

# **SRA KEOW CAVE : STORY OF A DEEP CAVE**

*by Cedric Verdier*



A few months ago, a team of experienced rebreather divers living in South-East Asia, decided to explore the Sra Keow cave in Krabi, Thailand. This cave system was previously explored by the Thailand cave Diving Project but, because of the limitation of Open Circuit Scuba, nobody ever reached the deepest part of the main passage. In a matter of a few months, three CCR depth records were broken, using stock units.

Cedric Verdier, a Technical Diving Instructor Trainer since 16 years, pushed the limits of the Cave to 201 m/ 663ft using a standard ISC Megalodon Closed-Circuit rebreather with an axial scrubber and no major modification. This dive is supposed to be the deepest dive ever done with a Megalodon, and also the deepest cave dive/rebreather dive ever done in Asia.

Mike Gadd, from Singapore, reached a depth of 191m / 626ft with a Delta-P Ouroboros CCR with no modification. Here again, it's supposed to be the deepest dive ever done with this unit.

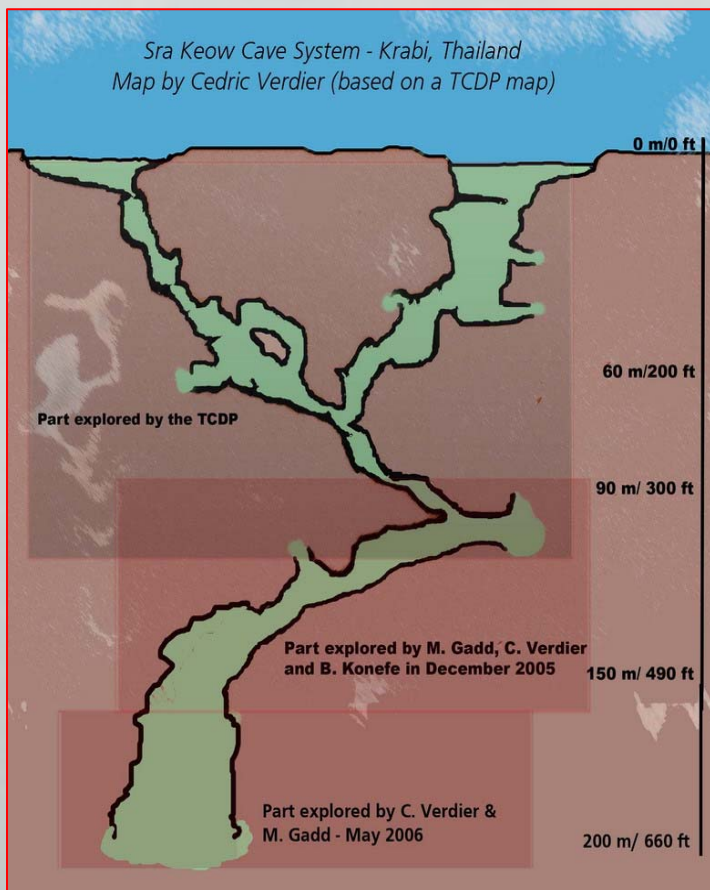
During a previous expedition, Bruce Konefe used an AP Diving Evolution CCR to explore the same cave at 120m / 393ft, quite a challenge with a very small scrubber.

Sra Keow is a wonderful place. An easy access, a convenient location close to Krabi and its beaches, a scenic landscape, with some placid elephants who sometimes come nearby to carry tourists. This is supposed to be the deepest cave system in Thailand. Two entrances are connected together as the gateway to a giant kingdom with crystal clear visibility and easy access. The main passage is huge and it was

impossible to see the bottom of the cave. This first expedition was such a success that they all decided to come back as soon as possible. Because of their respective occupations, nothing will happen before four months. The abyss had to wait for them.

