Deep-Sea Mining Requires Transparent Environmental Management

For three years researchers from eleven countries have been working intensively on these questions on the consequences on deepsea mining on ecosystems and environmental aspects in the project “MiningImpact” coordinated by the GEOMAR Helmholtz Centre for Ocean Research Kiel, Germany. This week, they discuss their findings at the project`s final meeting at the Natural History Museum London, UK. They also presented recommendations for the protection of the marine environment.

In the 19th century, some researchers believed that below water depths of 1,000 metres life was not possible. Today we know they were wrong. However, the deep sea still surprises scientists. Until recently it was widely believed that the large deep-sea plains in the central Pacific were very uniform and only sparsely populated. Another mistake, as researchers of the European project "MiningImpact" have found out: The ecological diversity in the deep sea is enormous.

This finding has implications for assessing environmental risks of proposed mining of metal ores from the deep sea. That is exactly what the 25 partner institutions of the project have been working on during the past three years. In October 2017, participants met at the Natural History Museum London (NHM), one of the project partners, for the final symposium. They discussed the results of the individual working groups with stakeholders, such as regulators, NGOs, and companies and put forward actual recommendations on how the deep-sea ecosystem could be protected.

Manganese Modules Form Habitat

A key finding is that the habitat formed by manganese nodules is home to specific sessile and mobile fauna. Species abundance and diversity is related to the nodule density. On the numerous seamounts in the most important area for manganese nodules, the Clarion-Clipperton-Zone (CCZ), different species occur compared to the nodule habitats in the plains. "MiningImpact" scientists emphasize that disturbance impacts on nodule ecosystems last for many decades and affect numerous ecosystem compartments and functions.

Researchers' recommendations include the establishment of protected areas with the same environmental conditions and community composition as in mining areas. There are already protection zones in the CCZ. The project has also shown that technology to monitor deep-sea mining is available. An exchange of knowledge between industry and science, as well as a standardisation of the investigation protocols is necessary.

Developing Legal Framework for Exploitation

These recommendations are directed especially at the International Seabed Authority (ISA). On the basis of the International Convention on the Law of the Sea (UNCLOS), ISA manages the entire seabed outside the exclusive economic zones (200-nautical mile zone) of individual states. The agreement also obliges ISA to ensure the effective protection of the marine environment from possible adverse effects of deep-sea mining. The ISA is currently developing legal frameworks for the exploitation if the first states are to apply for mining licenses in the near future.

As early as in the 1970s, there were initial plans for the mining of manganese nodules from the deep sea, but they never proceeded past pilot trials. Manganese nodules are ball- or cauliflower-shaped pieces of ore, which occur mostly at depths below 4,000 metres on the deep seabeds. They consist of manganese, iron as well as coveted metals, such as copper, cobalt and nickel. The technical effort to get them out of the deep sea is according to the researchers still extremely high. But the demand for metals is increasing and will continue to do so with a growing world population. One should be prepared if a country wants to start mining deep-sea ores.