**The exploration of mineral resources in the Area**

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The International Seabed Authority (ISA) is the organization through which States Parties to the 1982 Convention on the Law of the Sea organize and control activities in the Area[[1]](#footnote-1). The ISA was created in 1994, upon the entry into force of the Convention and following the adoption of the so-called “1994 Agreement”. The set of activities in the Area are governed by the provisions settled in Part XI and Annex III of the Convention, particularly to administer the resources of the Area[[2]](#footnote-2). The Area itself corresponds to “the seabed and the ocean floor and subsoil thereof, beyond the limits of national jurisdiction” (Article 1.1 (1)). Spatially, it is constrained by the outer limits of the continental shelf of coastal states as defined in Article 76 and Annex II of the Convention[[3]](#footnote-3).

“Resources” under the Area regime means “all solid, liquid or gaseous mineral resources in situ in the Area at or beneath the seabed (…)” (Article 133 (a)) and these are considered as the common heritage of mankind[[4]](#footnote-4). In the Area, the most promising mineral resources are polymetallic nodules, polymetallic sulphides and ferromanganese crusts. The former were first discovered in the second half of the XIX century and were recognized as a potential source of nickel, copper, cobalt and manganese after the 1960s (Rona, 2008 and references therein). The latter has gained interest as a cobalt rich resource and, more recently, as a possible source for REEs[[5]](#footnote-5) capable of supplying global needs (Hein, 2012). Marine deposits of polymetallic sulphides, first discovered in 1979, constitute a valuable potential resource of copper, zinc, lead and gold, and will soon be exploited in some EEZs[[6]](#footnote-6) of the Pacific ocean (for more information, see <http://www.nautilusminerals.com>).

Hydrocarbons and gas hydrates may also occur in some parts of the Area and will certainly be a target in the near future, following the recent technological progresses in offshore operations and the increasing demand of modern and emerging economies. However, society’s claim to change the growth paradigm towards a green economy while leading to an increase in efficiency and use of renewable energy sources will also increase metal needs at a global scale. This is easily predicted regarding the production of hybrid and electric cars, wind turbines, solar panels, superconductors and super alloys. Some base metals (like copper) are becoming depleted on land-based deposits and present-day market prices make the search for marine minerals more attractive.

There are several reasons to consider seabed mining more advantageous when compared to land mining. Land-based mines commonly require the removal of large amounts of barren overburden rock, leaving a significant footprint in the landscape. Conversely, most marine mineral deposits sit at the seabed with little or no overburden to remove. Polymetallic nodules are potatoes sized concretions formed mostly by hydrogenous and biological processes leading to the precipitation of concentric layers of iron and manganese hydroxides around a core (Morgan, 2012). The nodules lie on the sea-bottom sediment, generally half buried, at depths over 4,000-5,000 m. Ferromanganese crusts are mostly composed by manganese oxides and amorphous iron oxyhydroxides that precipitate directly from cold seawater, forming pavements on hard-rock substrates on the flanks and summit of submarine seamounts (e.g. Hein, 2000). They are found at water depths of about 400-4,000 m, but the thickest crusts (up to 25 cm thick) typically occur at depths between 800 and 2,500 m. Polymetallic sulphides of copper, zinc, and lead precipitate at hydrothermal vents (also called black smokers) when high-temperature fluids (heated beneath the oceanic crust and up to 400 ºC) ascend and mix with the cold surrounding seawater (e.g. Herzig and Petersen, 2000). These deposits are related with ocean spreading centres at water depths generally lower than 3,500 m.

