Module “Economic value and protection of the deep sea”

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Laurea Magistrale in Biologia ed Ecologia dell’ambiente marino ed uso sostenibile delle sue risorse

The deep-sea realm is one of the least-known oceanic areas on Earth, but this remote environment owns large areas of concentrated metal reserves. Many of these metals are used in electronics, and since terrestrial supplies are diminishing, deep-sea mineral resources are likely to be extensively mined within the next few decades. There are four main types of resource that are of commercial potential: manganese nodules, seafloor massive sulphides, cobalt-rich ferromanganese crusts and phosphorite nodules. These resource are hidden in deep-sea ecosystems such as hydrothermal vents, nodules and seamounts.

It is mandatory, before such plans are implemented, to perform a legal framework for this activity to envisage a responsible and sustainable management. Prior to the commencement of commercial mining, environmental studies must be conducted to evaluate potential impacts to the biological assemblages inhabiting these areas.

The main objectives of this module was to introduce students to key aspects of deep-sea ecology, exploring different deep-sea ecosystems, including the last-generation tools developed for biomonitoring of these exploited environments.

Theoretical lessons were focused on a general introduction to the deep sea and to the mining problematic. We explored three targeted deep-sea ecosystem: hydrothermal vents, seamount and nodules, including their colonization and connectivity. This module proposed a review of the last-generation tools for biomonitoring the deep sea. We stimulated a reflection about the economic value and the necessary protection of the deep sea.

The practical part of this module proposed the extraction of meiofauna (including sieving and centrifugation), the identification and sorting of meiofauna taxa at the stereomicroscope, the preparation of permanent slides for nematodes and the identification of nematodes at the optical microscope.