

Cave photography

by Jean-Michel Machefert

Why take pictures in places where the sun never shines?

Cave divers have the opportunity to see unique scenery and the pictures they take during their subterranean dive trips allows them to share with everybody the mineral (and sometimes animal) beauties only seen by few.

The good news is that there's no need for the latest camera in the latest brand of housing! Don't forget that in cave diving equipment suffers a lot. You will always feel more comfortable with equipment that you can replace in case of a terminal problem than with something which makes you nervous each time you descend. The first rule for nice pictures and safe dives in caves: relax...

A solid and easy to use camera (Single Lens Reflex or Compact or Bridge) familiar and controlled by the photographer in an appropriate housing for the intended depth is perfect. External strobes (at least one) are also highly recommended and powerful continuous lights are also effective. Internal strobes are not sufficient for correct lighting in caves, other than to trigger external slave

strobes.

Most pictures are taken in manual exposure mode and usually with fixed manual focus with a range of focus (depth of field) from about 0.7m to 5m or more (hyperfocal distance). This is because the autofocus needs some light to work but with a strong focus light with automatic light shut off, to avoid any "hot spot" on the walls, auto focus can also be used.

Because of the usual lack of space in caves and also the presence of silt the photographer has to be close to the subject. Wide angle lenses such as the Nikon 10.5mm or Tokina 10-17 or Sigma 10-20 are the most popular for cropped sensors and 15 to 24mm for full frame sensors.

If the photographer feels comfortable and has enough experience to dive safely in caves it could even be easier than in the sea

The entrance of the same cave in Burgundy France, but the view is from under the surface.

Nikon D2x with nikkor 10.5mm, in Aquatica housing, f 5.6, 1/15s, 400 ISO. 2x Nikon SB 910 strobes in Patima housings, 1/4 and 1/2 power.



The entrance of a cave in Burgundy (Douix in Chatillon sur Seine) France illuminated by a powerful HID lamp from under the surface. Last briefing before diving. Leica D Lux 5, 13.9mm, f 2.9, 1/30s, 400 ISO. Picture : Marie Machefert.





Easy shot: portrait of a diver. Single strobe on the camera. Nikon D70 with sigma 10-20mm (17mm), in Sealux housing, f 5.3, 1/60s, 200 ISO. 1x Nikon SB 800 strobe in Patima housing, 1/2 power.

since in caves there is no influence of the light of the sun and the only light is provided by the equipment of the photographer and can be controlled.

The light reflecting off the walls is an important parameter and influences quite a lot the results. The equipment used by divers acting as models is also very important. If possible try always to avoid models with black diving suits and reflecting bands. The reflecting bands will be too bright and the black suits will disappear in the dark background... If

you want to be photographed in cave diving, wear a red or orange suit and you will come out of the picture even in muddy water!

The first step in the life of a cave photographer is to take well focused and well exposed pictures of the caves and their buddies to give scale. A camera working in manual mode with a single external strobe works well. A second strobe can be added but not at the beginning. The strobes should be fitted with diffusers to avoid burnt spots on the walls and



An orange suit in muddy water is far better than the black one. Typical example of cave diver in action with a line and some silt around. Nikon D2x with nikkor 10.5mm, in Aquatica housing, f 6.7, 1/30s, 400 ISO. 2x Nikon SB 910 strobes in Patima housings, 1/4 and 1/2 power.

to fill as much as possible the picture with the light from the strobe(s). To prevent unaesthetic shadows and also burnt out walls the easiest way is to orient the strobes in the direction of the axis of the galleries. More over by using the lowest possible power of the strobe the backscatter from particles (there are so many in caves most of the time!) is reduced.

Here's some technical tips but only basics! : The strobes have a limited power indicated by the guide number (Guide number = aperture

x distance). A usual strobe with a guide number of 36 (in air) will have a guide number of about $36/3 = 12$ under water and so at 1.5m the correct aperture should be F8. In caves a part of the light will be reflected by the walls. The consequence is that a correct exposure in white walled caves requires to close the aperture by 1 f stop (f11) and in caves with dark walls it would be better to open by 1 f stop (F5.6).

So starting with the old saying "f8 at 1 meter and be there!" it is

*Diver with an off camera strobe behind him lightning the gallery
Nikon D70 with sigma 10-20mm
(14mm), in Sealux housing, f 8, 1/60s,
200 ISO. 1x Nikon SB 24 strobe in
Subal housing, full power. Extra off
housing strobe: Nikon SB 105 ¼ power
with a RSU from Heinrich Weikamp*



possible to take nice pictures and portraits of your buddies.

