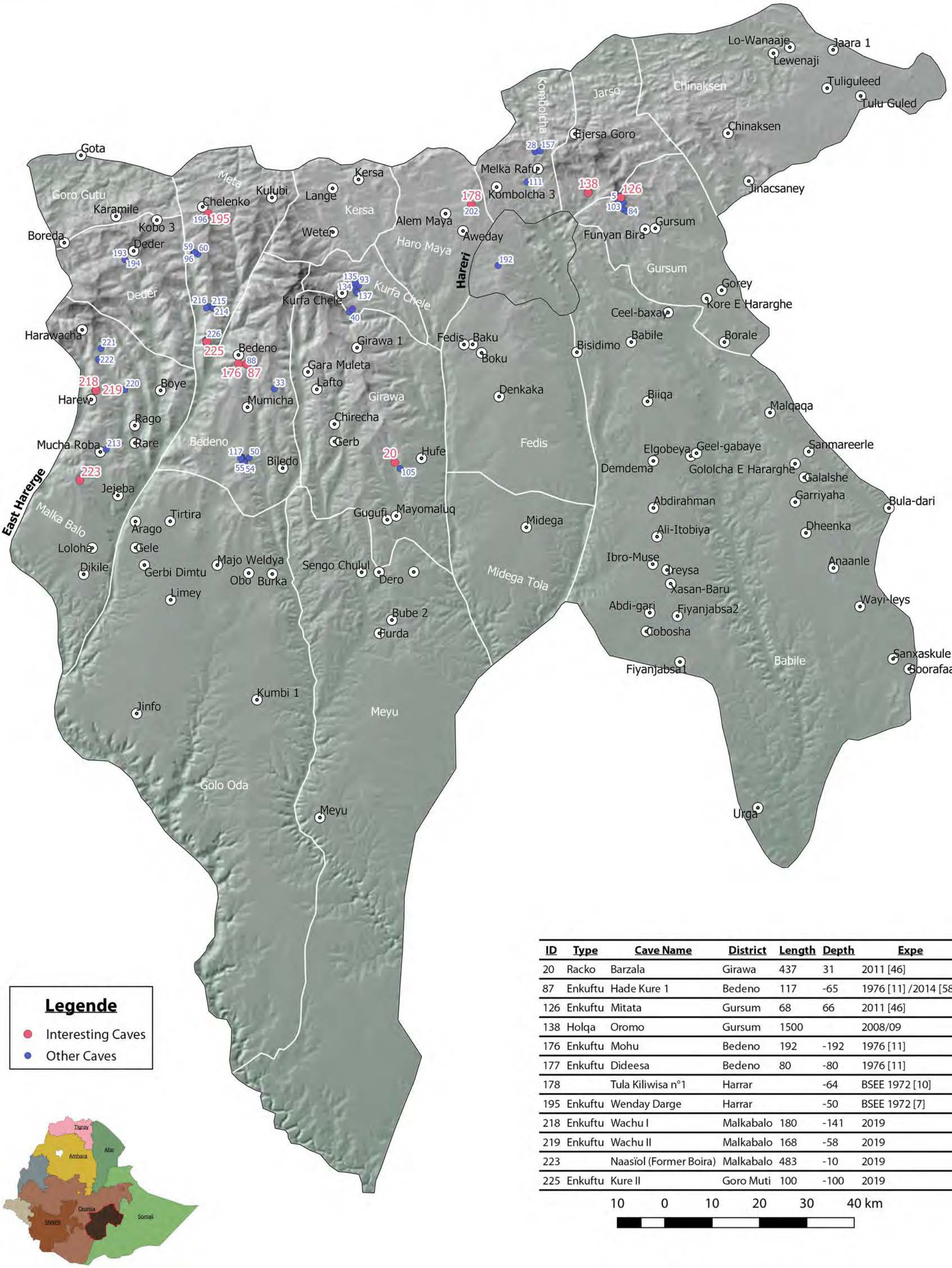
Id	Type	Name (Alternate Name)	District	Length (m)	Depth (m)	Long (WGS 84)	Lat (WGS 84)	Alti (m)	Expe
50	Holqa	Dima 1	Bedeno	146	39	41.63561	8.92053	1840	2011 [46]
52	Holqa	Dima 3 (Holqa Abdi)	Bedeno	128	7	41.626487	8.912367	1910	2011 [46]
87	Enkuftu	Hade Kure 1 (Holqa Huttun)	Bedeno	117	-65	41.6319	9.0988	2110	1976 [11] /2014 [58]
51	Holqa	Dima 2 (Holqa Odaa)	Bedeno	97	22	41.623683	8.91128	1900	2011 [46]
33	Holqa	Cheikh Momina (Cheik Hamina)	Bedeno	63	-23	41.685399	9.05166	1664	2014 [58]
113	Holqa	Lucho 1	Bedeno	38	8	41.62208	8.92115	1940	2011 [46]
55	Holqa	Dima 7	Bedeno	36	7	41.6245	8.91350	1930	2011 [46]
54	Holqa	Dima 6	Bedeno	30	6	41.62666	8.91055	1920	2011 [46]
114	Holqa	Lucho 2	Bedeno	23	5	41.622333	8.92050	1935	2011 [46]
116	Holqa	Lucho 4	Bedeno	20	5	41.619967	8.919533	1935	2011 [46]
115	Holqa	Lucho 3	Bedeno	15	3	41.62066	8.92	1935	2011 [46]
117	Holqa	Lucho 5	Bedeno	5	-2	41.61958	8.9194	1930	2011 [46]
53	Holqa	Dima 5	Bedeno	0	0	41.626	8.91350	1910	2011 [46]
176	Enkuftu	Mohu	Bedeno	192	-192	41.61666	9.10000	2100	1976 [11]
177	Enkuftu	Dideesa	Bedeno	80	-80	n/k	n/k	n/k	1976 [11]
88	Enkuftu	Hade Kure 2	Bedeno	5	-38	41.62985	9.09883	2110	2014 [58]
20	Racko	Barzala	Girawa	437	31	41.915683	8.90918	1445	2011 [46]
105	Holqa	Kiya	Girawa	270	7	41.9254	8.89744	1540	2011 [46]
214	Enkuftu	Debe	Goro Muti	33	-22	41.56887	9.20650	2226	2019
216	Goda	Warabessa	Goro Muti	18	0	41.55801	9.20986	2040	2019
215	Enkuftu	Nole	Goro Muti	15	-15	41.56503	9.20849	2204	2019
217	Rift Cave	Bube	Goro Muti	15	-7	41.55571	9.20685	2074	2019
224	Enkuftu	Kure	Goro Muti	21	-21	41.55460	9.14006	2071	2019
225	Enkuftu	Kure II	Goro Muti	100	-100	41.55621	9.14238	2089	2019
226	Enkuftu	Kure III	Goro Muti	17	-17	41.55434	9.14566	2091	2019
138	Holqa	Oromo	Gursum	1500		42.291333	9.4207	2170	2008/09
21	Holqa	Bela	Gursum	134	-11	42.358667	9.400933	2330	2011 [46]

