

INDIA BACKS EXPLORATION OF RARE EARTHS IN DEEP SEA

With China controlling most of valuable rare-earth mineral supplies, India makes a strategic move to back exploration off its own coast, writes *Paula Park*.

India has joined the race to explore and develop deep-sea mining for rare earth elements further complicating the geopolitics surrounding untapped sources of valuable minerals beneath the oceans.

The country is building a rare-earth mineral processing plant in the east coast state of Orissa and it is spending around US\$135 million to buy a new exploration ship and to retool another for sophisticated deep-water exploration off its coast.

The Central Indian Basin, for example, is rich in nickel, copper, cobalt and potentially rare-earth minerals, which are highly lucrative and used widely in manufacturing electronics such as mobile phone batteries. They are found in potato-shaped nodules on the deep-sea floor.

These nodules offer a good solution to meeting the nation's demand for metals, C. R. Deepak, head of the deep-sea mining division at the National Institute of Ocean Technology (NIOT), Chennai, told *SciDev.Net*.

The Indian government also plans to bring together its marine science experts and engineers in nuclear energy, space research and defence, using their expertise to help accelerate mineral extraction, according to a July press statement.

India's network of government-sponsored marine science programmes has already studied the seabed and carried out test mining, according to Rahul Sharma, a scientist at India's National Institute of Oceanography (NIO) in the west coast state of Goa.

India's ocean exploration programme is about two decades old, and focuses on 'polymetallic nodules' containing cobalt, copper, manganese and nickel, in addition to small amounts of aluminium iron and rare metals such as molybdenum, tellurium and titanium.*

The mining engineers have already tested some systems at lower depths and are in the process of up-scaling for deeper depths, Sharma told *SciDev.Net*.

NIO has tested deep-sea mining systems up to a depth of 512 metres, off the coast of Mavelan, Goa, and is now working on systems suited to depths of up to 6,000 metres.

Geopolitical tensions

The recent push for deep-sea mining exploration reflects India's concerns that China's deep-sea excavations will further increase China's dominance over rare-earth elements, which are used in aviation and defence manufacturing, as well as electronics.

Late last year, the China Ocean Mineral Resources Research and Development Association (COMRA) obtained a licence to mine polymetallic sulphides in the Southwest Indian Ridge (SWIR). The SWIR is a divergent tectonic plate boundary between the African and Antarctic plates, running from the South Atlantic to a junction the place where two or more plates meet in the Indian Ocean just south of Madagascar.

In July, Ashwani Kumar, India's minister of planning, science and technology, and earth sciences, told local media that countries like China have begun deep-sea mining with the strategic purpose of staking a claim in the oceans.

Deep-sea mining will help meet the critical and strategic needs of the country, particularly in the area of access to rare earth materials, Kumar said during last month's announcements regarding deep-sea deployments.

China currently controls around 95 per cent of global rare-earth mineral output. The country has been accused of unfairly restricting overseas mineral sales through taxes and quotas, to force more high technology production to move to China.

The World Trade Organization agreed last month (23 July) to create a panel to investigate China's influence in the market, following complaints filed by the United States, the European Union and Japan the second biggest consumer of rare earths after China.

In 2010, for example, China blocked Japan's supply of rare-earth minerals for two months, over skirmishes relating to disputed territorial claims in the China Seas. Over the past week, tensions between the two countries over similar territorial disputes have been growing.

In June this year, Japan opened the Rare Earth Research and Technology Transfer Centre in Hanoi, in partnership with Vietnam, as a response to fears over a supply crunch. It is also in negotiations with India over investments in the Orissa processing plant, according to a recent *Wall Street Journal* article. [1]

Deep-sea riches

All three countries have been eyeing exploration of as yet untapped deep-sea deposits of rare-earth minerals in the wider region. Last year, Japanese scientists identified major new mineral supplies in the Pacific.

But so far, India has done little relating to the commercial mining of the seabeds.

In the past, like most governments, India found that establishing mines under the sea would be more expensive than land-based mining, according to Carl Gustaf Lundin, director of the global marine and polar programme at the *International Union for Conservation of Nature (IUCN)*. It also considered that mineral costs did not justify the expenditure, Lundin explained.

More recently, however, worries over China's market domination and its ability to set prices for rare earth and other minerals have increased international interest in deep-sea mining. At the same time, innovations in underwater robotics created for the petroleum industry have improved prospects for mining undersea metals, Lundin said. So far, the only company with a licence to mine the seabed is the Canadian firm Nautilus Minerals.

In 2011, the company received a licence to mine massive seabed sulphide resources at a depth of about 1,600 metres off the coast of Papua New Guinea, as part of the much criticised Solwara 1 project.

However, Nautilus's president and executive director, Stephen Rogers, told *SciDev.Net* that countries like India may be better positioned than private companies to develop undersea resources.

We see that there are many countries both exploring and developing technologies, Rogers said.

Several countries, including China and Korea, have been granted seabed access; Japan is investing US\$200 million in deep-sea prospecting; and the United States has extensive research programmes underway, Rogers said.

Environmental concerns

However, as the Indian Ocean explorations accelerate and the first commercial endeavours in the Pacific get underway, a clear international overview of the potential environmental impact of the projects is still lacking.

Indian scientists have participated in International Seabed Authority (ISA) workshops aimed at outlining how to regulate mines and protect the marine environment, said NIO's Sharma. But these regulations are still not finalised.

Helen Rosenbaum, campaign coordinator for the Australia-based Deep Sea Mining campaign, told *SciDev.Net*: There's no regulatory framework, either at a national or international level, for deep-sea mining.

She said the International Seabed Authority, which has jurisdiction over the open seas outside national territories, has done too little to investigate and regulate the potential for environmental damage.

Source: <http://www.scidev.net/global/biodiversity/feature/india-backs-exploration-of-rare-earths-in-deep-sea-1.html>