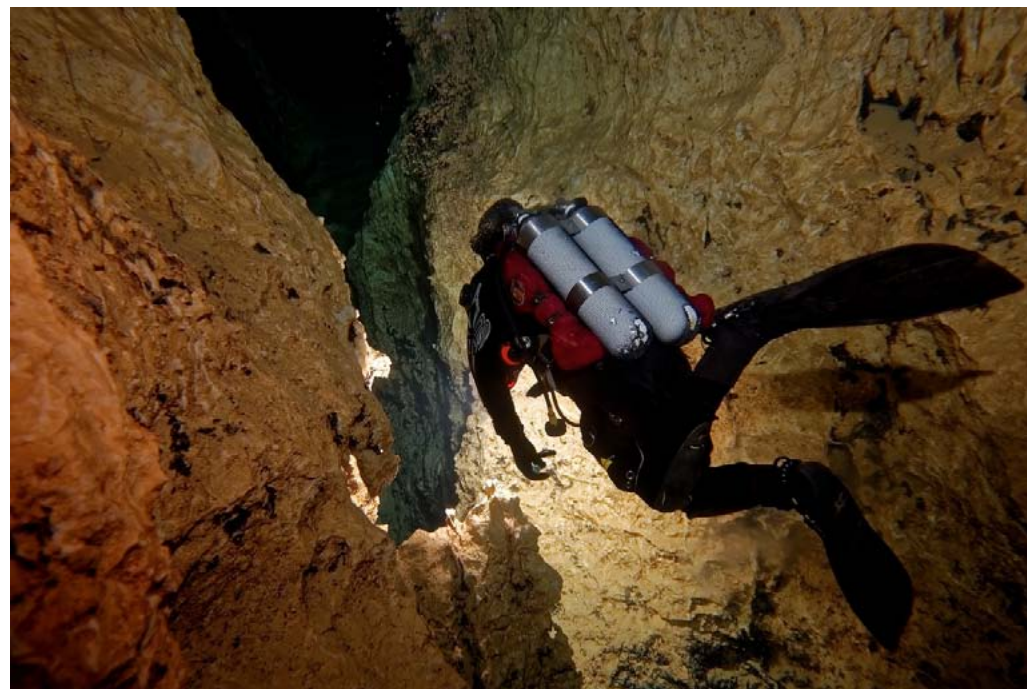
With only on camera strobes it is sometimes interesting to take a picture of the entrance of the cave with the light of the sun illuminating the background through blue or green water. The conditions are the same as in the sea. You choose the aperture to match the strobe power and the subject you would like to photograph and then the correct shutter speed to background light.

Now for something a little bit more complicated – the use of several strobes. If you have the full collection of portraits of your buddies it is time to take pictures showing bigger spaces (cave divers aren't always happy with narrow passages filled with mud !) But here there is a problem. There is no sunlight for blue or green backgrounds. The only solution is to replace the sun with an off camera strobe (slave strobe) fitted with a trigger cell. This second strobe will be used for lighting the backgrounds as

the sun does in open water.

How to proceed? Some technical details but easy ones: the slave strobe will be fired by the light emitted by the main flash on the housing of the camera. The connection between the master and the slave flash has to be wireless to avoid any cables. The most convenient solution consists in using a remote trigger cell (as the RSU cell by Heinrich Weikamp or the triggerfish by Hedwig Dieraert or Ikelite or homemade...). All these cells allow you to fire the slave strobe as soon as they receive some light. Usually in caves they can be used at a distance up to 10m from the nearest strobe.

One more technical tip on the



*Diver with an off camera strobe behind him lightning the gallery
Nikon D70 with sigma 10-20mm (14mm), in Sealux housing, f 8, 1/60s, 200 ISO.
1x Nikon SB 24 strobe in Subal housing, full power. Extra off housing strobe:
Nikon SB 105 ¼ power with a RSU from Heinrich Weikamp*

off camera strobes: Since the remote trigger cell fires the strobe as soon as it receives some light, it is important to use the camera strobe in manual mode to avoid any pre flash. If not the slave strobe will fire when receiving the pre flash and at the time of the effective flash it will be recycling and not fire. Some remote trigger cells (named digital adapter) take in account the pre flash but they need to be very close to the main strobe (about 10cm) and so are impractical to

use in caves for background lightning.