Id	Type	Name (Alternate Name)	District	Length (m)	Depth (m)	Long (WGS 84)	Lat (WGS 84)	Alti (m)	Expe
5	Enkuftu	Abdurahim	Gursum	90	-39	42.34811	9.414233	2460	2011 [46]
126	Enkuftu	Mitata	Gursum	68	66	42.35388	9.411316	2560	2011 [46]
103	Goda	Kerensa (Holqa Kerensa)	Gursum	52	12	42.349633	9.40605	2255	2011 [46]
78	Holqa	Golaa	Gursum	50	2	42.35895	9.38806	2100	2011 [46]
84	Goda	Guracha (Holqa Guracha)	Gursum	44	4	42.36518	9.38486	2115	2011 [46]
127	Enkuftu	Mume	Gursum	36	-14	42.35188	9.41375	2440	2011 [46]
124	Enkuftu	Medero	Gursum	30	-23	42.34831	9.41421	2500	2011 [46]
139	Holqa	Passionate	Gursum	10	0	42.34969	9.406059	2255	2011 [46]
196		Beleka	Harrar	130	n/k	41.560568	9.387403	n/k	BSEE 1972 [7]
197		Jewae	Harrar	125	n/k	n/k	n/k	n/k	BSEE 1972 [7]
193	Goda	Mendisa 1	Harrar	60	-7	41.4	9.3	n/k	BSEE 1972 [7]
203		Tula Cave no 4	Harrar	20	n/k	42.06666	9.4	n/k	BSEE 1972 [7]
207		Lao Goda Rock Shelter	Harrar	4	n/k	n/k	n/k	n/k	BSEE 1972 [7]
178		Tula Kiliwisa n°1	Harrar	n/k	-64	42.06666	9.4	n/k	BSEE 1972 [7]
192		Gara Hakim Nos 1 - 23	Harrar	n/k	-35	42.11666	9.28333	n/k	BSEE 1972 [7]
194	Enkuftu	Kekhelli	Harrar	n/k	-44	41.40000	9.30000	n/k	BSEE 1972 [7]
195	Enkuftu	Wenday Darge	Harrar	n/k	-50	41.56056	9.38740	n/k	BSEE 1972 [7]
198		Tula Kiliwisa no 2	Harrar	n/k	-30	42.06666	9.4	n/k	BSEE 1972 [7]
199		Tula Kiliwasa no 3	Harrar	n/k	-25	42.06666	9.4	n/k	BSEE 1972 [7]
200		Tula Cave no 1 (Cave of the Thousand Amharas)	Harrar	n/k	n/k	42.06666	9.4	n/k	BSEE 1972 [7]
201		Tula Cave no 2 (Hyena Cave)	Harrar	n/k	n/k	42.06666	9.4	n/k	BSEE 1972 [7]
202		Tula Cave no 3	Harrar	n/k	n/k	42.06666	9.4	n/k	BSEE 1972 [7]
157	Enkuftu	Wara Mucha	Kombolchaa	56	-46	42.19967	9.50186	2360	2014 [58]
28	Holqa	Burka	Kombolchaa	0	0	42.18978	9.49995	2170	2014 [58]
111	Goda	Lencha	Kombolchaa	n/a	n/a	42.1742	9.44262	1900	2014 [58]
155		Un-named Resurgence	Kurfa Chele			41.84567	9.23409		2014 [58]
40	Holqa	Dere Haro	Kurfa Chele	235	-7	41.83043	9.197643	2190	2014 [58]

