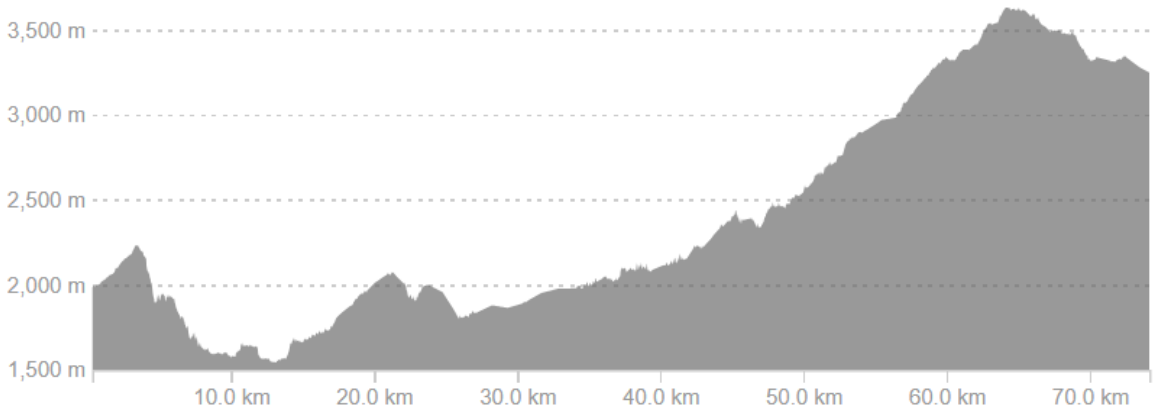
The Canaan Super-Karst Caving Expedition in 2025

6th to 24th September 2025

An International Expedition that is part of a wider series of North Perú Caving Expeditions organised by Espeleo Club Andino (Perú) and Groupe Spéléo Bagnols Marcoule (France)

Photo: Jean Yves in the ongoing river cave of Tragadero de Castillo (photo Martin Holroyd).



The expedition involved a ~100 mile (~150 kilometer) walk, ~50 miles each way, with about 8,000 m of ascent, as shown by this elevation profile from a GPS track. Atuen is on right, Canaan on the left.

Expedition Narrative:

Background: This was a small reconnaissance (6 person) expedition that aimed to reach new areas of limestone karst in North Peru, and to determine if they contained significant caves. Initially, there were two main expedition target areas.

First, we aimed to reach an extensive area of karst around and east of the village of Canaan (figs. 1 and 2). This area includes some very impressive river sinks visible on satellite images (e.g. Google Earth or Bing Maps; figs 3 and 4), and it had previously been informally termed the 'superkarst' by the GSBM-ECA team. There had been previous attempts to reach this lower altitude (~1,500-2,000m) area to the east of the Andres from further east, through the dense jungle, but this approach route was found to be completely impractical.

Second, another major river sink (termed 'Tragadero Z') had also been seen on satellite images at higher elevations (~3,300m) (see https://cuevasdelperu.org/san-martin-mariscal-caceres/tragadero-del-rio-z/ and figure 7). Tragadero Z was located at the top of a side valley in the Rio Huabayacu catchment (figure 7), to the side of a path from a roadhead near Atuen to the villages of La Morada and then on to Canaan. Tragadero Z lies about 10-15 km into the mountains from an area adjacent to Bolivar ('Gringobamba'), which had previously been the focus of a series of expedition by teams of US cavers (NSS News Feb 2005 and October 2011; figure 2). However, due to very challenging terrain the US team had not visited Tragadero Z, which has well over 1,000m of depth potential. The US expeditions had explored numerous deep pits, which tended not to be major river sinks, but had not yet found the 'master drainage' cave system hypothesised to lie beneath the mountains (NSS News 2005, 2011). Tragadero Z is a far larger river sink that other caves in the Gringobamba area, and it was hoped it might lead to that master drainage cave system.

The final piece in the puzzle was that Tonio De Pomar Cáceres has met Ever Jou Cabellero Chàvez, who was head of the tourism committee in the village of La Morada, during Tonio's initial explorations from Atuen. Ever explained to Tonio how Canaan and La Morada couple be reached with mules from the roadhead near Atuen. Tonio thus got in contact with Ever for this expedition.

We are also very grateful to Brian Grindling who has been part of the US Gringobamba team for his enthusiasm and support, although he could not come on the expedition due to last minute work commitments. We have also greatly enjoyed corresponding with Keith Muscutt, an archaeologist based at UC Santa Cruz in the US, who knows the people and terrain in this area really well.

Initial stages: The 6 expedition members assembles in the major town of Cajamarca on the 8th and 9th of September where Tonio lives. We brought some dehydrated meals (our thanks to Adventure Nutrition) and some caving gear from the UK, but most food was purchased in Cajamarca. Jean Yves also kindly brought some further caving gear from the GSBM-ECA 'tackle store' in Luya. A minivan was they chartered to take the team on the 10th from Cajamarca to the roadhead that lies a few km before Atuen. This is a spectacular drive including a ~2,000m deep gorge of the Maranon River, with the town of Balsas at the bottom of the gorge having a far warmer climate and different crops. This is over a 10-hour drive, and we arrived at the roadhead in the dark, after turning left at Leimebamba.