Since its foundation the ISA[[7]](#footnote-7) has so far elaborated three sets of regulations governing prospecting and exploration for polymetallic nodules (adopted in 2000), polymetallic sulphides (adopted in 2010) and ferromanganese crusts (adopted in 2012). Contracts for exploration are approved for a period of 15 years, but following the end of the first contracts for exploration of polymetallic nodules in the Pacific, signed in 2001, the ISA is scheduling a work plan to be able to present an exploitation code in the next 2-3 years. The set of rules, regulations and procedures adopted for prospecting, exploration and exploitation of marine minerals in the Area - as the common heritage of mankind - must take into account the effective protection and preservation of the marine environment[[8]](#footnote-8). Since there is broad consensus in that the current stage of knowledge prevents any definite risk assessment of the effects of large-scale seabed mining (e.g. Van Dover, 2010), contractors are required to collect oceanographic and environmental baseline data as an integral part of their exploration programs (see also ISA Technical Study: No. 10). The type of baseline data to be collected and the methods used to do it should be revised from time to time in order to incorporate state of the art scientific knowledge, technology and best environmental practices. Contractors are also compelled to present a preliminary assessment of the possible impact of the proposed exploration activities on the marine environment. This includes mining tests, which would be used to assess and evaluate their impacts on the marine environment prior to the issue of licenses for mineral exploitation.

According to the regulations on prospecting and exploration issued by the ISA, each contractor needs to “take necessary measures to prevent, reduce and control pollution and other hazards to the marine environment arising from its activities in the Area as far as reasonably possible using the best technology available to it”. Moreover, the Authority and sponsoring States are also engaged to apply a precautionary approach, as reflected in principle 15 of the Rio Declaration[[9]](#footnote-9).

Regarding the protection of the marine environment and in order to ensure compliance by the contractor with its obligations and to exempt the sponsoring State from liability as predicted by the Convention on the Law of the Sea, the Advisory Opinion of the Seabed Disputes Chamber of 1 February 2011 states that the “laws and regulations and administrative measures of the sponsoring State cannot be less stringent than those adopted by the Authority, or less effective than international rules, regulations and procedures”. However, as also noted in the Advisory Opinion, the principle 15 of the Rio Declaration declares that States shall apply the precautionary approach “according to their capabilities”. Notwithstanding the combination of this principle with the obligation of contractors to use the “best environmental practices”, the former might indicate a less strict standard for developing States (Lynch, 2011).

The Convention on the Law of the Sea aims to establish a legal order for the seas and the oceans in order to promote their peaceful uses and the equitable and efficient utilizations of their resources. One of the main achievements relies on the effective participation of developing States in activities in the Area[[10]](#footnote-10). According to the Article 143 of the Convention the ISA “shall promote and encourage the conduct of marine scientific research in the Area, and shall co-ordinate and disseminate the results of such research and analysis when available”. We are convinced that this principle, as well as the exploration activities and cooperation between States and contractors through the ISA, will be the basis to apply the precautionary approach in a constructive way that will enable the developing States to participate in deep seabed mining on an equal footing with developed States while protecting and preserving the marine environment.

**References**

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1. In accordance with Article 156 of the Convention on the Law of the Sea of 10 December 1982 [↑](#footnote-ref-1)
2. Article 157 of the Convention on the Law of the Sea. [↑](#footnote-ref-2)
3. Article 76 states that “The continental shelf of a coastal State comprises the seabed and subsoil of the submarine areas that extend beyond its territorial sea throughout the natural prolongation of its land territory to the outer edge of the continental margin, or to a distance of 200 nautical miles from the baselines from which the breadth of the territorial sea is measured where the outer edge of the continental margin does not extend up to that distance”. [↑](#footnote-ref-3)
4. Article 136 of the Convention on the Law of the Sea. [↑](#footnote-ref-4)
5. The REEs acronym stands for Rare Earth Elements forming the lanthanide group (15 elements) in the periodic table. The industrial use of these elements has been increasing in emerging high- and green-technology applications. [↑](#footnote-ref-5)
6. Economic Exclusive Zones [↑](#footnote-ref-6)
7. Through the Council, the executive body of the ISA. [↑](#footnote-ref-7)
8. Article 145 of the Convention on the Law of the Sea. [↑](#footnote-ref-8)
9. Principle 15 of the Rio Declaration 1992 states that: “In order to protect the environment, the precautionary approach shall be widely applied by States according to their capabilities. Where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation”. [↑](#footnote-ref-9)
10. Article 148 of the Convention on the Law of the Sea. [↑](#footnote-ref-10)