Cedric lives in Thailand and Mike in Singapore. Nevertheless the communication was almost daily when they both agreed on going back to explore the cave in the 200 m range. Soon, they both discovered that it was definitely a technological and a physiological challenge:

- Mike dives with an Ouroboros and Cedric with a Megalodon CCR. Even if both units are extremely reliable and have a good reputation in the deep diving community, nobody ever tested them at these depths. A few minor changes were necessary, mainly on the Megalodon, in order to safely plan these dives. The handsets and the battery compartments were filled with mineral oil to withstand the 21 ATA of ambient pressure and all air-filled pressure gauges were removed. Every single piece of equipment was thoroughly inspected and the divers carefully read the user manuals of all their gear (canister light, back-up lights, computers and depth gauge) to find data about crushing depth. Nevertheless the idea of having something that could implode at depth never really left their mind.



- Planning a dive at 200m / 660 feet is clearly something different than planning a "normal" trimix dive (if such a thing exists!). A long discussion took place between the two divers about the right mix, the right setpoint and the right decompression procedures. The dive plans that both divers exchanged could have been interpreted as an elaborate secret code of a counter-intelligence agent who eats too many magic mushrooms. Mike and Cedric finally agreed to use only one diluent all the way to the surface, to limit their setpoint on the bottom while slightly increasing it during the ascent. The deco obligation will be longer than when using multiple diluents but the off-gassing process will be smoother. They also agreed on "trusting" the VPM-B/E algorithm implemented in V-Planner to safely bring them to the surface.

- Diving deep is one thing, Coming back alive is another one. In case of emergency, all options should have been thoroughly planned. Both divers spent an interesting evening in a Pizzeria in Krabi, planning all the "What if's"

they could imagine. They both decided to have a comfortable safety margin by staging multiple tanks in the cave in the case one of them has to go the “Open Circuit” way. At the end, it means more tanks than a body builder could safely lift and the real challenge was to keep everything quite streamlined.

- Extremely long exposures, even in quite warm waters (around 26°C at the surface), are also a concern. A dry suit is clearly a must, even if it means a difficult and very hot gear-up session in the Tropics. A proper hydration schedule is also required (as is the P-valve). Both divers also decided to set up two very basic habitats, one for emergency at 12m / 40ft (in case of convulsion, or simply .... to throw up!) and one at 6m/ 20ft for comfort (to drink and eat some junk food). The main concern was to know if the local kids were able to hold their breath and dive to the habitat to enjoy the candy bars before the divers.

Diving in a pond surrounded by hysterical kids and impressive elephants is something that most of divers will never experience. But gearing up with state-of-the-art rebreathers, Full Face Mask and astronaut suits with a lot of sunburnt tourists and puzzled locals is not the best part of the dive. Quite difficult to focus on a rebreather check-list when people come to ask you one of the most stupid questions you could hear: “You’re going diving?” when you were just considering going for a trek in the jungle with more than 80 kg of tanks on your back and a suit that makes you sweat your body weight every minute.

The equipment all around the pond was very impressive, with the equipment for the bottom divers, all the staged tanks and the big twinsets of the support divers. The local people were also quite surprised to see both divers installing the two habitats (barely more than two blue buckets) that they simply named RITZ and HILTON.



Everything would have been perfect without the rain. Unfortunately the amount of water coming from the sky out weighted the amount of water in the pond and the visibility quickly started to decrease and became close to zero. That will not make the dive easier: the entrance of the cave is a restriction and following the guideline in a low viz will certainly slow down the descent rate. But in a very international team (American, British, German, Thai and French), there is always somebody to keep the motivation level high.

On the “big day”, everybody is quite focused. Mike doing his extensive (and quite long) Ouroboros check-list, Cedric listening to his MP3 player while checking his equipment, and the support divers in the middle, trying to help them without disturbing.

After a long time to gear up and sweat at the surface, and a few minutes to relax at the surface, both divers submerge along the descent line that Bruce installed earlier. 6 minutes to reach 60 meters/ 197 ft. Then a long descent to reach the end of the line at 150m/ 490 ft. After a few seconds of hesitation and rest, a new line is laid and the divers keep on going down. The cave is massive and the water so clear compared to the surface. Even with powerful lights, no way to clearly see the opposite wall. The walls are vertical and as smooth as the shaved legs of a fashion model.