Id	Type	Name (Alternate Name)	District	Length (m)	Depth (m)	Long (WGS 84)	Lat (WGS 84)	Alti (m)	Expe
		(Dire Horow /Dire Harow)							
135	Holqa	Orde 2	Kurfa Chele	177	8	41.842256	9.252291	2120	2014 [58]
140	Holqa	Qawa	Kurfa Chele	85	3	41.84655	9.23401	2060	2014 [58]
100	Enkuftu	Kara	Kurfa Chele	38	-18	41.83653	9.2026	2160	2014 [58]
93	Holqa	Hatu	Kurfa Chele	25	0	41.84855	9.24724	2200	2014 [58]
136	Goda	Orde 3 (Holqa Orde 3)	Kurfa Chele	11	0	41.845558	9.2341	2050	2014 [58]
134	Enkuftu	Orde 1	Kurfa Chele	9	-8	41.837872	9.24511	2230	2014 [58]
137	Holqa or Goda	Orde 4	Kurfa Chele	8	0	41.844586	9.23475	2100	2014 [58]
218	Enkuftu	Wachu I	Malkabalo	180	-141	41.342076	9.050369	2022	2019
219	Enkuftu	Wachu II	Malkabalo	168	-58	41.34278	9.05100	2039	2019
221	Holqa	Halele	Malkabalo	60	0	41.35282	9.13088	1920	2019
220	Holqa	Beke	Malkabalo	30	0	41.39750	9.05199	1720	2019
222	Holqa	Gola	Malkabalo	20	-2	41.34791	9.10948	1840	2019
223	Holqa	Naasïol (Former Boira)	Malkabalo	483	-10	41.31052	8.87938	1801	2019
59	Enkuftu	Ere Toquma	Meta	n/k	n/k	41.532722	9.312661	n/k	2014 [58]
95	Enkuftu	Hayu 2	Meta	45	-31	41.53266	9.31273	2280	2014 [58]
94	Enkuftu	Hayu 1	Meta	41	-38	41.53363	9.31243	2290	2014 [58]
60	Holqa	Ere Toquma	Meta	37	0	41.54006	9.31003	2200	2014 [58]
96	Enkuftu	Hayu 3	Meta	n/k	n/k	41.53363	9.31243	2280	2014 [58]
213	Rising	Dhera		n/k	n/k	41.36134	8.93805	1623	2019