Prospecting near Atuen road head: We spent the night of the 10th in a small community owned hut next to the road, after navigating the deep mud between the hut and the road (figure 9; exceptionally muddy paths were a theme of the expedition). We were met there by guides from La Morada (including Feder Antonio Chàvez Chàvez and Oblitas Chiguala Silva) and 6 mules, and enjoyed chatting to Segundo who lives in the house opposite. It rain heavily overnight, and this

heavy rain continued through the morning of the 11th. Our guides suggested delaying a day, and this seemed good advice.

Only the rain abated somewhat about midday, we walked up the valley that extends from the road bend towards the La Cruces pass (note this valley is a few km down the main-valley from Atuen itself). A series of significant river sinks were visited, and one of those sinks (-6.877813 -77.748973, elevation 3340m) had an ongoing 15m pitch down (figure 9). However, this relatively obvious feature may have been explored previously from Atuen, as there was a piece of flagging tape in its entrance with a date from 1997. The pitch was left for our return trip, but for reasons outlined below, the pitch was not descended by us. It is a relatively accessible lead that lies below a hanging valley of karst, and it could be interesting to revisit for others, if explored already. Some other river sinks along the initial parts of the valley above the roadhead were also explored, and found to be blocked with no way on. However, we did not go to one river sink (at -6.868265° -77.754477°, elevation 3,313m) in a hanging valley that is relatively close to the roadhead, and this may be worth a visit in the future.

Note on the nature of the karst: The steeply dipping and extensive limestone in this area around Atuen (figure 9) seems to be broadly similar to that in the Gringobamba area closer to Bolivar, explored the US expeditions. On satellite images, although there are river sinks in the valley at the bases of some mountains, this unit of limestone shows limited 'classic' karst weathering (that character of these mountains on satellite images sometimes rather resembles sandstone cuestas rather than limestone pinnacles and dolines). So it was interesting to see this limestone unit in person. It obviously hosts numerous vertical pits in the Gringobamba area, and rivers do sink into its base. However, our impression was there the limited amount of karst weathering was surprising, given the obviously very substantial rainfall in the area (carpets of grass covering near vertical cliff faces). We wondered if this limited karst weathering was linked to its composition, or even its consistent near vertical dip or other features. That near vertical dip may indeed favour the development of vertical pits in many places, but the karst development in this limestone unit is very differs to that in the lower lying limestone unit we encountered near Canaan, which has far more classical karst weathering features.

Walking into La Morada from Atuen (September 12-13): The weather improves on the 12th, and the team set off over the very muddy mule trail up the valley to the El Cruce junction and pass. A series of further river sinks were visited in the upper part of the valley in the same type of limestone, but they were also blocked (The final river sink in that upper valley was visited on the return walk by AA and was also blocked). After passing over the col at ~3,620m elevation (figure 10), the team descended down through woods to a cabin below the spectacular bright green lake of Lago Jardin (figure 11). The night was spent in tent, with cabin used for cooking and by our guides. This was about a 7-8 hour walk, so fairly long and at altitude (our guides would do it ~5 hours). The next day was walk down to a major river junction (the other branch goes to Pampa Hermosa – where there is no cabin – and potentially on to Tragadero Z – figure 2) and then along the main valley to La Morada. This was a longer and tiring 11-12 hour walk that ended with a steep ascent of ~500m up to La Morada (figure 12) from a bridge across the main river.

[Note that there are also 2 cave entrances noted by Keith Muscutt that are on another path from the col at La Cruces to a bowl that lies ~500m above Lago Jardina, to the north east. At least one of these seems to be a large pit, and they could be accessed along a path that connects to La Cruces col. They are the 'Soledad' and 'for Brian Grindling' features whose coordinates are noted later in the report.]

Day in La Morada: The next day (September 14th) we then needed to arrange mules to go to Canaan, and negotiate their price. The original price quoted by Ever to Tonio was ~100 soles/day per mule, and this had initially increased to ~120 and then 150 soles, and we did not have enough money to pay the latter. But a good compromise was agreed, and we also had to transfer over to guides and mules from Canaan, for the next leg to Canaan. Tonio made an outstanding speech to explain what we were doing on this and other caving expeditions. We enjoyed a beer in La Morada, which also has an internet link (via Starlink) that was interesting, and we watched the men play football and the women play volleyball (figure 13). La Morada seemed a strongly organised place that is doing well, despite major challenges in how to transport material to it. Our thanks to Feder and the family that hosted out tents in their field next to a good water source, and they were very hospitable and welcoming.

Walking from La Morada to Canaan: On the 15th September, we walked from La Morada to Canaan. After going back down to the river, this involved a significant river crossing at the start of a limestone gorge. There was no bridge here, even though the river is bigger here than adjacent to La Morada, and the return crossing a few days later needed knowledge (from Martin) of basic white-water techniques, and this crossing may be very challenging after heavy rain for any future expeditions.

