



Deep sea mining: The new resource frontier?



Michael Lodge

Deputy Secretary-General, International Seabed Authority, and a Member of the Global Agenda Council on Oceans

The global demand for natural resources continues to grow. As land-based sources decline, corporate and governmental attention is increasingly turning to an area of the planet that has been beyond reach until now – the ocean floor. Hailed as a ‘new resource frontier’, the deep seabed is home to a variety of valuable minerals and metals, which lie hidden in underwater ridges, seamounts and sediment, up to depths of 5,000 metres.

At present, under the United Nations Convention on the Law of the Sea (UNCLOS), any country or deep sea mining company that wishes to exploit the seabed needs an exploration contract from the International Seabed Authority (ISA). There has been a dramatic increase in the number of applications for such contracts. Five years ago there were just six projects in international waters; we now expect there to be 26 by the end of 2014.

Most of the interest over the past three years has come from the private sector. So, what is the prize? The world’s undersea reserves are estimated to include 10 billion tonnes of polymetallic nodules. On average, the most promising of these deposits will break down to about 30% manganese, 1.5% nickel, 1.5% copper, and 0.3% cobalt. In short, the ocean floor is home to a staggering quantity of useful minerals – and these deposits also contain smaller traces of rare earth elements. Many of these are used in electronics and in the manufacture of ‘clean technologies’, such as wind turbines and hybrid

cars. These elements are technically by-products of the mining process, but they are driving a lot of new commercial interest. Japanese geologists estimate that a single 2.3 km² patch of seafloor might contain enough rare earth materials to sustain global demand for a year.

Technological progress in accessing remote areas has also spurred much of the recent interest. Remotely operated vehicles (ROVs), for instance, can gather samples from the ocean floor, which are returned to the surface for analysis. Ore can be extracted by specially designed collectors and transferred to a waiting ship or platform via hydraulic suction, pumping the seabed material up long, hose-like tubes. Once the targeted resources have been filtered out, excess seawater and sediment are subsequently returned to the ocean floor.

The rise in commercial interest in deep sea mining has been accompanied by an upsurge in fears about environmental damage, the potential destruction of marine life and real concerns about the impact on biodiversity. Greenpeace has pointed out that mining exposes sea life to metallic and acidic substances, which introduce toxic particles to underwater food chains. Deep sea trawling has already shown that the destruction of oceanic topography takes a big toll on fish, particularly slow-breeding species such as redfish and orange roughy. Aside from the impact on aquatic ecosystems, these issues could also have serious consequences for the livelihoods and well-being of coastal communities.

The value of seabed resources



\$150 trillion+

worth of gold resources are estimated to be in the seabed

Estimated annual seabed metal yield value:



Manganese
\$950m



Nickel
\$759m



Copper
\$259m



Cobalt
\$118m

Source: The Pros and Cons of Deep Sea Mining, 2013 miningaustralia.com.au



98%

of the oceans’ species live in, on or just above the floor of the sea

Source: The Deep Sea Conservation Coalition



A deep-sea mining machine being built for mining company Nautilus Minerals at Wallsend, England
© REUTERS/ Nigel Roddis

Although the ISA has regulations in place to govern exploration of the oceans within its remit, the aim is to develop legislation to cover all aspects of the industrial extraction of undersea resources in international waters. ISA stakeholders have been consulted and the current goal is to have a financial, fiscal framework for exploitation in place by 2016.

Creating a cohesive governance framework for national waters is more challenging. Nations have sovereign rights over resources on their continental shelves and, given the potential economic benefits, some emerging economies see the new industry as a huge opportunity. For example, Papua New Guinea's government has reached an agreement to allow seabed mining in its territorial waters and is optimistic that the project will deliver a significant amount of revenue.

One major region of focus for the industry is the Pacific Islands. In order to address the issue of governance, the Pacific Community, a strong regional organization, is helping countries to put regulatory frameworks in place. In other regions, however, there is a lack of governance – and there are no global standards for deep sea mining in national waters.

If we are to make the most of these precious resources and protect the delicate and diverse ecosystems of the ocean floor, good governance and best practice for the deep sea mining industry must be set in place now ■