Ethiopia 2019

East Hararghe



Legende

- Interesting Caves
- Other Caves

ID	Type	Cave Name	District	Length	Depth	Expe
20	Racko	Barzala	Girawa	437	31	2011 [46]
87	Enkuftu	Hade Kure 1	Bedeno	117	-65	1976 [11] /2014 [58]
126	Enkuftu	Mitata	Gursum	68	66	2011 [46]
138	Holqa	Oromo	Gursum	1500		2008/09
176	Enkuftu	Mohu	Bedeno	192	-192	1976 [11]
177	Enkuftu	Dideesa	Bedeno	80	-80	1976 [11]
178		Tula Kiliwisa n°1	Harrar		-64	BSEE 1972 [10]
195	Enkuftu	Wenday Darge	Harrar		-50	BSEE 1972 [7]
218	Enkuftu	Wachu I	Malkabalo	180	-141	2019
219	Enkuftu	Wachu II	Malkabalo	168	-58	2019
223		Naasïol (Former Boira)	Malkabalo	483	-10	2019
225	Enkuftu	Kure II	Goro Muti	100	-100	2019

10 0 10 20 30 40 km

West Hararghe

Id	Type	Name (Alternate Name)	District	Length (m)	Depth (m)	Long (WGS 84)	Lat (WGS 84)	Alti (m)	Expe
92	Holqa	Haro Gurati	Bedesa	152	-53	40.76667	8.799967	2010	2013 [54]
156	Enkuftu	Uttee	Bedesa	109	-50	40.7678	8.8272	2038	2013 [54]
39	Holqa	Debe	Bedesa	84	-9	40,92389	9.02979	2240	2013 [54]
64	Holqa	Evelo	Bedesa	75	10	40.77962	8.80725	1963	2013 [54]
38	Goda	Debe	Bedesa	70	6	40.92763	9.02867	2230	2013 [54]
133	Enkuftu	Odaa Sadeeni	Bedesa	63	-8	40.764416	8.82308	1995	2013 [54]
125	Enkuftu	Mile	Bedesa	60	-47	40.85697	8.89986	2045	2013 [54]
72	Enkuftu	Gara Kufa	Bedesa	32	-13	40.78661	8.85131	2010	2013 [54]
107	Goda	Kotcho 2	Bedesa	26	3	40.84921	8.90849	2015	2013 [54]
58	Goda	en falaise	Bedesa	20	0	41.21777	9.14645	1850	2013 [54]
106	Goda	Kotcho 1	Bedesa	20	1	40.84901	8.90822	2022	2013 [54]
90	Enkuftu	Haleya Keltu	Bedesa	13	-13	40.77678	8.80929	2000	2013 [54]
65	Enkuftu	Evolo	Bedesa	7	-7	40.77982	8.80789	1980	2013 [54]
37	Resurgence	Debe	Bedesa	0	0	40.92763	9.02877	2235	2013 [54]
97	Holqa	Huttun	Bososo	108	5	41.051916	8.59065	1500	2014 [58]
154	Enkuftu	Tufte	Bososo	26	-10	40.998817	8.640567	1470	2014 [58]
112	Goda	Lencha	Daro Lebu			40.373057	8.610711	n/k	1995 [22]
11	Holqa	Achere	Daro Lebu	3830	0	40.372912	8.608143	n/k	1996 [22]
17	Holqa	Ayanage (Aynage)	Daro Lebu	3308	0	40.373157	8.613251	n/k	1996 [22]
142	Holqa	Rukiessa	Daro Lebu	1071	-72	40.379025	8.605191	1630	2012 [53]
22	Holqa	Bero (Baro)	Daro Lebu	884	39	40.307916	8.42542	1380	2012 [53]
132	Holqa	Nanoo	Daro Lebu	457	10	40.306216	8.47951	1470	2012 [53]
99	Enkuftu	Kabanawa	Daro Lebu	405	-54	40.333283	8.43886	1490	2012 [53]
56	Holqa	Dollys (Goda Mea)	Daro Lebu	374	-26	40.446829	8.580537	1620	2009[42]/ 2012 [53]
98	Holqa	Ijafayitee (Ijafavitee)	Daro Lebu	362	-17	40.310536	8.475256	1520	2012 [53]
27	Holqa	Bortee	Daro Lebu	236	15	40.30559	8.476259	1490	2012 [53]
102	Holqa	Kele Ebeda	Daro Lebu	131	-22	40.40440	8.615263	1590	2012 [53]
67	Fissure	de Dollys	Daro Lebu	50	-8	40.44685	8.581515	1600	2012 [53]