In order to have a correct exposure the easiest solution consists in choosing the aperture for a correct exposure where the slave flash is and to adjust the power of the off camera strobe to lighten the subject area correctly and of course take in account the aperture set on the camera. The setting is done by choosing the aperture and the power settings on the 2 strobes for the correct exposure of the 2 lightened areas.



*Tek diver in a decorated gallery. Off camera strobe on hand.
Nikon D2x with sigma 10-20mm (11mm) in Aquatica housing, f 11, 1/60s, 400 ISO. 1x Nikon SB 800 strobe in Patima housings, 1/2 power. Extra off housing strobe: Sea and sea YS 90 fitted with a RSU from Heinrich Weikamp.*

For model photography give a remote strobe to a photogenic, well trained diver. Safety first is important because if the subject feels unsafe and not relaxed the result will be not as good as it could be with an experienced diver.

The model should hold the strobe like a diving lamp lighting away from the photographer (but with the trigger cell in the direction of the photographer). The aim should be

mainly in the direction of the center of the passages and not to the walls to avoid any hot spots. The orientation of the light can be easier with a strobe fitted on an arm. If the model with the off camera strobe is in front of the photographer in the direction of the scene the pictures will really describe what it's like to be a cave diver with the risk of seeing only the fins and the back side of the leader handling the slave strobe. With some preparation



This picture was taken in the upper shunt gallery of the Ressel spring in Lot France. This gallery is yellow white with crystal clear water and no silt. Perfect for such kind of pictures. Nikon D70 with sigma 10-20mm (13mm), in Sealux housing, f 4.8, 1/60s, 200 ISO. 1x Nikon SB 24 strobe in Subal housing, 1/2 power on the housing. 2 Extra off housing strobe : Nikon SB 105 1/4 power with a RSU from Heinrich Weikamp on the subject and Nikon SB 105 1/2 power with a home made cell on the 3rd diver hidden by the subject.

and communication the diver with the off camera strobe can rotate time to time in the direction of the photographer. In this case he lights forwards to always have the light of the strobe in the same direction as the lens of the camera and the cell in the direction of the photographer. The subject is now seen from the front and

the scenery behind him giving a more contrasty and bright image.

One other method that can be used after careful preparation is backlighting the model with a strobe carried by a third diver hidden by the model. It can only be performed in known caves with clear water.

The photographer needs 2 strobes



Divers in progression in a big room. 1 off camera strobe handed by the diver with a black suit Nikon D70 with sigma 10-20mm (14mm), in Sealux housing, f7.1, 1/60s, 200 ISO. 1x Nikon SB 24 strobe in Subal housing, full power. Extra off housing strobe Sea and sea YS 90 fitted with a RSU from Heinrich Weikamp.



Jean Michel ready for action. Leica D Lux 5, 5.1mm, f2.5, 1/125s, 80 ISO. Picture : Marie Machefert.

with remote trigger cells and 2 friends with a good looking one to be the model.

The photographer dives first and at the place chosen for the picture the 3 divers stop. The photographer rotates in the direction of the subject and this one channels his remote strobe to lighten at the opposite of the photographer in the direction of the third diver hidden behind the subject (1 or 2 m behind). The third diver channels his remote strobe in the direction of the photographer to create the backlighting of the subject and also with the cell in the same direction as the light. A wide snoot can be helpful and lead to nice effects. The photographer shoots aiming to hide the third diver.

Of course to avoid any flare or poor reflection (and also some more fun) the diving lights have to

be switched off... This is only possible safely in a cave well known by the divers and with a careful preparation before diving.

If the 3 strobes are identical, the easiest setting consists in setting the aperture of the camera for a correct exposure of the subject, the slave strobe of the subject can be set on a small power ($\frac{1}{2}$ or $\frac{1}{4}$ of full power) because it is only here to trigger the flash of the third diver and a little bit of the background (low power for dark background and higher power for lighter background) and the flash of the third diver is normally on medium power (half power) depending on the targeted strength of the backlighting.

Underwater photography in caves is technically not really more complicated or more difficult than

photography in open water under the light of the sun, and it allows the cave diver to share his passion and the beauty of the under earth sceneries that only few people have the chance to experience.

Jean-Michel Machefert

Jean Michel began diving in caves, lakes and the oceans in 1987. He started underwater photography in 1992 using a Nikonos IV. After shooting many years with a Nikon D70 he now uses a Nikon D2x in an Aquatica housing. Pictures and some technical tips are presented on his website:

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