Deep sea mining: An Ocean Odyssey we need to take?

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We could be on the cusp of a new 'gold' rush. One that extends to, quite literally, the greatest depths of our oceans. Perhaps the final frontier of mystery on our planet could soon be exploited before its wonders are truly understood and appreciated. Alas, our modern economies and consumer desires have driven us to plumb to such depths to acquire the precious raw materials necessary. The increase in resource prices coupled with our technological advancements mean that deep sea mining is no longer a fantasy, the feasibility is very real. But, should we?

Current situation

The UN's International Seabed Authority (ISA) governs the deep ocean. They have currently issued 26 permits to allow the exploration of the seabed for potential mining opportunities. The total area now licensed has exceeded 1.2 million km^2, encompassing 6000 km of mid-ocean ridge (7.5% of the total) (Shukman, 2014). A variety of state-owned and private companies have been granted permission, from UK Seabed Resources to Nautilus Minerals of Canada. The latter of which has brokered a deal with the government of Papua New Guinea to extract metals from a field of hydrothermal vents within their territorial waters and beyond the reach of the ISA.

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About the deep sea

It is often stated that we have a greater knowledge of the surface of the Moon than we do of our own oceans, particularly the depths of the seabed. Robots such as ISIS of the James Cook are now able to enlighten us with details of hydrothermal vents and the life that survives there. These are underwater volcanoes occurring at spreading ridges and convergent plate boundaries, revealed as recently as 1977. A variety of unique species thrive in such environments, characterised by large clams and vestimentiferan worms. All reliant upon the seemingly alien chemosynthetic microbes for energy. Such colonies vary greatly across the vastly separated ridges, leading to many endemic species (Grassle, 1985).

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YES

Economic value: Deep sea mining could be worth up to £40bn to the UK economy over the next 30 years, a substantial income given the decline of terrestrial mining. The hydrothermal vents that have been prospected so far could be worth £150bn globally in copper and zinc deposits alone (Macalister, 2013).

Rare raw materials: Many modern technologies are highly dependent upon such minerals. Hybrid cars require 10kg of lanthanum for batteries along with more than double the copper of regular cars (80kg). Mining of manganese and cobalt could also occur; these have a number of industrial uses, predominantly alloys (Amos, 2014).

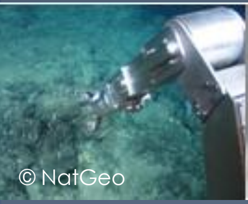
Environmental impacts: Deep sea hydrothermal vents are naturally disturbed environments due to their volcanic nature and so the ecosystem could cope with the additional stresses of mining. Additionally, some explored mineral deposits contain no current life.

NO

Habitat destruction: Terrestrial mining leads to a plethora of detrimental environmental impacts and it can be assumed that deep sea mining will be no different. We are only now learning of the wonders of the hydrothermal vent fauna and how they are able to survive there through life histories alien to previous knowledge. It would be a travesty to risk the survival of such rare organisms (Amos, 2014). Additionally, the transportation required would increase the number of vessels, thus threatening other aspects of marine life.

Pollution: The process would be high energy along with transportation costs, thus contributing to vast pollution outputs. Furthermore, risks of aggravating dangerous elements exist. Uranium could be present, a mineral that has suspended terrestrial mining practices in areas such as Greenland (Shukman, 2014).

Feeding demand: Deep sea mining is a means to sate our ever burgeoning appetite for technologies dependent upon rare raw materials. We should be looking to promote the recycling of minerals and to diversify our requirements so as to reduce our dependency.



Recommendations:

In an ideal world, deep sea mining would not be considered as a viable option. However, global demand has lead to such practices being on the cusp of global use. Before this commences, a greater exploration of the fauna must be undertaken to determine the true scale of impact mining will have upon the ecosystem and what can be done to minimise this. The responsibility lies with the ISA to create a protocol to which companies must comply. They have a chance to create a sensitive approach to ocean exploitation, based upon ecosystem management and sustainable methods. Furthermore, the ISA states that ocean minerals are a global resource. The riches should be shared with developing countries and those with no ocean access to avoid dominance of the deposits. Given these recommendations, deep sea mining could avoid the catastrophes of the fishing sector. It is now up to the ISA and mining companies to ensure the future of our hydrothermal vent ecosystems.

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