

## OCEANOGRAPHY

# China Makes Waves With Ambitious Ocean Research Plan

SHANGHAI—Last July, when the *Jiaolong* submersible plunged 5000 meters below the Pacific Ocean waves, China joined an elite set of nations capable of crewed exploration of the deep sea. *Jiaolong*'s program this coming summer will be even more eye-catching. First, the sub will attempt a world record-breaking dive 7000 meters below sea level; then it will carry out its first research mission in a region of high scientific and political significance: the South China Sea.

The target is enticing. Its sediments hold clues to the evolution of the East Asia monsoon and how tropical conditions over the

And China is leading an Intergovernmental Oceanographic Commission (IOC) project on the dynamics of as much as 570 million tons of sediments that rivers discharge into the South China Sea each year.

But politics cast a shadow over these efforts. China claims sovereignty over a wide swath of the South China Sea, which has sparked territorial disputes with six neighbors. At stake are rich fishing grounds and seabed resources, including gas hydrate reserves. Last November, U.S. Secretary of State Hillary Clinton irritated China when she offered U.S. help in mediating disputes; China reiterated its stance that it would negotiate only bilaterally. Meanwhile, a few Chinese scientists have raised hackles by including

in publications maps depicting China's territorial claims—reportedly at the government's behest. “Southeast Asian nations are carefully monitoring the expanding geopolitical influence of China in this region. One is aware that scientific data could be crucial in supporting territorial claims,” says Edlic Sathiamurthy, a hydrologist at University Malaysia Terengganu who is involved in the IOC sediment study.

Long-simmering tensions complicate research. “There are serious difficulties as a result of territorial claims,” Sathiamurthy says. Sampling in Malaysia's Exclusive Economic Zone, he says, requires approval from the National Security Council. When working with foreign colleagues, Sathiamurthy says, “we are expected to make sure national interests and security are safeguarded.”

Scientists involved in South China Sea Deep, which is funded by the National Natural Science Foundation of China, say there is no hidden agenda and pledge transparency. “Data will be shared freely between scientists from different countries,” says Wang Pinxian, a marine geologist here at Tongji University.

South China Sea Deep is the culmination of 2 decades of patient efforts to persuade China's leaders to pay attention to ocean research. “Deep-sea studies were overlooked for many years,” says Wang, China's preeminent ocean scientist. A breakthrough

came in 1999, when Wang co-led an Ocean Drilling Program research cruise in the South China Sea. That and subsequent seabed coring expeditions have yielded a trove of paleoclimate data, putting the South China Sea on a par with the Arabian Sea as a place to decipher ancient monsoon patterns, says Jian Zhimin, director of Tongji's State Key Laboratory of Marine Geology.

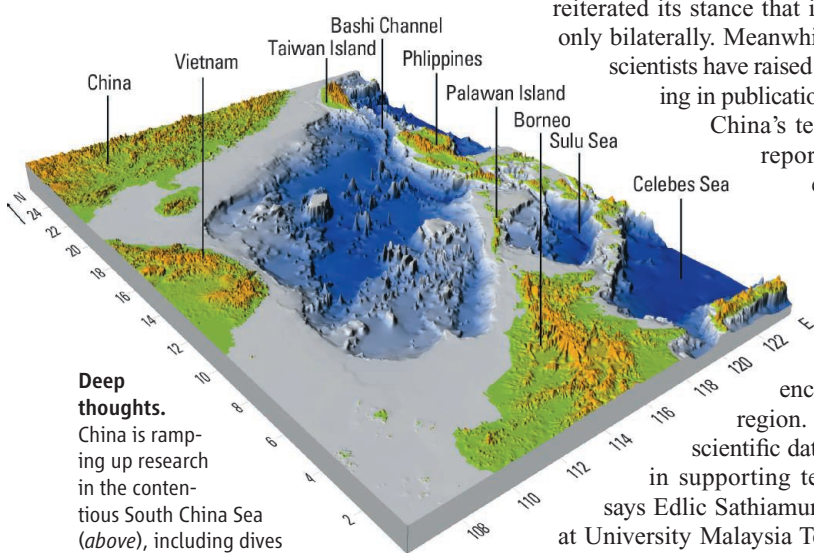
Then a few years ago, the central government grew keenly interested in ocean research. “Because of the economy,” Wang explains. “If the seaways are cut off, we can't import oil. China would be dead.” Another incentive was China's discovery in 2007 of gas hydrates in the South China Sea. This summer's planned 10-day *Jiaolong* program will explore gas hydrate outcrops at a depth of around 1000 meters in the South China Sea.

*Jiaolong*'s dives will get South China Sea Deep off to a flying start. Over the next decades, scientists will drill into the seabed and use deep-tow measurements to estimate the oceanic crust's age, probe a possible mantle plume off Hainan Island, and explore the origins of volcanic chains. They will also sample methane seeps and characterize microbes in the water and sediments. “The project is expected to reveal the life history of the South China Sea,” Wang says.

Researchers here at Tongji, a powerhouse in ocean research, note that South China Sea is not their sole target. Last month, they broke ground on a marine science center at the tip of the Yangtze River delta. It will be a staging ground for an \$80 million sea-floor observatory just off shore, in the East China Sea. And they are eager to collaborate broadly with scientists from Southeast Asian nations, says Tongji marine geologist Liu Zhifei, who leads the IOC sediments project. Last November, for example, Tongji and the Hanoi University of Mining and Geology agreed to cooperate on education and research in marine geology and geophysics. “Our goal is to develop marine geology in Asia, not just China,” Wang says.

Southeast Asian researchers welcome such overtures and say they see eye to eye with their Chinese colleagues. Research in the South China Sea “has a potential to ease political tensions if every scientist is transparent and does not serve some greater geopolitical agenda,” Sathiamurthy says. “Then again,” he says, “it would naïve not to be careful.”

—RICHARD STONE



## Deep thoughts.

China is ramping up research in the contentious South China Sea (above), including dives this coming summer with the *Jiaolong* submersible (below).



eons have influenced global climate patterns. To tackle these questions, China has just embarked on South China Sea Deep, an 8-year, \$24 million project feted last month at the American Geophysical Union's fall meeting in San Francisco. Complementing *Jiaolong*'s dives will be research cruises in the area this spring with France and Germany.