This limestone gorge also had a significant resurgence cave (Figure 14; Cueva de la Polrosa; 6.87490, 77.49166) that we explored for ~50m along a stream to a small (2-3m) pitch down that needed a rope and bolting. This pitch may be bypassed at low water, and the river passage clearly continues and drafts. There is also a flood overflow entrance above and to the side of the resurgence passage, which we explored but found to be blocked (it probably connects to the river passage as a small hole drafts). We still had a long way to go to Canaan, so this resurgence cave was also left to our return. But due to the pressing need to cross the rising river when we returned, it was not subsequently explored and is a good future lead.

The rest of the day was spent trudging up the poetically named Cuesta Amor Inmenso that goes from the river at ~1500m steeply up to Canaan at ~2150m (figure 24). This is the muddiest path that PT has encountered in about 60 caving expeditions, and it was a particularly memorable experience.

Canaan: The then camped next to the home of Artemis Chavez in Canaan, and we are really grateful for his kind hospitality and strong support. Canaan is larger than La Morada, and also has a shop from which beer and some food was purchased, and there is an internet link. It was a friendly place to stay. The limestone around Canaan is different and far more classically karstic than around Atuen (figure 15).

Caves near to Canaan (16th September): We were shown by Neiser Rodriguez to some caves that are about a 20-minute walk from where we stayed in Canaan, on the edge of the village (figure 5, 16 and 17). They were on the property of Luber Davila, who kindly granted permission to explore. They lie near a classic dry valley, in an area where a river seen on satellite images disappears for ~1 km.

We initially rigged a 15-20m pitch down into a hole (figure 16) with a significant river at the bottom (probably the one seen on the satellite images) (Tragadero del Tunel; 6.8749 S 77.4619 W, 1961m). This quickly sumps in a downstream direction, although the river may resurge just a few 100m further northeast. There was a ~10m waterfall pitch in the upstream direction of the cave, which was not climbed and continues (you would get very wet climbing it). But it appears that the upstream lead is only ~100m from where the river may reappear again on the surface in an upstream (westerly) direction, so there may not be too extensive cave in that direction. Note this river also disappears for stretches of a few 100m further upstream to the west, and in general this

seems to be an intermittent river cave, whose downstream course also carries on the north on the satellite images.

However, in the field above the Tragadero del Tunel cave we saw a large dry fossil cave, which we explored and mapped for a total of 333m (figure 17). This was called Cueva del Luber Davila, and it has some high fossil galleries that are well decorated, and clear evidence of human occupation. At the end of the cave, a very strong draft disappears into a lower boulder choke, whilst Martin ripped a short rope climb into an upper chamber that has no draft and closes down by flowstone. There was also a sporting climb up a flowstone wall further towards the entrance that was also found to be blind. But this cave hints at the development of large caves that may be found within the wider area.

Large river cave in jungle outside Canaan (September 17th): On our last caving day, we were guided by Neiser to a large mega-doline (100m across, ~80m deep), which was about a ~2.5 hour walk for us to the east of Canaan (figure 18). This mega-doline lies ~40 mins beyond a clear-felled area with a cabin, on an area of higher ground in dense jungle, again with very muddy paths.

The mega-doline was descended initially by a short (20m) handline from a tree towards the (very) loud sound of water (figure 18), and there is indeed a really spectacular river cave at its base (Figures 19-23; Tragadero del Castillo; 6.87379 S 77.42776 W, ~2083m; GPS taken at crest of megadoline). This large river cave was then quickly explored to determine whether future expeditions should come back, but the decision was taken to not survey as we had limited time for a return to Canaan in daylight, on this last day.

In an upstream direction (figures 19-22), a fine near-horizontal river passage continues for maybe 250-300m (paced distances) to a pair of entrances into daylight. There are various shallow pools that were up to knee deep to be negotiated, but it was easy going. These twin-entrances seem to be where the river sinks. From a subsequent look at satellite images, this daylight entrance and sink is well-outside the original mega-doline, but close to where there seems to a transition from mudstone to limestone (figure 6).

The downstream continuation of the river cave at the base of the mega-doline has a series of short pitches needing rope. Martin and Jean Yves quickly rigged two short pitches from bolts (~5m and 10m), before they stopped at a larger (~15m) pitch. It was thought a better future strategy would be to rig past these pitches from a different point in the mega-doline's base. But the downstream end of this major river cave continues flowing in a south-southwest-ward direction, and it is ongoing (figure 23).

This river cave is thus an outstanding lead. It is even more interesting as it could be a tributary into an even larger river cave. The mega-doline is located about 2-3 km from a major river sink originally identified on the satellite images further to the southeast (figure 6). However, the crest of the mega-doline is ~220m higher than that larger river sink on the satellite images (you can also see the mega-doline on the satellite images, once you know it is there). The mega-doline is < 100m deep, so the river cave we explored must be at least 100m higher than the river sink seen 2-3km on the satellite images.

