Double strength: the *Alpha Delphini* (smaller vessel) alongside the *Alpha-Crucis*, anchored in the Port of Santos

Back to sea

Carlos Fioravanti and Fabrício Marques

May 30, 2012 in the Port of Santos, on the coast of São Paulo State, marked the beginning of a new era of oceanographic research in that state. The day featured the public presentation and inauguration of the *Alpha-Crucis*, the oceanographic vessel acquired by FAPESP for the Oceanographic Institute of the University of São Paulo (IO-USP). The new ship will replace the *Professor W. Besnard*, USP's first oceanographic vessel, which made dozens of trips—including six to Antarctica in the 1980s—between 1967 and 2008, when it was decommissioned.

The history of the acquisition of the *Alpha-Crucis* began in 2009, when Michel Mahiques assumed the directorship of the IO and found a disheartening scenario: a fire aboard the *Professor Besnard* had put it out of service. With no feasible way to refurbish it and no money to buy a new ship, Mahiques decided to purchase a used ship and adapt it for use in oceanographic research. On his nineteenth visit to research vessels for sale in several countries, he found the Moana Wave, a ship that had served the University of Hawaii, was purchased by a shipyard in Seattle and was then leased to the U.S. National Oceanic and Atmospheric Administration (NOAA). The $4 million price tag was reasonable. A group of

New oceanographic vessel advances research on climate, ocean currents, sediments and biodiversity along the Brazilian coast

Before departure: team prepares cylinders for collecting water samples

engineers and crew members from the IO visited the ship while it was anchored on the Chilean coast and liked what they saw. FAPESP approved the purchase order, on the condition that USP provide for crews and maintenance. The final cost of the ship, $11 million, was shared by FAPESP and USP.

The 64-meters-long, 11-meters-wide ship was rechristened the Alpha-Crucis—the star that represents the state of São Paulo on the Brazilian flag. It was refurbished, fitted with new equipment and then had to make its way through a bureaucratic labyrinth before it could leave Seattle. "Sometimes I thought we'd never manage to get the ship out of the United States, there were so many obstacles to overcome," Mahiques recalls. The IO—which was established in 1946 as the Paulista Institute of Oceanography, absorbed into USP in 1951 as a research unit and transformed into an academic unit of the university in 1972—gained new impetus with the ship, which has been used by its own teams in two FAPESP programs—Global Climate Change and Biota-FAPESP—as well as teams from other São Paulo State institutions (*see* Pesquisa FAPESP *Issue No. 195*).

The *Alpha-Crucis* departed for its first international cruise on the afternoon of December 1, 2012. On board were 20 researchers led by Edmo Campos of the IO, and 19 crew members. The voyage was part of an international program called SAMOC (South Atlantic Meriodional Overturning Circulation), whose principal purpose was to develop and implement a system for monitoring changes in the meridional transport of mass and heat—and climate change in general—in the South Atlantic. Even the slightest change in the amount of heat in the ocean has a major effect on the Earth's climate," Campos said, shortly before leaving on the expedition.

Sand and mud from the Rio de la Plata travel 2,000 km to the coast at São Sebastião

"We are finally going to measure the current variability—in a project financed by Brazil, Argentina and the United States—using a suitable ship," commented Argentine researcher Silvia Garzoli, Chief Scientist at NOAA's Atlantic Oceanographic and Meteorological Laboratory . It was also the first voyage undertaken by the *Alpha-Crucis* to collect water samples and take temperature measurements in deep water, up to six kilometers below the surface of the ocean (*see* Pesquisa FAPESP *Issue No. 203*).

Mahiques led one of the expeditions in February 2013 to collect sediments from the ocean floor along the São Paulo State coast, to reveal the climatic, environmental and evolutionary history of the region. He and researchers from Germany and Uruguay ascertained that the fine grains of sand, mud and organic material carried along by the Rio de la Plata and caught up in ocean currents travel nearly 2,000 kilometers to the coast at São Sebastião (*see* Pesquisa FAPESP *Issues No. 206 and 215*).

One year after going into service, the *Alpha-Crucis* was joined by the oceanographic vessel Alpha Delphini, built entirely at the Indústria Naval do Ceará shipyard (INACE), also with FAPESP support, to boost the state's oceanographic research capability. In July 2013, a month after arriving in São Paulo, the *Alpha Delphini* made its first scientific expedition off the coast of Pernambuco State, between the island of Itamaracá and the Fernando de Noronha Archipelago, passing through the Recife coastal zone. The objective of the expedition was to assess the role of Pernambuco's oceanic and coastal regions as carbon sinks or emitters and to identify which zones act one way or the other.

The teams from the Oceanographic Institute have also researched other topics, such as maritime currents, geological evolution and the impacts of pollution in the waters around the island of São Sebastião, the origin and consequences of beach erosion and the diversity of whales and dolphins along the São Paulo State coast (*see* Pesquisa FAPESP *Issues No. 51, 92 and 218*). ■

PHOTOS EDUARDO CESAR