

Creep into the DEEPEND

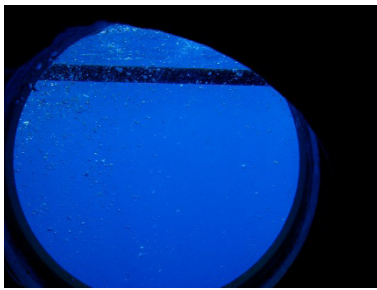
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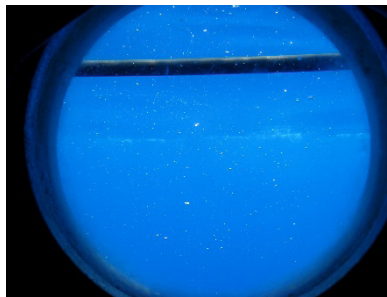
FROM: DEEPEND Science Team
TO: DEEPEND Virtual Team Leaders
SUBJECT: Color, Light, and Vision in the Deep Sea

Hiya Virtual Science Team!

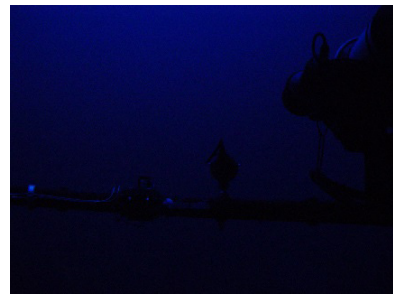
This is what we see as we go deeper and deeper into the water aboard a submersible.



66 feet (20 meters)



164 feet (50 meters)



328 feet (100 meters)

In the ocean, the light is mostly blue. We have all the colors of the rainbow available to us here on land. The moment the sun hits the water, colors of the rainbow are absorbed or scattered by the water.

That's because the light from the sun is actually a rainbow of color. When the light hits the water it splits into the colors that create the white light we see. Red light is absorbed or scattered first. Then orange, followed by yellow and so on. As you can see from the photos taken from a submersible, the remaining light from the sun gets bluer and bluer and dimmer and dimmer. At a certain point the light from the sun is completely absorbed by the water. In other words, there is no visible light, it is completely dark.

I study the vision of deep-sea animals. You might wonder what splitting of light has to do with the eyes of deep-sea animals. The answer is simple. In order to understand how an animal



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survives in its home, we first have to understand the environment. Light, or the lack of it, has a lot to do with the way many deep-sea animals are adapted.

Now you know blue light is the color that travels the furthest down into the ocean. Did you know that most animals in the deep sea can see only blue light? Most cannot see red or green. Why waste space in your eye to see red, or green, when there is no red or green light to see? In other words, deep-sea animals only have blue visual pigments in their eyes or can only see blue.

With just one visual pigment, deep-sea animals do not have color vision. They see everything in shades of grey. For example, as a deep-sea animal looks around, it tries to what might be a dark grey body against a slightly brighter background.

Sönke Johnsen, a vision scientist at Duke University, put these pictures together to show you how this works. The picture on the left is a crab the way we would see it -- because we have color vision. The picture on the right is the way an animal with a single visual pigment would see it -- because it doesn't have color vision.



So now you know how color and light matter to me as I study the vision of deep-sea animals. Thanks for joining us at the DEEPEND.

Tammy

Dr. Tamara Frank
Team Crustacean and Deep-Sea Explorer
seamail@whaletimes.org
Creep into the DEEPEND Mission

