

Creep into the DEEPEND

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FROM: DEEPEND Science Team
SENT: Summer 2016
TO: DEEPEND Virtual Team Leaders
SUBJECT: Studying Light in the Ocean

Hello Virtual Science Team,

My name is David English with Team Optics. I am one of the scientists who try to assess the physical environment during the DEEPEND cruises. I am interested in both the vertical and horizontal variations of temperature, salinity, density, and plankton in the water. I am particularly interested in the transmission and reflection of light within the water.

Sunlight provides the energy used to make food or warm the water surface. It is not only the water itself, but also the small particles, organisms, and dissolved material that determines how the sunlight is absorbed or redirected beneath the surface of the sea.

Sunlight is a mixture of different colors of light. Sunlight is made up of several colors of light. Together it looks white. When it bends, we can see the rainbow of color light that creates the white light. When sunlight hits the droplets of water in the air (say after a rain) the light splits and we see a red, orange, yellow, green, blue, and violet rainbow.

When sunlight hits the water, the different colors of light are not all absorbed or scattered equally. Light absorption is the most significant factor that reduces the amount of light available within the water. The water absorbs almost all of the sunlight we see at the surface before it reaches 656 feet (200 meters). That distance is less than a typical city block.

The scattering of light is much smaller than light's absorption. But it provides important information about particles or organisms in the water. If it weren't for the small fraction of sunlight that enters the ocean and is scattered back to the water's surface, the oceans would appear black.

Most people think the ocean is all about water. But for someone like me, it's all about the light!

David

David English
Team Optics and Deep-Sea Explorer
seamail@whaletimes.org
Creep into the DEEPEND Mission



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