Our guides in Canaan also report that there is a lake called the Laguna Negra (Black Lake) with oilbirds about another 1 hour walk away (at their speed) from Tragadero del Castillo, and that there is a large cave (tragadero) a further hours-walk (5 hours from Canaan) beyond that. These features may lie on the land owned by another person who was in Cajamarca when we visited. We thus wonder whether this 'Black Lake' is a river sink that partly or fully blocks up, and it is the river sink seen on satellite images ~2-3 km further to the east of Tragadero de Castillo (figure 6). It could be

that the tragadero located another hour to the east is a resurgence for that same river, also seen in satellite images. (However, the satellite images cannot independently determine if their features are sinks or resurgences, as the direction that river flows where it emerges on those satellite images in unclear).

Keith Muscutt also reports he was told about a similar underground lake, which he was told is quite large (a campesino friend said his flashlight wasn't bright enough to illuminate the opposite side of it). He says if it does indeed have oilbirds in residence, it might have been visited by ancient Chachas collecting their eggs.

This were therefore a memorable and successful day in the reconnaissance expedition that shows large river caves may lie within the jungle around Canaan (figure 3,4), which may be explored further by future expeditions.

Walking back from Canaan to La Morada: The following day (September 18th) we started the 4-day walk back to Atuen, where the minivan would come to the roadhead early on the 22nd. There was overnight rain, so the descent of Cuesta Amor Inmensa was especially muddy (figure 24), but more importantly – the river crossing near Cueva de la Polrosa had risen significantly. Basic white-water techniques in groups of 3 were thus used (figure 25), before our guides crossed with their horses. We did not have time to explore Cueva de la Polrosa any further, and it is left ongoing. At La Morada we again stayed at the same location, and again with excellent hospitality.

Walking back from La Morada to Atuen (September 19-21st): We split this walk into 3 days, and this involved staying at an abandoned cabin near Ofedon, about 30mins short of the Pampa Hermosa turnoff from the main track. Unfortunately, this abandoned cabin had a very large bee's nest (figure 26), and some bee's took a fancy to particular team members, who had to take cover in tents. The we then had a long tiring day (~1400m ascent) to a new campsite just before the col by El Cruce (figure 27), before a final easier day that was mainly down hill to the roadhead at Atuen. We were picked up by the minivan at ~6am on the 22nd, and then made the spectacular drive to Cajamarca.

The UK cavers flew back to Lima early on the 23rd, and then from Lima later that day back to Europe. Tonio and Jean Yves continued with plans to take a boat to Iquitos, and then join the later ECA-GBSM expeditions south of Soloco and Chachapoyas.

Figures

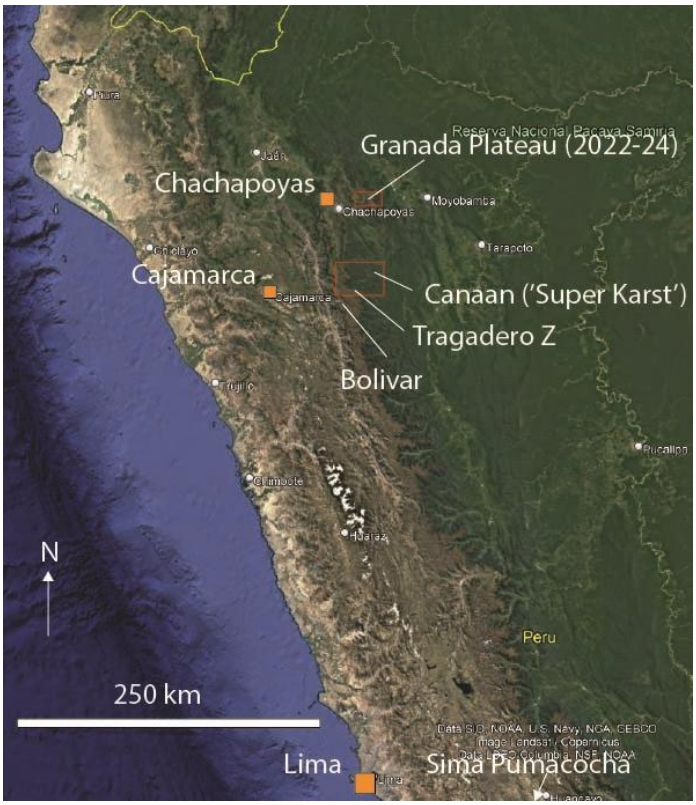


Figure 1. Overview map showing the location of the two objectives of the 2025 expedition (Canaan super karst and Tragadero Z). Also shown are the locations of areas explored near Bolivar by US cavers, and the site of expeditions by in 2022-2024 on the Granada (Picos del Oro) Plateau.

Figure 2. More detailed map showing the location of Cajamarca, Atuen, and the path (blue dotted line) from Atuen to La Morada and Canaan. Note that Canaan may be approached somewhat more quickly (2 days rather than 4 days walk) from the town of Luz Del Oriente by future expeditions. The location of past US caving expeditions (Gringobamba) and Tragadero Z (eventually not visited on this trip) are also shown.

