Why whale sharks need to swim near the surface

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(Phys.org)—Whale sharks, the world's biggest fish, can dive to chilly waters hundreds of metres deep but they need to return to the surface to warm up, according to a new study led by researchers from The University of Western Australia's Oceans Institute.

Lead researcher Dr Michele Thums said the findings delivered new insights into the little-known behaviour of these gentle giants of the sea.

For instance, whale sharks have been known to undertake regular dives to around 100 metres and then return to the surface relatively quickly, the so-called "bounce" or "yo-yo" dives.

But the research team, including UWA Adjunct Professor Dr Mark Meekan of the Australian Institute of Marine Research, discovered that whale sharks could also undertake very long, deep dives lasting more than two hours.

"When we looked at our data, we found that the whale sharks spent regular intervals at the surface between diving bouts. This pattern of returning to the surface looked similar to the patterns seen in air-breathing marine animals, so we were curious as to why fish that do not breathe air would do it," Dr Thums said.

The study involved four whale sharks: three at Ningaloo Reef off the North West coast of Western Australia and one at Christmas Island.

The sharks were tagged with time-depth recorders which also recorded water temperatures.

The researchers found that after the deepest and coldest dives - an average 340 metres deep with temperatures of about 14 degrees Celsius - the sharks spent the longest time at the surface, an average of 145 minutes.

Dr Thums concluded that they need to do so to regulate their body temperature - in effect, to warm up after spending time in the deeper, colder parts of the sea.

"Whale sharks, like many other fish are ectothermic, which means that their body temperature is similar to the surrounding water temperature and they can't regulate their body temperature through internal physiological processes. So, behavioural mechanisms such as spending time in the warmer surface waters are needed to warm them, similar to a reptile basking in the sun to warm up and then moving under a rock once sufficiently warmed," Dr Thums said.

Dr Thums said a better understanding of the whale sharks' behaviour will help in developing effective conservation and management strategies, as well as predicting responses to environmental changes.

The study, "Evidence of Thermoregulation by the World's Largest Fish," was published this week in the *Journal of the Royal Society*.

More information: rsif.royalsocietypublishing.or … /rsif.2012.0477.full

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