

The survey result of ship wreckage off the coast of Oman

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ABSTRACT

Between 1405 and 1433 the Chinese Ming Emperor authorized Admiral Zheng He to take great fleets of vessels into the Indian Ocean to conduct trade on equality and mutual benefit. The port the Chinese fleets visited nearest Istanbul on the European trade route was the island of Hormuz in the Arabian Gulf. A Chinese-Omani joint project was carried out to search for remains of these ships, using modern sonars. Finding such remains would throw fresh light on cultural and technological exchanges between the two regions and the areas of contact along them in the 15th Century. In April 2009, based on preparation for 2 years, Chinese and Omani scientists have conducted the first investigation off the coast of Oman and good result has been achieved. In this paper, the equipments, survey plan and investigation result will be introduced.

BACKGROUND

It was well known that Zheng He, Chinese famous navigator, took great fleet visiting the Indian Ocean 7 times 600 years ago. These fleets were massive. Some involved up to 100 ships, carrying 27,000 men, plus food, water, horses, trade goods and gifts. This was well before Magellan's celebrated voyage of circumnavigation of the globe and the vessels used were much more advanced than those available to the Europeans.

In the course of Zheng He's voyages, because of poorly known waters along the route, that considerable number of ships wrecked and lives lost would not be at all surprising. During the Ming period China was an advanced civilization compared with Western Europe. Searching for physical evidence of wrecks will be well worthwhile, in view of the impact this would have on our knowledge of early East-West interaction. The port the fleet visited along the European trade route was the island of Hormuz in the Arabic Gulf. Oman was one of the very important countries for Zheng He's ships to enter Arabic Gulf and go to West Asia and East Africa and back.

The routes of Zheng He's fleets in the Indian Ocean has also been researched in the project and shown as figure 1. It manifests that these fleets went into Oman Gulf at Ra's Al Hadd from west shore of Indian. Located by the mountains in the east Arabic Peninsula, they navigated along the north shore of Oman, and arrived on Hormuz. Meanwhile, east shore and north shore of Oman were also the routes for Zheng He's fleets going and back from East Africa. Therefore, the survey was designed to be carried out off the coast of Oman.

The aim of the Chinese-Omani joint project is to search for remains of these ships, using modern sonars. In the project, Chinese side provides necessary equipment and operates the equipment to survey the seabed, obtains historical information on the routes taken by Zheng He's fleets. Omani side provides suitable ship for use in the survey and Information as available about Chinese artifacts appearing on beaches and in fishing nets along the coast of Oman.

SURVEY EQUIPMENTS

To find the wreckage of Zheng He's fleets, the activity is carried out in two surveys. The First Survey is a broad scale seabed survey, which will later be surveyed more closely. The Second Survey shall be a more detailed seabed survey of specific sites identified in the first survey.

In the first survey, a side-scan sonar and a sub-bottom profiler were used. The side-scan sonar is produced by Institute of Acoustics, Chinese Academy of Sciences. The sub-bottom profiler is made in United Kingdom.

The side-scan sonar is shown as figure 2. It has the specification as below:

- Maximum swath width 1500m at low frequency
- Maximum swath width 300m at high frequency
- Towfish working depth up to 300m
- Operating speed no more than 6 knots



Figure 1. Zheng He's routes in the Indian Ocean

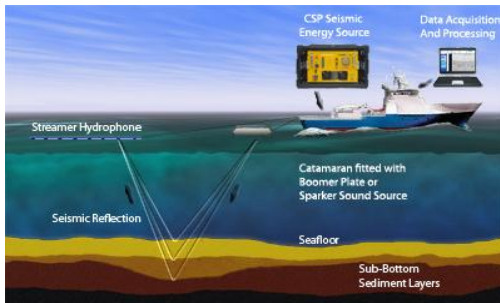
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Figure 2. The towfish of the side-scan sonar

CPS-L100 sub-bottom profiler is shown as figure 2. It has the specification as below:

- Power: 100 Joule
- Frequency Response: 145Hz~7kHz(-3dB)
- Hydrophone length: 4.5m
- operating speed: 2~6knots