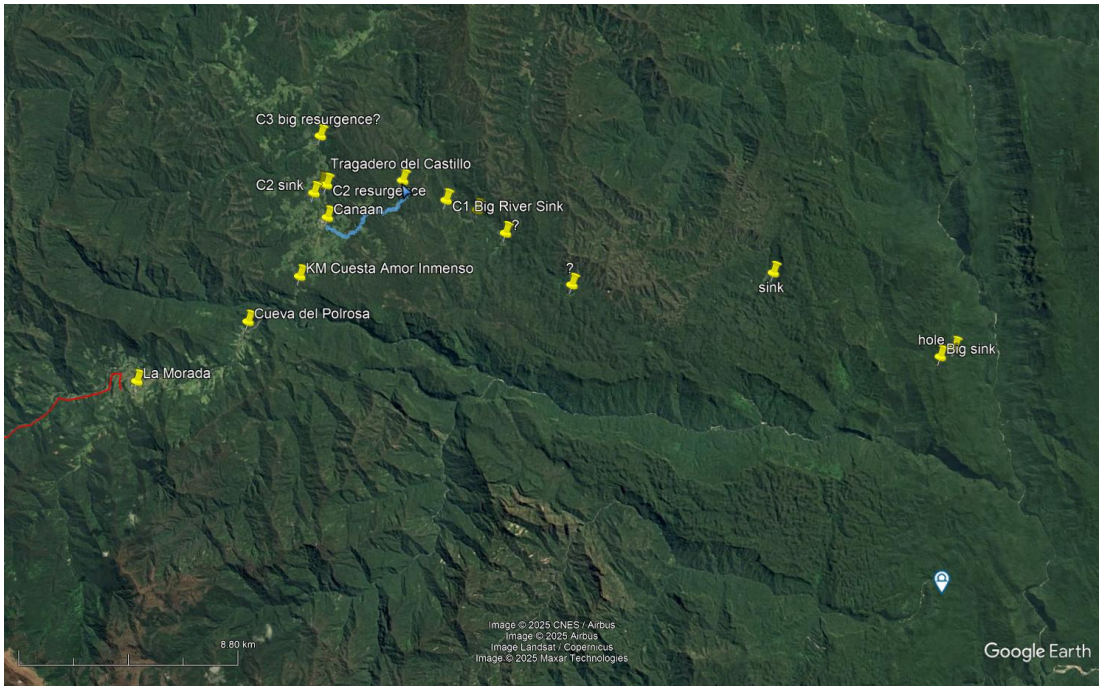


Figure 3. Map of 'super karst' area around Canaan, showing our walk to Tragadero del Castillo, which is a few km away from C1 river resurgence and sink (figure 4a). The C2 resurgence and sink lie closer to Canaan, and to Tragadero del Tunel and Cueva del Luber Davies. Note there is a very big and exceptionally remote river sink at the bottom right of this map, which is shown in Figure 4b.

Figure 4. Features in the Canaan Super Karst. (top) The C1 river sink and resurgence, a few km away from and lower than Tragadero del Castillo, about 3-5 hours walk east of Canaan. This feature is current best seen on Bing Maps and not Google Earth. (bottom) An extremely remote but large river sink shown at the bottom right of Figure 3, far into the jungle.

Figure 5. Map showing route to the Tragadero del Tunel and adjacent Cueva del Luber Davies, close to Canaan. These caves lie between the intermittent course of a river between C2 sink and resurgence. There is a possible (uncertain) resurgence of the Tragadero del Castillo water at the top of the map, but this has not been visited and checked.

Figure 6. Map showing our route from Canaan to Tragadero del Castillo, which lies above and a few km away from the C1 river sink and resurgence, shown in figure 4a.

Figure 7. Satellite image of Tragadero Z, a major high-altitude river sink yet to be visited by cavers. We did not manage to reach Tragadero Z on this expedition, and its position is shown on Figure 2.

Figure 8. Muddy path at the road head near Atuen. Our first two nights and last night were at the Cabin on the right.

Figure 9. (left) Location of cave found on first data near Atuen, which may have been explored previously, as flagfging tape found with date of 1997. (Right) There is an ongoing 15 m pitch, but no evidence of bolts having been placed previously.

Figure 10. Landscape just to the east (La Morada side) of the col at El Cruce, on the way in.

Figure 11. Lago Jardin.

Figure 12. La Morada viewed from the east.

Figure 13. The team enjoying (top) watching volleyball and (bottom) beer at La Morada.

Figure 14. Cueva del Polrosa in the main river gorge, under lower flow conditions.

Figure 15. The views from Canaan.

Figure 16. Tragadero del Tunel near Canaan. (left) Looking into entrance shrubbery. (right) Survey (drawn by Andrew Atkinson).

Figure 17. Cueva de Luber Davila (Swift Cave). (left) Climb above drafting choke at end. (right) Survey (drawn by Andrew Atkinson).

Figure 18. Tonio descending into the mega-doline of Tragadero de Castillo towards the roar of water.

Figure 19. Andrew looking upstream into Tragadero del Castillo.

Figure 20. Looking back towards the mega-doline entrance from a short distance upstream.

Figure 21. Tragadero del Castillo, heading upstream.