No way to wrap the line around some rocks or formations. Mike finally finds a place to tie off the line, cut it and recover his expensive reel. Cedric is slightly below him, looking at the impressive environment. At 200m/ 660 ft, he can't even see the bottom at least more than 20m below.

Both divers realize that no equipment imploded and both rebreathers perform flawlessly. The work of breathing is still good and there is no sign of hypercapnia, even with the standard axial canister in the Megalodon. After a few minutes exploring the cave, it's already the time to start the ascent. First stop planned at 135m/ 443 ft. Just the beginning of a very long ascent.

The funny thing about dive planning is that even if you plan for the worst case scenario, you can still be surprised. Therefore the ascent wasn't really boring. Quite the opposite:

- Even with ample stock of gas for suit and wing inflation, both divers were heavy on the bottom and Cedric ran out of gas for his wing and had to switch tank and reconnect his LPI (something you don't like to do at 200m in mid-water, kicking hard to maintain your depth).
- All the computers used gave massive decompression obligations (specially the VR3 VPM) with long deep stops and overall hang time over six hours. Even if you plan your decompression careful, your common sense is always reluctant to “bend” your computer and fully trust your tables... Therefore both divers were late compared to their decompression schedule and the support divers were surprised and concerned not to find them around the expected depth.
- With such a low visibility, a line trap was the opportunity to understand the true meaning of streamlining one's equipment. Cedric and Mike both cursed (respectively in French and in English) when they couldn't find a way to follow

the line with all their sling tanks and had to descent a little bit to find the proper passage.

- The RITZ decided to sink and became entangled in the main line. Cedric was quite surprised to bump his head into a plastic bag full of fruit juice...
- Some annoying shrimps came to the decompression stops in order to know if the soft skin of mixed-gas divers could be a proper food to be incorporated in their regular diet. Just to let you know that it's extremely painful when these lovely creatures bite your face.
- Because of the extremely low visibility, reading the gauges was very uneasy. Some mistakes in the run time were made and the ascent even more delayed.
- The anti-dehydration plan was very effective and both divers exchanged their points of view. Cedric was happy to see his bladder still active at 200m and Mike enjoyed letting it go every 10 minutes.
- Both divers spent a very long time at their shallowest stops, reading, sleeping or swimming around. Having drifted from the decompression station (a submerged tree trunk conveniently at 6 and 4.5m), Mike was surprised to find a solid rock over his head when he started his final ascent to the surface. He had to look for the exit for quite a long time, while avoiding to descent (no diluent left).

***May the 17<sup>th</sup> 2006. 8:30PM.***

Both divers are at the surface. According to the support divers, Cedric is blue and Mike looks rather tired. They look at each other without really believe it.

- The deepest dive ever done with an Ouroboros (191m/ 626 ft).
- The deepest dive ever done with a Megalodon (201m/ 663 ft).
- The deepest cave dive in Asia.

No mechanical problem, no CO2 hit, no signs or symptoms of DCS. Nothing.

*Special thanks to: Bruce Konefe and Thomas Bodis, our favourite support divers, to Protech Diving College in Phuket, to Cochran Computers and to Ross Hemingway and his wonderful V-Planner software.*

*All pictures courtesy of Mike Gadd. More pictures are available at <http://drmike.smugmug.com>*

### **Technical Data**

- ❖ **Decompression schedule:** V-Planner VPM-B/E (conservatism level 3)
- ❖ **Bottom diluent:** Trimix 5/75
- ❖ **pO2 Setpoint:** 1.1 at 200m / 606 ft, 1.2 at 100m / 330 ft, 1.3 at 60m / 197 ft.
- ❖ **Gases:** 16 000 liters of Helium and 11 000 liters of Oxygen, in 12 stage tanks, 7 sling tanks and 4 on-board tanks. Twinsets and decompression mixes for the support divers. Dry suit inflation with Air.
- ❖ **Decompression station:** two habitats with ample food, drinks and reading.