Id	Type	Name (Alternate Name)	District	Length (m)	Depth (m)	Long (WGS 84)	Lat (WGS 84)	Alti (m)	Expe
12	Holqa	Adaanguv (Adaangur)	Daro Lebu	34	14	40.37856	8.602760	1630	2012 [53]
23	Holqa	Bero 2 (Baro 2)	Daro Lebu	23	10	40.30807	8.42583	1390	2012 [53]
79	Enkuftu	Gondha Dadhii 1	Daro Lebu	15	-15	40.31243	8.47331	1550	2012 [53]
34	Enkuftu	Chitu	Daro Lebu	12	-12	40.40389	8.62180	1620	2012 [53]
80	Enkuftu	Gondha Dadhii 2	Daro Lebu	6	-6	40.3125	8.4734	1550	2012 [53]
143	Holqa	Rukiessa 2	Daro Lebu	n/k	n/k	40.38061	8.60694	1640	2012 [53]
144	Holqa	Rukiessa 3	Daro Lebu	n/k	n/k	40.38717	8.61128	1630	2012 [53]
164	Holqa	Wene Kalo	Daro Lebu	109	24	40.32954	8.44535	1700	2016 [59]
19	Enkuftu	Baka	Habro	5.25	5.25	40.522910	8.737030	1762	2016 [59]
8		Abro Doline 1	Habro	n/k	n/k	40.799015	9.119845	n/k	2014 [58]
9		Abro Doline 2	Habro	n/k	n/k	40.457318	8.65172	n/k	2014 [58]
10		Abro Doline 3	Habro	n/k	n/k	40.457346	8.651206	n/k	2014 [58]
14	Enkuftu	Ancher 1	Habro	n/k	n/k	40.569233	8.60361	n/k	2013 [55]
15	Enkuftu	Ancher 2	Habro	n/k	n/k	40.571266	8.59836	n/k	2014 [55]
66	Holqa	Fatmashee	Habro	89	9	40.53539	8.74963	1696	2016 [59]
77	Holqa	Gola Gada	Habro	>37	2	40.55168	8.73897	1624	2019 [59]
118	Holqa	Madhisa	Habro	n/k	n/k	40.421683	8.75725	0 n/k	2011 [46]
122	Enkuftu	Mate 2	Habro	n/k	n/k	40.518783	8.6441	1726	2013 [55]
162	Enkuftu	Wene	Habro	n/k	n/k	40.528416	8.65493	n/k	2013 [54]
163	Enkuftu	Wene Kalo	Habro	32	32	40.53794	8.76080	1779	2016 [59]
158	Holqa	Warabesa	Habro	3102	-75	40.405316	8.65433	1645	2011[46]/2012 [53]/2013 [54]
70	Holqa	Ganda Alaa 1	Habro	161	-25	40.58855	8.75071	1841	2013 [55]
230	Holqa	Dhamay	Habro	91	10	40.55893	8.73138	1637	2016 [59]
49	Enkuftu	Diblo	Habro	90	-80	40.54481	8.64268	1775	2014 [58]
42	Enkuftu	Dhabaa 2	Habro	89	-44	40.47978	8.6616	1735	2014 [58]
161	Holqa	Wawache (Enkuftu Wawache)	Habro	87	-44	40.464471	8.641157	1660	2014 [58]
229	Enkuftu	Biyo	Habro	83	10	40.47527	8.70958	1758	2016 [59]
36	Enkuftu	Dambii	Habro	78	-33	40.48231	8.66713	1760	2014 [58]
86	Enkuftu	Gusa 2	Habro	78	-65	40.52583	8.70726	1864	2013 [55]
89	Enkuftu	Hafursa	Habro	71	-35	40.49648	8.62161	1485	2013 [55]