Figure 22. Formation in Tragadero del Castillo.

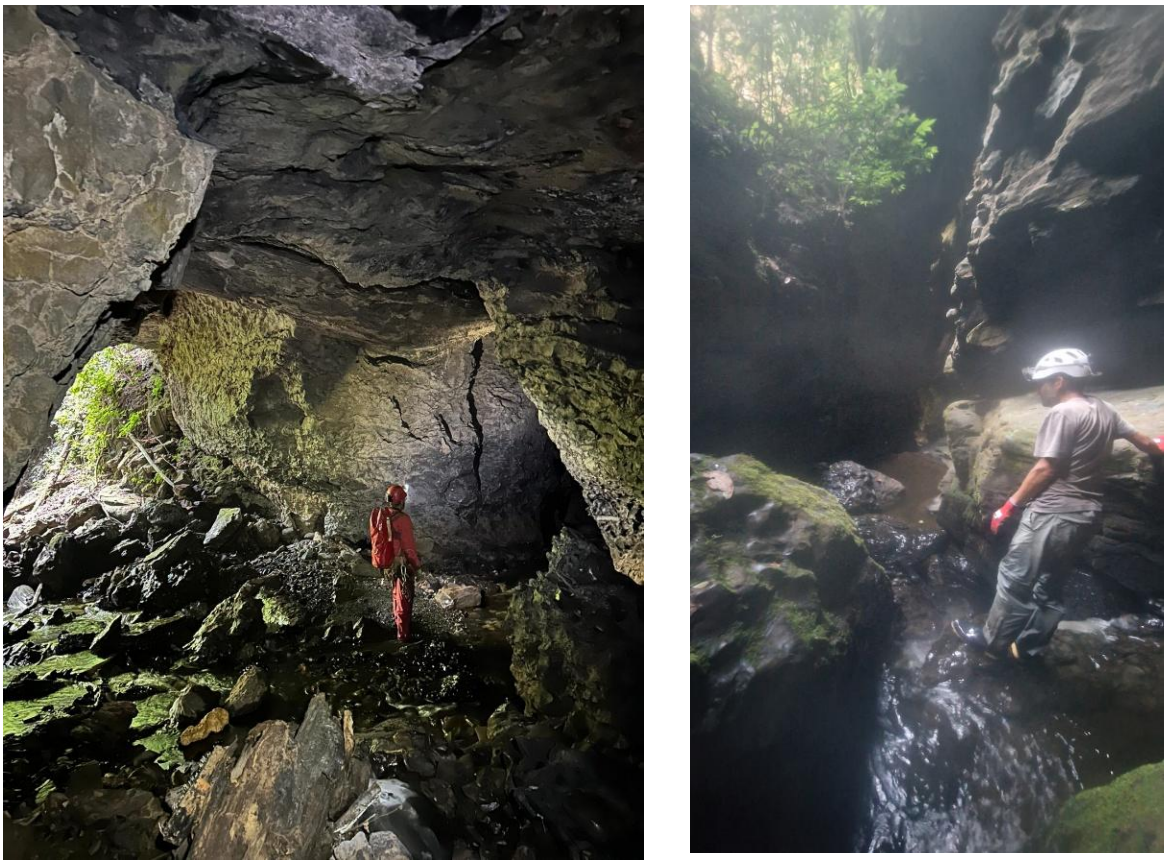


Figure 23. (left) one of the two upper entrances where water sinks. (right) Looking at the first of the pitches in the downstream branch.


Figure 24. (left) The rather muddy Cuesta Amor Inmensa with La Morada in the distance. (right) Pete's HOKA trainer post Cuesta Amor Inmensa.

Figure 25. Martin, Darren and Andrew showing exemplary river crossing skills on the way back, which were not entirely mirrored by the next group of 3.


Figure 26. (left) The ‘Bee Hut’ used as a camp on the return walk. (right) The huge nest on the side of the cabin built by bees, who took a fancy to some expedition members.

Figure 27. View from near the camp at the col by El Cruce, looking back towards where we had walked.

Figure 28. (top) The caving team, and (below) the wider team at La Morada.

References: (and also see the tremendous www.cuevasdelperu.org website for more information).

Gringo, M., 2011. Perusing South America. NSS News, v. 11 (October).

Knutson, S., 2005. Deep in the Andrean Mists: Peruvian caving on the grim side. NNS News (feb 2005).

Information on Tragadero Z: see https://cuevasdelperu.org/san-martin-mariscal-caceres/tragadero-del-rio-z/

Muscutt, K. 1998. Warriors of the Clouds: A Lost Civilization in the Upper Amazon of Peru. University of New Mexico Press. 128 pp.

2024 Expedition Members:

Andrew Atkinson (UK),

Jean-Yves Bigot (France),

José Antonio De Pomar Cáceres (Perú),

Martin Holroyd (UK),

Darren McKenzie (UK),

Peter Talling (UK).

Timeline (Chronogram) of 2025 Expedition

6th September: UK and French cavers fly out.

7th September: UK and French cavers travel out (with Jean Yves coming via bus from Luya).

