VALLINA DOWNSTREAM SUMP 6 DIVING PROJECT

CONCLUSIONS AFTER SUMMER 2021

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Having spent several years and tried different strategies for extending the existing limit of exploration at this site, I have drawn the following conclusions, which I hope will help with future attempts by both myself and others in continuing exploration here and at other similarly remote dive sites.

There are basically two approaches now feasible to continue from the last push at the site, which was made in ' alpine style ' ie. carrying more or less everything needed for the dive on the day. This approach is no longer physically possible due to the amount of gas required and the terrain it has to be carried over. A limit has been reached, beyond which more complex siege style tactics are now necessary.

1. Open circuit with a large carrying team. This would require at least 4 x 7 litre cylinders and drysuit for just one further push, and would still present difficulties for the pushing diver unless he had a further diver to assist with transport between sumps (mainly sumps 5 and 6, but there is also above water travel between sumps 1 and 2, and 2 and 3), requiring yet more gas for the support diver. Carrying larger capacity cylinders is simply not an option. Transport to and from the dive base would only be possible by a very fit and competent team, and would not be sustainable on a long term basis. Attempting to transport such a load in the passage between sumps 5 and 6 would result in damage to the drysuit or serious injury through a fall in the razor sharp potholed streamway. Any further push would entail organising a team of around 10 sherpas, to carry both in and out of the cave. Having achieved such a task, the whole enterprise may have to be cancelled at short notice due to the unpredictability of the weather. Such a high volume of traffic through the cave would also severely reduce the visibility in all the downstream sumps. This would be detrimental in sump 6, where the large and complex tunnel will require good conditions for a useful push. The often superb vis is one of the reasons why diving here is worth such a lot of effort in the first place.

2. Closed circuit with staged cylinders and rebreather. This approach makes feasible a considerable extension to the sump without any requirements for Sherpa support. Bailout cylinders and rebreather must be pre-staged at Sump 6, as it is not possible to carry the entire equipment package in one go. The cylinders are normally unused, and can be permanently left at the sump. The rebreather can be brought in at the start of an expedition and left in situ for a couple of months. This approach was used to reach the existing end of the line in 2019, in a half hour dive which used virtually nothing in terms of gas or absorbent time. The only flaw in the approach is the unreliability of the electronic components after being left in the cave environment for some time. It is therefore essential to have spares, both of the oxygen sensors and the dive computer that monitors their output. (both of these elements failed in 2021).

Initially, the dive base was from an advanced camp on a ledge above the streamway after Sump 5, where much kit was left throughout the year. This strategy has now been abandoned in favour of starting from the Sump Chamber at the old end of Vallina, and removing all gear at the end of the expedition. It was found that most gear suffers for being left in the cave atmosphere; neoprene absorbs water and loses its stretch, drysuit seals become flabby and leak; dry underclothes become mouldy; all electronics just don't work after

exposure to damp, especially sensors and batteries. There was also the added complication of an 11 metre SRT pitch before and after every dive, to access the ledge.

The trade-off is having to traverse a lot more cave in the delicate drysuit. I had some especially made boots fitted by O Three to my suits this year, to withstand the sharp and irregular cave floor. The usual catheter system for allowing a pee tends to come adrift during a lot of movement, resulting in very wet underwear, so this was supplemented by "teenagers overnight bedwetting pants" (yes, they do exist, and absorb a lot of fluid).

A normal day's dive outing therefore consists of several stages:

1. To the base of the Double Dutch pitches in dry gear, change into wetsuit.

2. Down to Sump Chamber, change into drysuit. Kit up on far side of the boulder chaos.

3. Through sumps 1 to 5 on open circuit gas. Just after sump 5, dump cylinders and lead. Carry valves, fins, mask, harness, etc, very carefully down to Sump 6.

4.Kit up at sump 6 with rebreather and two side mount 7 litre bailout cylinders, all pre-staged. No lead is needed here as the rebreather package (Classic KISS with 2 x 3 litre on board cylinders) is very negative.

This system was found to work very well in 2021, sump 6 being reached in just 3 hours 30 mins. However, no progress was made in the sump due to several factors, lessons learnt being:

1. Don’t fall over the dog in Ramales (luckily no-one was watching). The resulting injury can cause a lot of pain whilst caving.
2. Electronics don’t like damp – always carry redundant parts. The main problem was oxygen sensors. These were almost impossible to buy in 2020 due to covid, the ones I had imported spent a lot of time in Customs, in transit, etc, and I think this had an adverse effect on them. They were new out of the sealed packs this year, but still were inconsistent and all 3 failed at some point during diving, having passed the initial calibration.
3. Also, my main dive computer, a Shearwater Petrel with external ppO2 monitoring, let me down – it wouldn’t switch on after 2 weeks underground. I think this is an inherent problem with damp but I should have had it serviced before coming this year. This is the one and only indispensible item as it monitors every aspect of the rebreather and dive profile. I intend to bring a spare for next year.

After finishing this report, a further complication arose in the form of the theft of my SRT kit from the head of the pitch area by persons unknown. I am sure they were able to easily get to this area because of the large number of route markers installed by the Catalans, meaning no prior knowledge of the route would be needed. The worrying implication is that on future trips into the system, I can't be sure that my gear or the ropes may be removed when I am down the pitch, resulting in a lengthy wait and rescue callout. Some thought will be required as to whether it is worth continuing with this uncertainty hanging over the safety of my return, and the security of my equipment.

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