



## **Exploration and study of deep reef slope by combination of deep diving operations by rebreather and manned submersibles**

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New scuba diving technology, specifically the mixed gas re-breather, has enabled scientists to explore ocean depths of 100-150 meters, which have not been explored in detail by submersibles. Consequently hundreds of new coral reef species have been described, and divers have observed the coelacanth in its natural environment. The authors have surveyed reefs to 150 metres off Indonesia, Florida and Curacao.

Physiological limitations and the level of support required make scientific diving below 150m impractical. While ten minutes of bottom time at 150m requires 5-6 hours of in-water decompression, a 10-15 minute dive at 180-190m is highly risky and requires 14-16 hours of in-water decompression, plus a support ship, separate decompression strategy and a huge budget.

In 2010, the Curacao Sea Aquarium established a submarine operations station with a 5-man submersible. Deep water animals can be collected safely by the submersible below 350m using specially designed anesthetic dispersal and a suction device. Deep divers handle the animals once they are brought up to depths above 100m. Small, delicate species are best collected manually by a team of divers. Several deep reef species have been displayed to the public for the first time, and some new species are currently being described.