8th September: Initial team assembles in Cajamarca and shopping.

9th September: Full team assembles in Cajamarca, and final shopping.

10th September: Team travels via minivan from Cajamarca to Atuen via spectacular road.

11th September: Heavy rain, and team spends afternoon prospecting from Atuen.

12th September: Team walks from Atuen to Lago Jardin, with some prospecting.

13th September: Team walks from Laho Jardin to La Morada.

14th September: Day in La Morada, including negotiations about cost of mules.

15th September: Teams walks from La Morada to Canaan.

16th September: Team explores river cave and adjacent 333m long fossil cave near Canaan.

17th September: Team explores major river cave in megadoline that is 2.5 hours walk from Canaan.

18th September: Team walks from Canaan to La Morada, with exciting river crossing.

19th September: Team walks from La Morada to Beet Hut.

20th September: Teams walks from 'Bee Hut' to camp near Col by El Cruce

21st September: Team walks from camp near Col by El Cruce to Atuen.

22nd September: Minivan picks up cavers at 6am at Atuen, and journey back to Cajamarca.

23rd September: UK cavers fly out of Cajamarca to Lima, and from Lima.

24th September: UK Cavers arrive back home. Tonio and Jean Yves continue with boat trip to Iquitos.

Summary of caves explored

Area 1: Valley above the roadhead near Atuen

River Sink 0 (un-named, on satellite images). -6.868265° -77.754477° 3,315 m. Significant river sink seen on satellite images, but not visited by this expedition. Worthy of a future look.

River Sink 1 (un-named, on satellite images): -6.875980° -77.754829° 3,351 m. Blocked, no access.

Unnamed Cave ('1997 cave'): -6.877790° -77.749002° 3338m. Obvious large feature on side of valley, below hanging valley. Entrance quickly leads to 15m pitch down with water. Flagging tape with '1997' was found at the entrance, so this may have been looked at before. But no sign of bolts on the pitch, and difficult or impossible to rig from naturals. Pitch was not descended by us, and may be worthy of future expeditions.

River Sink 2 (un-named, on satellite images): -6.881507° -77.747735° 3,308 m. Blocked, no access.

River Sink 3 (un-named, on satellite images): -6.896882° -77.733807° 3,476m. Blocked, no access.

River Sink 4 (un-named, on satellite images): -6.903359° -77.727074° 3,499m. Blocked, no access.

Area 2: Above Lago Jardin (Nor visited by expedition, but from Keith Muscutt)

Tragadero Soledad: -6.935288° -77.692751° 3,261. Large feature in satellite images, may feed Lago Jardin about 500m lower. Not visited by this expedition.

For Brian Gindling: -6.926912° -77.689566° 3,581 m. Cave entrance reported by Keith Muscutt. Not visited on this expedition.

Tragadero Z area

Tragadero Z: -7.052446° -77.611120° 3,422 m. See https://cuevasdelperu.org/san-martin-mariscal-caceres/tragadero-del-rio-z/.

There may also be an adjacent hole at -7.049087° -77.613669°.

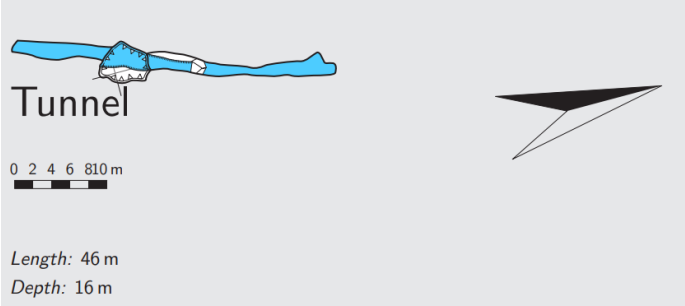
Also see -7.077357° -77.581532°; -7.082474° -77.576548°; and -7.082660° -77.575943°

Gorge near the river crossing from La Morada to Canaan

Cueva del Polrosa: -6.92824° -77.49166° 1,571 m. Significant resurgence cave in gorge near to river crossing from La Morada to Canaan. River passage (~ 3 x 5 m) followed for ~50m to small (2m) pitch back down to stream (needs rope and bolts, no naturals). Pitch could be bypassed closer to entrance perhaps but very wet. Left at large ongoing passage, and not explored further. No survey. Good prospect.

Caves around Canaan

Tragadero del Tunel: -6.87490° -77.46193° 1933 m (GPS reading taken at path). 15m pitch down with bolt belay and rebelay, leads to river and short traverse to a downstream sump pool. The upstream direction leads to a waterfall that would mean you get very wet to climb. The river in this cave may both sink and resurgence within ~500m of the skylight entrance. The cave may be part of a wider intermittent river cave, judging from satellite images. It is a 20–30-minute walk from Canaan.



Cueva de Luber Davila ('Swift Cave'): -6.87490° -77.46193° 1933 m (above Tragadero del Tunel). Total length 333m. Obvious large entrance in field above Tragadero del Tunel, leads to large dry passage. After sharp bend, there is a tricky climb up flowstone to higher level that does not continue. Main passage continues with a strong draft to a 15m handline climb up, beneath which is a bolder choke that takes the strong draft. The climb up leads to a chamber, but with no way on. Locals report that the sound of water occurs in this cave (in the boulder choke?) during floods.

