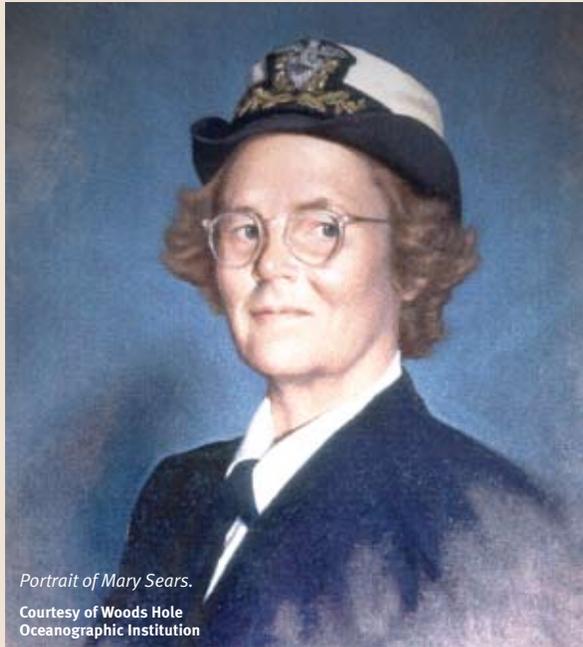




OUR HERITAGE

Oceanographer Mary Sears Advanced Marine Science

BY HOWARD C.



Portrait of Mary Sears.
Courtesy of Woods Hole
Oceanographic Institution

On Oct. 19, 2000, scuttling a longtime U.S. Navy tradition, then-Secretary of the Navy Richard Danzig named the Navy's newest oceanographic survey vessel for Mary Sears, honoring one of this country's earliest women pioneers in oceanography. It was the first Navy oceanographic ship named for a woman. Like all ships in its class, the Mary Sears is a multimission vessel capable of surveying in coastal waters or the deep ocean.

The USNS Mary Sears employs products, services and data from NGA's Office of Global Navigation, Maritime Services, to accomplish its various oceanographic survey missions. Crewed by civilian mariners, it is one of seven oceanographic survey ships in the U.S. Navy's inventory and is operated by the Military Sealift Command for the Oceanographer of the Navy, Rear Adm. David W. Titley.

In a partnership with the U.S. Naval Oceanographic Office, these survey vessels also play an integral role hosting NGA maritime analysts as part of the joint-agency Shiprider Program. About these opportunities, the program manager said, "It's a great opportunity to see our products used first hand and participate in data collection that we use to populate and maintain our hydrographic databases."

But who was Mary Sears? Born July 18, 1905, Mary Sears was raised in Wayland, Mass. She graduated from Radcliffe College with a bachelor's degree in 1927, a master's degree in 1929 and a doctorate in zoology in 1933. While still at Radcliffe, Sears worked with the first and founding director of the Woods Hole Oceanographic Institution, Dr. Henry Bigelow, at Harvard University. She began at Woods Hole as a planktonologist in 1932, working summers at first, becoming one of 10 research assistants first appointed to the staff.

During World War II, Sears left Woods Hole to answer her country's call to duty. As a Navy lieutenant in the Women Accepted for Volunteer Emergency Service (WAVES), she and Navy Reserve Lt. Roger Revelle, for whom the Scripps Institution of Oceanography research vessel RV Roger Revelle is named, were appointed to head the Navy Hydrographic Office's new Oceanographic Unit, which she directed very often in Revelle's absence. The unit, created in 1943 after the oceanographic unit of the Army Air Forces was transferred to the Navy Hydrographic Office, marked the beginning of military efforts to consolidate oceanographic programs.

Sears' contributions to the U.S. Navy and the research community are legendary, as exemplified by her post-analysis of the Battle of Tarawa in the South Pacific, where the familiar adage "time and tide wait for no man," had proved literally true.

The Second Marine Division's invasion of Betio—the Tarawa atoll's only island of consequence because it had an airfield—was set for Nov. 20, 1943, when the tide was expected to be favorable. The bombardment would begin in the early morning at low tide. As the tide rose and water levels in the lagoon reached 5 feet, landing craft would head ashore. By noon, at high tide, heavier craft could come ashore bringing tanks and supplies.

It seemed like a sound military plan; however, the British advised against the invasion timing because of an unusually low and narrow tidal range time that would prevent the invasion craft from moving close to the beach. U.S. Navy planners believed differently, and their calculations proved grossly in error.

The landing craft needed 4 feet of water to cross the reef. At landing time, the reef was covered by only 3 feet

of water. As a result, no landing craft was able to float over the reef, and the Second Marine Division troops had to wade for 400 to 500 yards under heavy fire, in water waist-deep, which meant death by drowning from a wound or a stumble into an underwater shell hole.

Three days and 3,407 casualties later, the division secured the three-mile-long, 800-yard-wide Betio Island. Sears went to Tarawa soon after. Her in-depth tidal analysis showed that forecasts predicting that a high tide would carry landing craft over the reef had been in error. With a delay in the planned invasion time, this error had led to terrible losses for the Marines.

Sears soon after applied her observational tidal data to build a much-improved method for tidal forecasting—amazingly, without the benefit of modern-day computers. Her model helped future beach assaults in the Pacific succeed, saving the lives of many U.S. soldiers, sailors and Marines.

Sears' research while in the WAVES also proved critical to the survivability of U.S. submarines during the war. Her intelligence reports, "Submarine Supplements to the Sailing Directions," predicted the presence of thermoclines—areas of rapid water temperature change—under which a submarine could hide to escape enemy detection by surface sonar.

Following the war, the Navy Hydrographic Office formally established a Division of Oceanography. On Jan. 29, 1946, Sears was appointed the first officer-in-charge of the division with Dr. Richard H. Fleming as the civilian director.

In 1947, Sears transferred to the Navy Reserve and returned to Woods Hole. Sears secured her reputation in marine science as an editor of journals and books that reported the results of oceanographic research. A found-

ing editor of *Deep-Sea Research*, she also helped establish *Progress in Oceanography*, another journal. She also edited several well-regarded books on the history of marine science. In 1963, Sears retired from the U.S. Naval Reserve as a commander. Woods Hole designated her a senior scientist in its biology department, from which she retired in 1970.

To honor Sears, *Deep-Sea Research* dedicated an issue to her for her 80th birthday. Affirming her contributions, the journal stated that she "has probably played a greater role in the advancement of oceanographic studies than any other woman." The Women's Committee of Woods Hole recognized her during its inaugural "Woman Pioneers in Oceanography" seminar in 1994.

After a brief illness, Mary Sears passed away Sept. 2, 1997, at age 92 in her home at Woods Hole.

NGA continues legendary oceanographer Mary Sears' pioneering endeavors. The agency's bathymetrists evaluate and extract hydrographic and bathymetric data to support safety in maritime navigation and create geospatial displays and textual reports of intelligence information to meet customer requirements. NGA Bathymetric Contour Charts play a vital role in underwater navigation and enable Navy submarines to support the nation's interests around the world. These and other maritime safety efforts build on the foundation Mary Sears helped establish. ▢

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USNS Mary Sears

U. S. Navy photo