



NOAA Teacher at Sea
Justin Czarka
Onboard NOAA Ship *McArthur II*
August 10 – 19, 2009

NOAA Teacher at Sea: Justin Czarka

NOAA Ship *McArthur II* (link: <http://www.moc.noaa.gov/mt/>)

Track the *McArthur II* online at <http://shiptracker.noaa.gov/default.aspx>.

Mission: Hydrographic and Plankton Survey

Geographical area of cruise: North Pacific Ocean from San Francisco, CA to Seattle, WA

Date: August 16, 2009

Weather Data from the Bridge

Sunrise: 6:29 a.m. Sunset: 20:33 (8:33 p.m.)

Weather: no significant weather (wx)

Sky: partly to mostly cloudy

Wind direction and speed: north-northwest 20-25 knots; (kt) gusts to 30 kt

Visibility: unrestricted, reduced to 1-3 nautical miles (nm) in mist

Waves: north-northwest 6-9 feet

Air Temperature: high 18°C, low: 12°C / Water Temperature: 15°C

Science and Technology Log

Wow! I stayed up past 2:30 a.m. this morning, but it was well worth it. I witnessed one of the most spectacular displays of nature's beauty. There was a bioluminescent bloom, where patches of ocean glowed as if hundreds of Halloween glow sticks floated in the ocean. While bioluminescence happens from time to time, this display of a glowing sea was unique. Crew and scientists aboard the *McArthur II*, some who have been on ships for 30+ years, say that they have



The turbulence in the *McArthur II*'s wake shines blue-green during a bioluminescent bloom 175 nautical miles off the Oregon coast. The ship was lit up as if by lamps lit underwater.

never seen a bloom like this. As far as the eye could see (12 miles in every direction), for over four hours, there were huge patches of ocean glowing blue green. As you scanned toward the horizon, it became nearly solid green-yellow. And to think that I almost missed it!

Scientists and crew were in the lounge watching a movie when the XO (Executive Officer) LT John A. Crofts rushed in saying, "You have to check this out! Come up to the bridge." We thought it was some joke, but we hurried up the stairs three levels, entering the pitch-black darkness of the Bridge.

Looking out, you could see a panoramic view of hundreds upon hundreds of floating, glowing patches on wave crests. On top of this, it was a clear, dark night where you could see the entire Milky Way galaxy and star clusters never seen near any human settlement (due to light pollution). It was a fantastic, otherworldly experience, as if we had sailed into the sunset, entered dark, and found ourselves in a new universe. Words are insufficient.

In scientific terms, what we were spectator to was a bioluminescent dinoflagellate bloom. Dinoflagellates are a type of plankton. When the water is disturbed, it excites the dinoflagellates, causing them to emit the colors at night. They are often seen close to shore, but not this far out in the Pacific. Or it could be that not many observers on a regular basis get out this far to see...

Personal Log

I had a good talk with Linda Halderman, the wiper aboard the *McArthur II*. A wiper is a person who does many different tasks in the engine department. She was talking to me about Personal Protective Equipment (PPE). She mentioned that PPE has “become really big. I’ve just started learning about it while on the job, but it would be really good for students to learn from the start.” It was a great conversation about safety equipment required for different jobs and the relevant



Justin Czarka and Morgaine McKibben try on their survival suits during drills aboard the *McArthur II*.

cleanup. Safety has been of utmost important aboard the *McArthur II*. Alarms are tested daily. Life jackets, safety harnesses, and hardhats are required during “ops” on the deck. We even practice drills in the event that a fire would occur, someone fell overboard, or we would need to abandon ship. Everyone is delegated a role in the event of an emergency.

Vocabulary

Dinoflagellate- a marine (ocean) plankton that propels itself with two flagella (bands around the organism) that provide propulsion and steering.

Bioluminescence- “bio-“ meaning life; “-luminescence” meaning light. An organism than emits light through an internal chemical reaction.

Did You Know?

According to Bill Peterson, chief scientist, plankton (small plant and animal organisms in the ocean) are so prolific in quantity that the Long Island Sound is actually filtered completely every three days! In order to obtain nutrients from the ocean, these small organisms either pump water through their bodies or propel themselves through the water, and consequently the water through their bodies. One doliolid filters about a liter of water every single day! While small individually, these organisms truly play a significant role in the ocean ecosystem. This is why the researchers are aboard the *McArthur II*.