Tragadero del Castillo: -6.87379° -77. 42776° 2,083m (GPS reading taken at top of mega-doline, about 60-80m deep). Not surveyed due to lack of time. An outstanding lead for future expeditions.

Impressive mega-doline with loud sound of water at base. Very steep vegetated slope may need a ~20m rope handline to climb down for about 60-70m, to eventually scramble down to reach river.

A large (8 x 5m) passage heads upstream over blocks. This large passage can be easily followed through various knee-deep pools and with a gravel floored river bed - for about 250-300m. In places it is well decorated, and there is plenty of evidence for flood debris. This large passage eventually leads to a surface opening on the right, and soon afterwards (via a crawl) there is a second surface

entrance into which water sinks. These twin sinks may be at the boundary of impermeable mudstone and limestone rock units seen on satellite images, beyond the initial mega-doline.

Back where the river is encountered in the mega-doline, a similarly large river passage heads off downstream. Two short pitches (~5m and then ~10m, rigged off bolts) were rigged, and the passage was left wide open and ongoing at a somewhat larger (15m) pitch down that needs more rope. It was thought a better future strategy would be to rig past these pitches from a different point that is further along the mega-doline's base.

This river cave is thus an outstanding lead. It is even more interesting as it could be a tributary into an even larger river cave. The mega-doline is located about 2-3 km from a major river sink originally identified on the satellite images further to the southeast. However, the crest of the mega-doline is ~220m higher than that larger river sink on the satellite images (you can also see the mega-doline on the satellite images, once you know it is there). The mega-doline is < 100m deep, so the river cave we explored must be at least 100m higher than the river sink seen 2-3km on the satellite images.

Our guides in Canaan also report that there is a lake called the Laguna Negra (Black Lake) with oilbirds about another 1 hour walk away (at their speed) from Tragadero del Castillo, and that there is a large cave (tragadero) a further hours-walk (5 hours from Canaan) beyond that. These features may lie on the land owned by another person who was in Cajamarca when we visited. We thus wonder whether this 'Black Lake' is a river sink that partly or fully blocks up, and it is the river sink seen on satellite images ~2-3 km further to the east of Tragadero de Castillo. It could be that the tragadero located another hour to the east is a resurgence for that same river, also seen in satellite images. (However, the satellite images cannot independently determine if their features are sinks or resurgences, as the direction that river flows where it emerges on those satellite images in unclear).

Keith Muscutt also reports he was told about a similar underground lake, which he was told is quite large (a campesino friend said his flashlight wasn't bright enough to illuminate the opposite side of it). He says if it does indeed have oilbirds in residence, it might have been visited by ancient Chachas collecting their eggs.

Notes for future expeditions

Easier and quicker approach to Canaan: We approached Canaan from Atuen (a 50 mile walk with ~4,500m of ascent) in part because we originally wanted to visit Tragdero Z, and because of advice from Tonio's contacts in La Morada. However, there is a significantly easier and quicker (2 days not 4 days) approach to Canaan from the town of Luz de Oriente. The path is significantly bigger than that from Atuen, although it may still be muddy. Locals report that it is 8-10 hours from Canaan to Luz de Oriente, and we estimate that would be ~12-23 hours (two days) at our speed. It should be possible to charter a minivan in Chachapoyas that may be able to get to Luz de Oriente via Mendoza, and it may be possible to get to Luz de Oriente in 1-2 days drive from Chachapoyas. This looks like a significantly easier (if not that easy) approach that will save time and effort.

We saw a trig post in the bogs near El Cruce, and La Morada may have plans to eventually build a road from Atuen to Lago Jardin. It may also be possible that road is built to Canaan from Luz de Oriente at some point in the future perhaps.

How to reach Tragadero Z: We did not reach Tragadero Z, and this challenge remains for future expeditions. It will be a significant undertaking with ~1,000m of ascent from Pampa Hermosa. Our suggestion would be to approach from Atuen, and turn off the main path to La Morada to camp at Pampa Hermosa. Note that path to Pampa Hermosa looks much smaller than the main path we followed down the valley, but it should be possible to get to Pampa Hermosa in 2 long days from

Atuen. There is no cabin at Pampa Hermosa to cook in the dry. We then believe there is a path over the mountains that goes to Bolivar, and some parts of this path seem to be visible on Google Earth. But you would need to deviate significantly off this path to get to Tragadero Z, and it may need to cut some new lengths of path. The satellite images also show a single cabin close to Tragadero Z, and there may be a path already cut to this cabin from Pampa Hermosa, if you have a suitable guide. It would thus probably be at least 3 and more likely 4 days from Atuen to reach Tragadero Z in each direction. Good luck……

Muddy paths: The area can have exceptionally muddy paths, and locals wear rubber wellington boots for good reasons. We were unused to walking in such boots for these long distances, and issued with wet feet may be worth thinking about carefully when choosing footware and socks.

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