






Scuba Monkey Dive Club – Meeting Summary

July 2025

-  Scuba Monkey Dive Club – Recap since last meeting
-  Travel updates
-  All about Dive Computers
-  Upcoming Activities
-  Random Pictures

Scuba Monkey Dive Club – Recap - Avon

Had a very successful Skills Day at the springs for the June club dive. And a big thank you to everyone who came out to the June meeting to discuss

Scuba Monkey Dive Club – Dive Shop News/Travel update - Tracey

- Cozumel trip is back on for May 2026. We will keep everyone informed as it gets finalized. This will be a different resort but will still have 5 days of boat dives plus unlimited shore dives, includes meals and airfare.
- We will discuss Dive travel at our August Dive Club meeting. George Sherrard will talk about do's and don'ts for dive travel and Tracey Boehnlein will talk about upcoming Scuba Monkey trips. The meeting will be 6:00 pm in the shop on 8/5/2025
- One slot with the Fiji group is still available for a female diver or non-diver to room with another.

Featured Topic: All about Dive Computers

Below are the highlights from a fairly technical discussion on how computer algorithms came about to develop modern day dive and decompression theory, and what you as a diver should consider when selecting a computer.

John Scott Haldane a Scottish physiologist is often seen as the originator of current dive theory. In 1908 he began developing concepts and theories about why British Royal Navy divers were suffering from DSC. His 7 concepts and critical definitions that form the basis of his theories are:

- Upon descent nitrogen pressure in breathing air is higher than the pressure of nitrogen dissolved in tissue.
- Nitrogen continues to dissolve into the tissue until equilibrium is reached given enough time.
- Upon ascent, nitrogen dissolved in the body is now HIGHER so it dissolves out of the tissues and is exhaled.
- The difference between the dissolved nitrogen pressure and the surrounding pressure is call a ***pressure gradient***
- On ascent, tissues can tolerate some gradient of high tissue pressure without DCS occurring. Nitrogen dissolves harmlessly out of the tissues.
- If the ***pressure gradient*** exceeds acceptable limits, nitrogen bubbles form causing DCS.
- DCS can be avoided by keeping the ***pressure gradient*** within acceptable limits.

Compartments – “Theoretical” tissue models that have differing rates of absorption and release of nitrogen.

Halftime – The time in minutes for a particular compartment to go ½ way from beginning tissue pressure to equilibrium.

Original Haldanean models had halftimes ranging from 5 minutes to 75 minutes. More modern research have halftimes that range from 3 minutes to more than 600.

M-Values – Besides differing halftimes, each compartment has a different M-value, which is the maximum tissue pressure allowed in the compartment when the diver surfaces to prevent exceeding the maximum acceptable pressure gradient.

- The “faster” the compartment - the lower it’s M-Value. Slower compartments have longer or higher M-Values
- M-Values play a crucial role in diver’s gradient factors by setting the MAXIMUM allowable pressure difference.

The Haldanean Decompression theory served as the basis for the usable dive tables, like the US Navy Dive tables. These tables applied a very conservative single tissue compartment/halftime/M-Value combination and applied this to an “average” Navy diver to make the assumption that if divers stayed within the parameters, DCS would be avoided.

For years divers, both professional and recreational used the Navy Tables with mostly success.

And then came Dr. Albert Bühlmann a Swiss physician who produced a number of algorithms for decompression models beginning in the early 1960’s through the 1990’s.

- One algorithm was the ZH-L16 model which is still widely used today by divers around the world.
- Critical to Bühlmann’s models and algorithms:
 - Like Haldane, Bühlmann used tissue compartments with each compartment has a specific half-time, determining how quickly it absorbs and releases nitrogen.
 - Based his model on the idea that the body behaved as a collection of tissues with different absorption and elimination rates.
 - Gradient factors. GF are applied to these half-times to adjust the decompression schedule.
- All of Bühlmann’s algorithms were based on dissolved gas theory.

After Dr. Albert Bühlmann’s death in 1994 others continued developing and evolving decompression theory algorithms.

- Bubble' models, such as Varying Permeability Model (VPM) and the reduced gradient bubble model (RGBM) emerged in the 1990’s.
- The RGBM is a widely-used algorithm developed in the late 1990’s and was first implemented by Suunto in 2002.
- The RGBM algorithm focuses on reducing the risk of DCS by predicting the formation and growth of micro-bubbles in a diver’s tissues. It presumes that by eliminating micro-bubbles through NDL and safety stops, it will prevent larger bubbles from forming.

Both the Bühlmann ZH-L16 and RGBM algorithms are widely used in modern dive computers and are known for their effectiveness in preventing DCS.

Each algorithm has advantages and disadvantages. The Bühlmann Dissolved Gas model

Pros:

- Can allow longer NDLs
- Uses gradient factors for fine-tuning conservatism
- Accounts for more nitrogen removal from the diver for a given duration of ascent
- Can be customized for different types of diving

Cons

- Does not account for micro-bubble control. Some post-dive fatigue can be connected to micro-bubble issues.
- Is less conservative than RGBM for repetitive and multi-day diving
- Using custom gradient factors can be challenging for new or inexperienced divers to understand and program.
- Typically does not offer the automatic conservatism of the RGBM algorithm and as a result divers may be exposed to higher DCS risk on aggressive repetitive deep diving /multi-day diving schedules.

The Relative Gradient Bubble model

Pros:

- Focuses on managing/reducing micro-bubbles.
- Reducing micro-bubbles can prevent post dive fatigue
- In a deco scenario making deeper stops reduces micro-bubbles
- Automatic increased conservatism is risky dive behaviors occur:
- Fast ascent warnings
- Incomplete safety stops
- Surface intervals of less than 1 hour
- Allows for longer no-stop time on a single dive

Cons:

- Very conservative for repetitive and multi-day diving
- Typically not changeable or programmable
- Unpredictable behavior on planned deco dives

When buying a dive computer, along with price and other features divers should Consider several factors including price, which algorithm makes sense to you, additional features but most importantly

decide your personal risk tolerance and diving habits.

- Do you tend to push the limits of NDLs or are you more conservative in your diving style?
- Do you dive extensively on diving vacations (multi-day diving/repetitive dives in a day)?

- Can you maintain “square profile” dives or do your dive profiles fluctuate in depth?
- Is your buoyancy control consistent and accurate?
- How knowledgeable are you about manually tailoring an optimal ascent profile?
- How comfortable are you programming a dive computer to a wide variety of profiles?

Understanding dive computer algorithms is helpful for any diver who wants to maximize their safety and make informed decisions when investing in a new dive computer.

The algorithms play an important role in dive safety and should not be discounted as a factor when purchasing a new dive computer.

Understand what is the best combination of algorithm, price and features for you and your safety.

Scuba Monkey Dive Club – Upcoming events – Avon

Avon and Sue are unable to schedule and meet for a July Club dive. If someone has the ability to lead this effort, please let Avon know.

The August Club meeting will focus on Dive Travel and will be in the shop at 6:00 pm on Tuesday 8/5/2025. See you there.

Random member pics from last month