Source: (website of Applied Acoustic Engineering Limited)

Figure 3. Display of the working sub-bottom profiler

SURVEY PLAN

The first survey has been carried out in Apr.2009. It was divided in 2 legs. Leg 1 was to survey chosen area Box A, and leg 2 was to survey Box B and revisit potential points. There would be 2 or 3 days break between 2 legs. Box A and B were chosen with the information from history research. Twenty scientists from China and Oman attended the survey. They were divided into 3 shifts. Equipments were being worked 24 hours with nonstop everyday. The ship should be maintained the speed no more than 5 knots, and the sea condition should be no more than grade 4.

In order to scan the seabed broad enough, the side-scan sonar was switched to scan bottom 400m width on every side of the ship. The distance between 2 neighbour lines was designed 700m. Thus scanned square along next line would 100m overlap that of the preline, shown as figure 4.

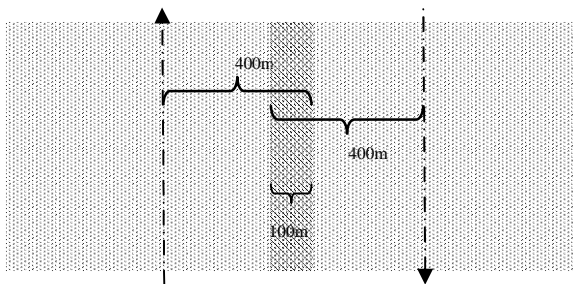


Figure 4. The scanned bottom along the survey line

SURVEY RESULT

There were total 15 working days on the sea and 387.5 square nautical miles (1329 square kilometers) seabed were scanned in the first survey. Omani side provides total 3 ships in the survey for operating equipments, watching out fishnets and safeguard.

During the survey, the equipments worked very well and the image was clear. It is believed that there are many ship wreckages around the survey area because of the geographical feature. We chose 50 potential points from the large on spot data to revisit. Finally, we concluded 12 points of them are high probably shipwrecks, which are worth to detect with high resolution sonar.

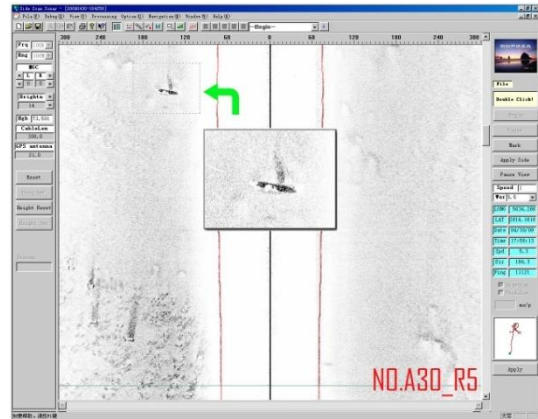


Figure 5. High probably ship wreckage 1

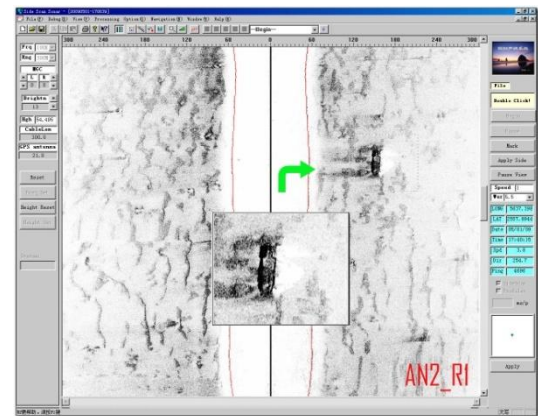


Figure 6. High probably ship wreckage 2

Figure 5 and figure 6 are shown 2 samples of high probably ship wreckages of the survey result. However, we still are not able to distinguish these wreckages are true or false, ancient or modern, made with wood or steel. Therefore, to carry out the second survey for further detecting these ship wreckages with high resolution sonar is necessary.

ACKNOWLEDGMENT

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