Id	Type	Name (Alternate Name)	District	Length (m)	Depth (m)	Long (WGS 84)	Lat (WGS 84)	Alti (m)	Expe
25	Enkuftu	Biyoo 1	Habro	63	40	40.51656	8.64530	1734	2014 [58]
44	Enkuftu	Dhabaa 4	Habro	61	-22	40.47785	8.66119	1735	2014 [58]
85	Enkuftu	Gusa 1	Habro	56	-44	40.5266	8.70738	1855	2013 [55]
123	Enkuftu	Mate 3	Habro	55	-37	40.52135	8.63946	1720	2013 [55]
35	Enkuftu	Ciccii	Habro	54	-17	40.54521	8.76671	1815	2012 [53]
91	Enkuftu	Hanchar	Habro	45	-18	40.5844	8.58273	1421	2013 [55]
153	Holqa	Taha	Habro	40	-40	40.53801	8.76077	1820	2012 [53]
121	Enkuftu	Mate 1	Habro	34	-6	40.52621	8.64705	1742	2013 [55]
109	Enkuftu	Kulubas 2	Habro	30	-6	40.60073	8.76858	1922	2013 [55]
45	Holqa	Dhama'e	Habro	29	-1	40.56615	8.73874	1750	2012 [53]
43	Enkuftu	Dhabaa 3	Habro	27	L-25	40.47785	8.66078	1735	2014 [58]
71	Holqa	Ganda Alaa 2	Habro	27	-22	40.58795	8.7507	1851	2013 [55]
159	Holqa	Warabesa 2	Habro	25	0	40.40543	8.65440	1631	2013 [55]
228	Holqa	Biyo	Habro	>20	3	40.48422	8.71954	1684	2016 [59]
108	Enkuftu	Kulubas 1	Habro	18	-18	40.60305	8.77084	1935	2013 [55]
24	Enkuftu	Bishani	Habro	15	-10	40.47188	8.682267	1750	2014 [58]
81	Enkuftu	Goro 1	Habro	13	-13	40.58725	8.76586	1870	2013 [55]
166	Holqa	Weni Kalo	Habro	13	-13	40.54768	8.752649	1810	2012 [53]
41	Enkuftu	Dhabaa 1	Habro	12	-12	40.47978	8.6616	1745	2014 [58]
26	Enkuftu	Biyoo 2	Habro	11	6	40.51833	8.64666	1742	2014 [58]
130	Perte	n 3	Habro	10	10	40.4573	8.6512	1680	2014 [58]
82	Enkuftu	Goro 2	Habro	6	-6	40.58713	8.76578	1877	2013 [55]
18	Holqa	Baka	Habro	n/k	n/k	40.52525	8.73873	1759	2016 [59]
128	Perte	n 1	Habro	0	0	40.4782	8.6730	1760	2014 [58]
129	Perte	n 2	Habro	0	0	40.4573	8.6517	1680	2014 [58]
165		Wene Kalo Rock Shelter	Habro	n/a	n/a	40.5490	8.74223	1750	2016 [59]
48	Enkuftu	Dhocoo Xiga 2	Kuni	8	-8	41.0367	8.6581	1740	2014 [58]
47	Enkuftu	Dhocoo Xiga 1	Kuni	n/k	n/k	41.0401	8.6714	1650	2014 [58]
120	Enkuftu	Mata Leencha 2	Mesela	>20	>15	41.18251	8.96493	1984	2013 [54]
1	Holqa	Abba Bichowo 2	Mesela	n/k	n/k	41.21199	9.13174	n/k	2013 [54]
32	Holqa	Chafe	Mesela	414	10	41.22969	9.14865	1875	2013 [54]

