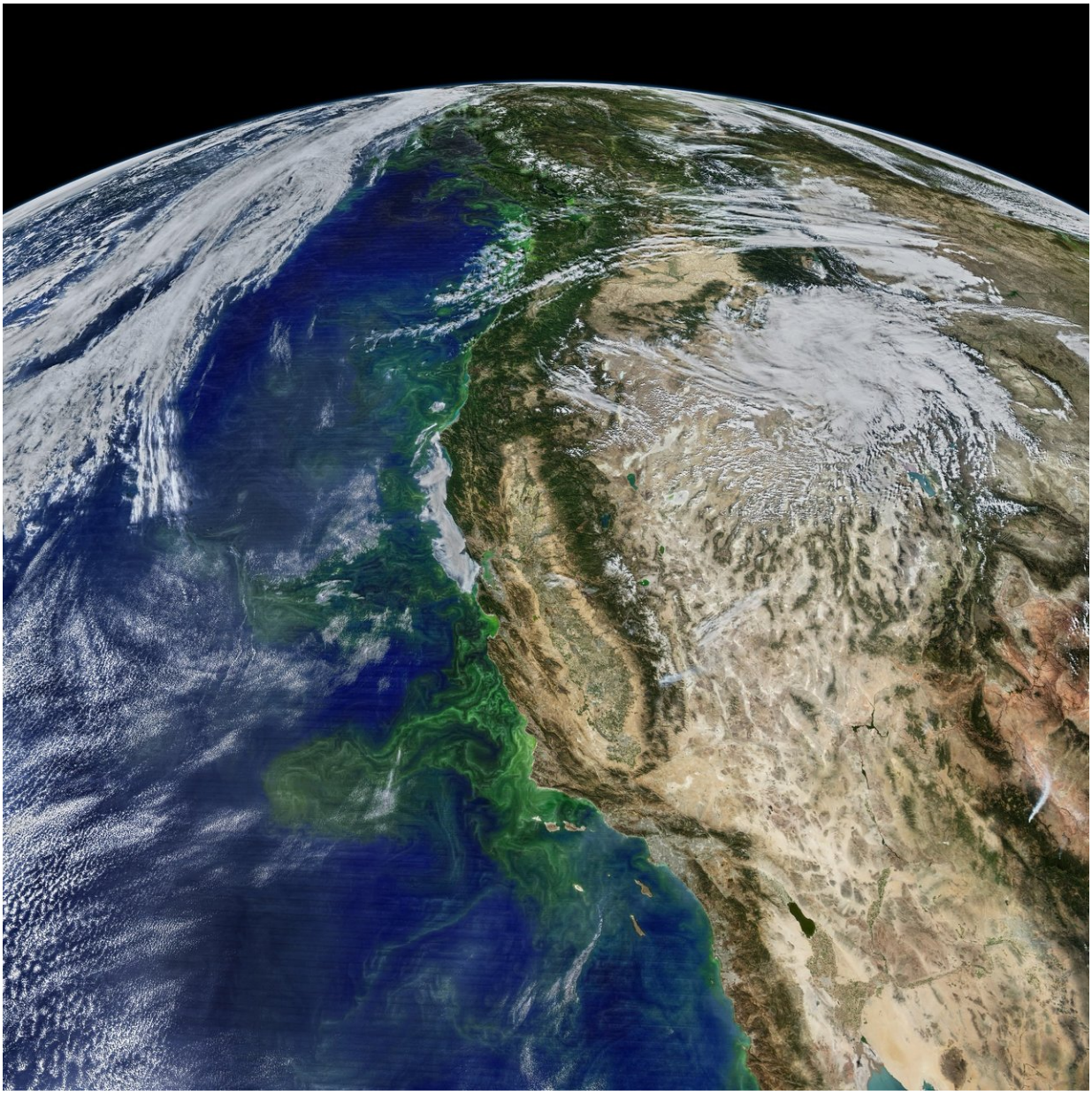
NASA, NSF expedition to study ocean carbon embarks in August from Seattle

June 22 2018, by Hannah Hickey



The Pacific Ocean off the West Coast is teeming with phytoplankton, plant-like marine organisms that reflect green light. Puget Sound is at the top of this image. NASA satellites can track phytoplankton blooms that play an important role in removing carbon dioxide from the atmosphere. The upcoming expedition will gather complementary information in the water. Credit: NASA

Dozens of scientists, as well as underwater drones and other high-tech ocean instruments, will set sail from Seattle in mid-August. Funded by NASA and the National Science Foundation, the team will study the life and death of the small organisms that play a critical role in removing carbon dioxide from the atmosphere, and in the ocean's carbon cycle.

More than 100 scientists and crew from more than 20 U.S. research institutions will embark for NASA's month-long Export Processes in the Ocean from Remote Sensing, or EXPORTS, oceanographic campaign. The University of Washington is leading one of the expedition's projects, with several others led by UW School of Oceanography alumni who are now faculty members at other institutions.

A NASA event Aug. 9 in Seattle will kick off the expedition.

