Tsunami sends seafloor sensor 5,000 miles back to Washington state

February 25 2016, by Sandi Doughton, The Seattle Times

When Jerry Paros shipped a seafloor sensor from his plant in Redmond to Japan in 2010, he never expected to see it again.

And when Tohoku University geophysicist Ryota Hino deployed the device off the coast of Hokkaido that July, his only expectation was that it would help him gather data about a dangerous, underwater fault.

But last month, the two men found themselves at the headquarters of Paroscientific Inc., along with a Japanese television crew, examining the battered - but intact - instrument and marveling at the long, strange trip across the Pacific that brought it back to its birthplace.

"It was an amazing moment," said Paros, who started the sensor business in his home in 1972. "It's like Lassie came home."

The instrument's journey began after the 2011 megaquake and tsunami that claimed 18,000 lives and battered a vast swath of Japan's coastline.

The Paroscientific pressure gauge was one of five that Hino and his colleagues had tethered to the seafloor in mile-deep water. Their goal was to monitor strain and motion on a submarine fault, called a subduction zone, that threatens Japan's northernmost island.

It was a different subduction zone that ripped on March 11, 2011, about 300 miles south of Hino's array.

But he figured there was a good chance the sensitive gauges recorded the tsunami as it swept through before slamming into the Hokkaido coast.

So Hino and his colleagues returned to the area by ship four months later to see if the instruments survived and retrieve any stored data. They recovered all but one of the pressure sensors, which were designed to detach from their moorings when signaled and be lofted to the surface by a buoyant glass float.

The missing sensor sent out an acoustic response when pinged but failed to surface, Hino explained.

"My guess is that the hard shaking from the earthquake generated some kind of mud flow, and the instrument got stuck in the mud," he said.

At some point, the apparatus worked its way free. Buoyed by the glass sphere, it began to drift - following the path of 5 million tons of broken docks, splintered homes, tangled nets and children's toys that collectively came to be called tsunami debris.

And that's where Phil Stamp comes into the story.

The manager of an oyster farm on Willapa Bay, Stamp is a veteran beachcomber. A few weeks before Christmas 2014, he was cruising the beach in his pickup when he spotted something pink at the edge of the waterline.

He could see it was a glass float encased in a plastic shell - but he didn't know what to make of the tangle of instruments inside the sphere or the metal cylinder attached to it.

"It was covered with gooseneck barnacles," Stamp recalled. "It weighed so much with all that junk on it I had to take my tailgate off and slide it

up into the truck with a rope."

Once he cleaned it, Stamp could see that the device was valuable. "I knew someone was going to want it more than me."

He enlisted a fellow beachcomber, who has reunited other Japanese debris with its owners, and a months-long email quest ensued.

The message didn't get to Hino until the following summer.

"I was really surprised," he said. "This instrument is very important to us."

Not only was there a chance it held precious data about the tsunami - it also cost almost $30,000. So Hino decided to come to Washington and fetch it.

A documentary crew from NHK, Japan's public broadcaster, accompanied him to film the story for a documentary episode called "Raging Earth II: Giant Earthquakes," scheduled for release around the fifth anniversary of the quake and tsunami.

The cameras were rolling on the blustery day when Hino and the instrument were reunited.

"When I pulled back the tarp, the professor's eyes were like a little kid on Christmas," Stamp said.

But an even bigger surprise was in store.

Hino brought the instrument to Paroscientific, where tests showed that though the battery was dead, the sensor was fine.

"We hooked it up and to everyone's amazement, it was perfect," Paros said.

The data recorded during the tsunami is also intact.

That's great news, Hino said, because most of the other pressure sensors were so badly damaged that little data was recovered.

Since the 2011 megaquake and tsunami, Japan has invested heavily in seafloor instruments to monitor subduction zones. Nearly 1,000 of Paroscientific's pressure gauges are deployed in networks around the islands.

Some of Hino's other sensors helped reveal that the seafloor moved nearly 200 feet in places during the magnitude-9 quake, which is one reason the tsunami was so huge.

His sensors and others also captured evidence that the fault had been slipping slowly in the days before the quake. That raises the intriguing possibility that monitoring might someday detect warning signs before major quakes.

A similar fault, called the Cascadia Subduction Zone, lies off the coast of the Pacific Northwest, and Paros has been advocating for a network of sensors to keep a closer eye on it. He gave the University of Washington $1 million to study the idea. Earlier this month, the California-based Gordon and Betty Moore Foundation anted up another million.

After testing and tuning up Hino's wayward device, Paroscientific's staff shipped it to Japan - for the second time.

It's now sitting in his lab, Hino said by phone last week. Soon, he hopes

to have it back in the water gathering data.

Citation: Tsunami sends seafloor sensor 5,000 miles back to Washington state (2016, February 25) retrieved 19 September 2024 from https://phys.org/news/2016-02-tsunami-seafloor-sensor-miles-washington.html