Id	Type	Name (Alternate Name)	District	Length (m)	Depth (m)	Long (WGS 84)	Lat (WGS 84)	Alti (m)	Expe
6	Enkuftu	Abonyou Inf	Mesela	306	94	41.15915	8.95546	2080	2013 [54]
7	Enkuftu	Abonyou Sup	Mesela	306	94	41.15877	8.95481	2115	2013 [54]
69	Goda	Gaddo 2	Mesela	219	-42	41.16634	8.96402	2015	2013 [54]
57	Porche	en falaise	Mesela	52	20	40.74875	8.81556	1800	2013 [54]
119	Enkuftu	Mata Leencha 1	Mesela	45	-25	41.18346	8.96477	1995	2013 [54]
152	Enkuftu	Suker 5	Mesela	23	23	41.22002	9.13200	2252	2013 [54]
149	Enkuftu	Suker 2	Mesela	16	16	41.22104	9.13786	2235	2013 [54]
131	Goda	Naniga (Holqa Naniga)	Mesela	12	0	41.20806	9.13404	1850	2013 [54]
4	Holqa	Abba Bichowo Khalaf	Mesela	10	0	41.21185	9.13176	2030	2013 [54]
148	Enkuftu	Suker 1	Mesela	10	10	41.22025	9.12977	2265	2013 [54]
151	Enkuftu	Suker 4	Mesela	9	4	41.22014	9.13360	2234	2013 [54]
2	Holqa	Abba Bichowo 3	Mesela	8	-3	41.21222	9.13156	2045	2013 [54]
110	Goda	Leenchaa	Mesela	7	-2	41.2167	9.13363	2100	2013 [54]
68	Goda	Gaddo 1	Mesela	4	-3	41.16546	8.96427	2015	2013 [54]
13	Holqa	Ahmed Dawid	Mesela	2	0	41.20925	9.14063	1850	2013 [54]
141	Rising	Resurgence	Mesela	2	0	41.2268	9.14551	1850	2013 [54]
3	Holqa	Abba Bichowo 4	Mesela	0	0	41.21214	9.13181	2040	2013 [54]
150	Enkuftu	Suker 3	Mesela	n/k	n/k	41.2206	9.13421	2260	2013 [54]
76	Holqa	Gola	Tulo	150	3	41.08858	9.1768	1845	2013 [54]
16	Holqa	Awufatan	Tulo	85	1	41.11953	9.15324	1890	2013 [54]
31	Holqa	Calloo 3	Tulo	38	8	41.1553	9.20630	1975	2013 [54]
29	Holqa	Calloo 1	Tulo	36	4	41,15567	9.20797	1900	2013 [54]
83	Holqa	Gudda	Tulo	33	-15	41.12997	9.14164	2100	2013 [54]
30	Holqa	Calloo 2	Tulo	32	7	41.15608	9.20785	1900	2013 [54]
75	Goda	Gojel	Tulo	28	-5	41,11973	9.20500	1950	2013 [54]
104	Enkuftu	Kike	Tulo	8	-5	41.09307	9.16757	1900	2013 [54]
171		Goddalencha (Lion Cave)		50	-5	40.37305	8.610711	1550	1995 [22]
160		Wart Hog Pot		40	-40	40.37161	8.61266	1603	1996 [22]
167		White Tree Cave		28	5	40.37281	8.606778		1996 [22]