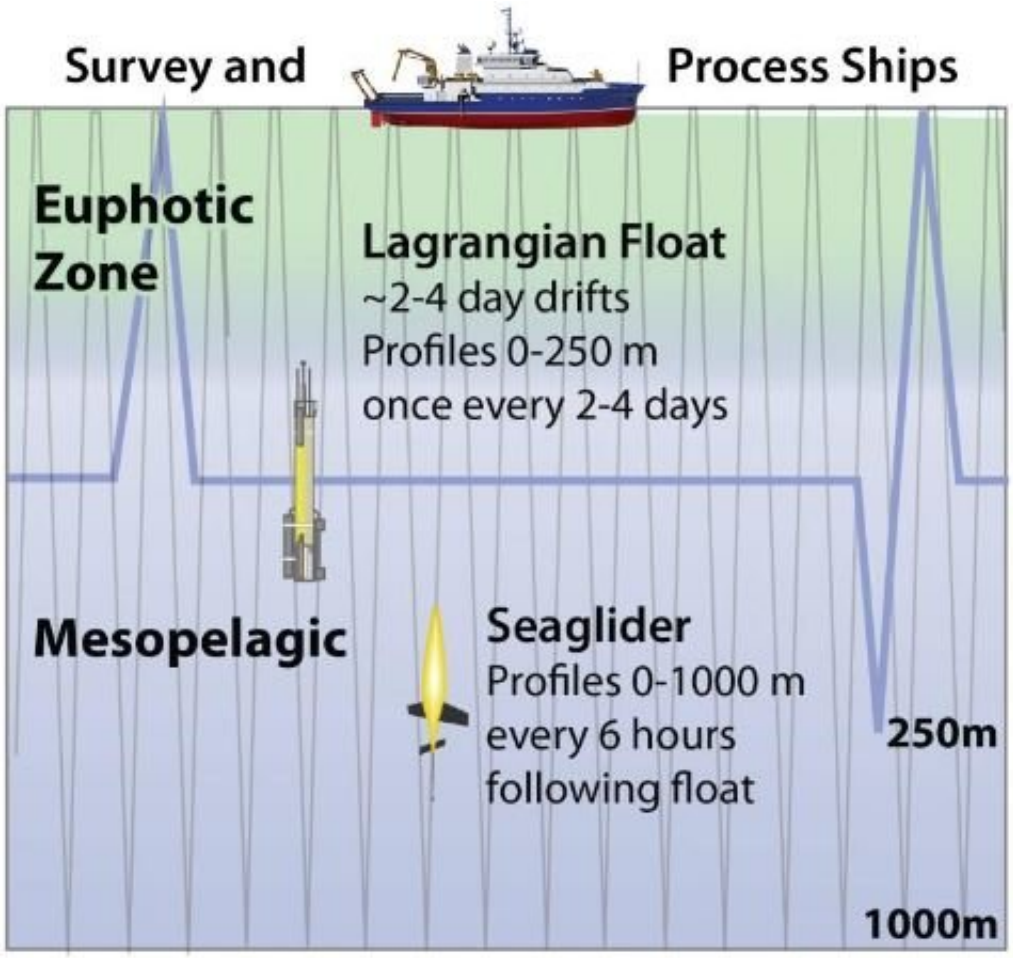
Two large research vessels—the R/V Revelle and R/V Sally Ride, both operated by the Scripps Institution of Oceanography at University of California, San Diego—will sail west 200 miles into the open ocean. From these seaborne laboratories, researchers will explore plankton life and the chemical and physical properties of the ocean from the surface down a half-mile to the "twilight zone"—a region below the sunlit surface layer where carbon from the plankton can be sequestered, or kept out of the atmosphere, for periods ranging from decades to millennia.

"By employing two ships we'll be able to observe complex oceanographic processes that vary both in space and time that we wouldn't be able to capture with a single ship," Paula Bontempi, program manager for Ocean Biology and Biogeochemistry at NASA Headquarters said in a NASA press release.

Craig Lee and Eric D'Asaro, both oceanographers at the UW Applied Physics Laboratory who also hold faculty appointments with the UW School of Oceanography, are part of the UW project using two robotic instruments developed at the UW. The first is a 6.5-foot-long underwater vehicle called the Seaglider that will gather measurements as deep as 1 kilometer, more than half a mile. The second is a float designed to follow the motion of water in the upper ocean that will be used to collect measurements just below the sunlit upper layer.

The UW team will use these and other autonomous tools to track upper-ocean community structure, sinking organic matter, currents and migrating zooplankton at two measurement sites in the ocean.

"Understanding, and eventually predicting, the oceans' role in fixing and exporting carbon to depth will require sustained, long-term measurements," Lee said. "EXPORTS takes us a step farther down that path, by advancing the use of long-endurance robotic vehicles—profiling floats and underwater gliders—for collecting biological and biogeochemical observations."



The UW researchers will use drifting, or Lagrangian, floats that adjust their buoyancy to move up and down through the sunlit euphotic zone. The UW team will use ocean drones called Seagliders to survey deeper water. Credit: Eric D'Asaro and Craig Lee/University of Washington

Seven years in the making, the 2018 campaign has been a huge undertaking, said David Siegel, EXPORTS science lead from the University of California, Santa Barbara.

"The impact the EXPORTS data will have for understanding how our planet is changing will be significant," Siegel said. "NASA's ocean-color satellite record shows us these ecosystems are highly sensitive to climate

variability. Changes in phytoplankton populations affect the marine food web, since phytoplankton are eaten by many animal species, big and small."

Provided by University of Washington