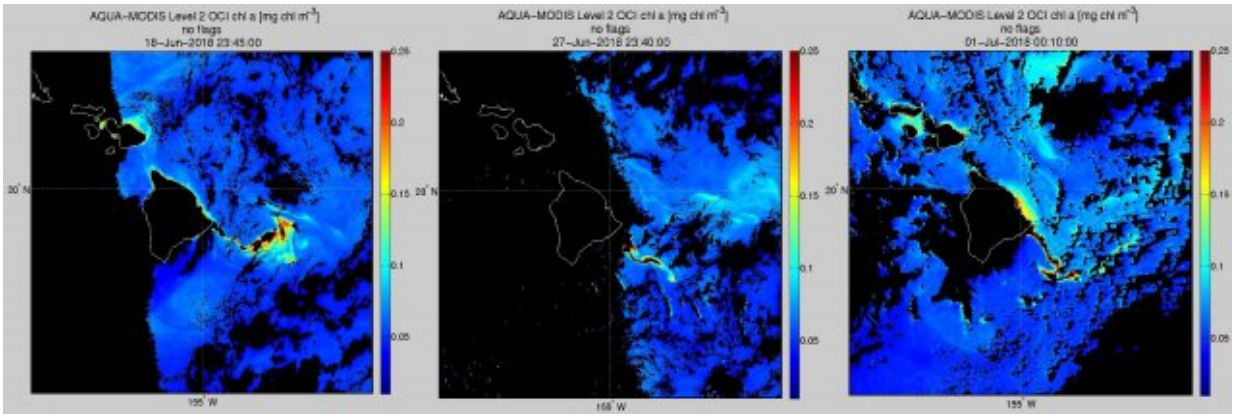
Columbia team helps investigate algae bloom near Kilauea eruption

July 19 2018, by Marie Denoia Aronsohn



Regions of high chlorophyll off the east coast of Hawaii's Big Island indicate an algae bloom. Scientists rushed to investigate. Credit: Satellite images provided by Ricardo Letelier, Oregon State University

Hawaii's Kilauea volcanic eruption, which continues spewing ash and lava, has been disrupting life on the Big Island. Since it began in May, the eruption has forced the evacuation of thousands of people, decimated more than 600 homes, and now is even impacting the state's agriculture industry. However, it has also created a rare opportunity for scientists to investigate how these events influence ocean life.

Satellite images have revealed elevated chlorophyll levels in the ocean near the eruption zone, indicating an algae bloom. Late last week, a rapid

response team of scientists rushed to investigate the bloom as well as Kilauea's impacts on other ocean processes east of the Big Island. A group from Columbia's Lamont-Doherty Earth Observatory are participating in the study, which is led by scientists at the University of Hawai'i Manoa.

Algae are a type of phytoplankton, a class of photosynthetic microbes that live on the ocean surface, where they use chlorophyll to harvest light, draw in CO2, and produce oxygen. These tiny cells do a big job in the ocean, trapping CO2 and serving as the foundation of the marine food web. Knowing what contributes to phytoplankton blooms is critical for understanding ocean health.

The researchers are sampling the water and will study its contents to discover how the volcanic eruption is influencing ocean chemistry, phytoplankton activities, and ecosystem processes. The team suspects the phytoplankton may be flourishing thanks to elevated nutrients delivered by lava and ash.

Lamont microbial oceanographer Sonya Dyhrman and a team from her lab will receive samples from the region of high chlorophyll to characterize which phytoplankton are there, and how chemistry changes in the water might be allowing them to grow. Dyhrman is a SCOPE Investigator, which is how she got involved with the rapid response team. SCOPE, the acronym for Simons Collaboration on Ocean Processes and Ecology, is a cross-disciplinary effort funded by the Simons Foundation to measure and model the critical activities of marine microbes, like phytoplankton, in the North Pacific Ocean.

Often, research cruises are planned years in advance. In this case, rapid deployment was necessary, Dyhrman explained, because phytoplankton blooms, like the one captured in the satellite images, are ephemeral. So it is vitally important to sample them quickly.

"This is particularly true when the potential cause of the bloom is from the chemically unique water or ash being discharged into the ocean from the volcano, which is in itself temporally unpredictable," said Dyhrman. One idea is that volcanic inputs rich in resources like iron or phosphorus, which are commonly at low levels in surface waters of the North Pacific, might be fueling phytoplankton growth.

Over the coming months, Dyhrman's lab will analyze the samples collected by the rapid response team and compare them to typical conditions. She says the event is "Like a very large-scale laboratory experiment, but in the natural environment. While volcanic eruptions occur worldwide, they don't always occur in a location that is so close to the ocean, and relatively accessible, so this is a unique opportunity."

Provided by Columbia University

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