Ethiopia 2019

West Hararghe

Legende

- Interesting Caves
- Other Caves

West Harerge
Mieso
Mulu
Biyo Karaba
Doba
Werehama
Tulo
Hirna
Duhkuka
Debeso 2
Adis Amba
Wedeytu
Mesala
Funyan Timo
Hunde Lafto
Yabdo
Bilu
Kora W Hararghe
Asebot
Fayu
Sodoma
Roma Boru
Asbe Teferi
Beka
Arba Reketi
Chiro Zuria
Merewa
Kuni
Bardoode
Arba
Guba Koricha
Komona
Goba Koricha
Kera Kurkura
Bedesa
Sire W Hararghe
Burk Gudo
Gemechis
Habro
Gelemso
Lebu
Delajebo
Boke
Gebiba
Anchar
Cheleleka
Chelekko
Anchar Bedeyi
Kotisa
Bososo
Hmero
Nure Musa
Teko Uno
Dereku
Kelado
Mechara
Halo
Ijegale
Kurfa Roka
Kuni
Arara 04
Daro Lebu
Hujufa
Roepeyh
Rukeyisa
Boke
Megala
Ido Gelemam
Aro Dimtu
Berche
Fulensa
Haro Kile
Chira W Hararghe
Ramis
Lilimis
Eurdo
Dida Adi
Agemti
Hawi Gudina
Korjo
Kutara
Bilika

10 0 10 20 30 40 km

ID	Type	Cave Name	District	Length	Depth	Expe
6	Enkuftu	Abonyou Inf	Mesela	306	94	2013 [54]
7	Enkuftu	Abonyou Sup	Mesela	306	94	2013 [54]
11	Holqa	Achere	Daro Lebu	3830	0	1996 [22]
17	Holqa	Ayanage	Daro Lebu	3308	0	1996 [22]
22	Holqa	Bero	Daro Lebu	884	39	2012 [53]
32	Holqa	Chafe	Mesela	414	10	2013 [54]
49	Enkuftu	Diblo	Habro	90	-80	2014 [58]
56	Holqa	Dollys	Daro Lebu	374	-26	2009 [42] / 2012 [53]
86	Enkuftu	Gusa 2	Habro	78	-65	2013 [55]
98	Holqa	Ijafayitee	Daro Lebu	362	-17	2012 [53]
99	Enkuftu	Kabanawa	Daro Lebu	405	-54	2012 [53]
132	Holqa	Nanoo	Daro Lebu	457	10	2012 [53]
142	Holqa	Rukiessa	Daro Lebu	1071	-72	2012 [53]
156	Enkuftu	Uttee	Bedesa	109	-50	2013 [54]

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Figure 43: The Djadja team


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