The Value of a Deep-Sea Collection of the Azores (NE Atlantic Ocean): Marine invertebrate biodiversity in an era of global environmental change

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Abstract

The deep ocean is the largest and least explored biome with the highest richness of species and phylogenetic biodiversity on Earth. The high costs of using sophisticated technological means to access deep-sea ecosystems gives an inestimable value to specimens collected in these environments. Azorean scientists have long started collaborating with fishermen to collect deep-sea marine invertebrate fauna accidentally captured during fishing activities, thus obtaining deep-sea organisms opportunistically. Specimens have been stored and catalogued at the Department of Oceanography and Fisheries – University of the Azores’ Marine Biological Reference Collection (COLETA) since 2006. The collection has been continuously growing through oceanographic cruises and fisheries observer programs in the framework of several national and international
collaborations. Currently, COLETA has 14367 specimens and samples corresponding to 10827 databased entries representing mostly corals (3415) and sponges (1941) of the deep sea (Fig. 1), for which data are available until 2012 (Institute of Marine Research (IMAR - Azores), Portugal and Department of Oceanography and Fisheries (DOP) - UAC, Portugal 2015). Specimens and associated metadata have contributed for the the taxonomy, population genetics and life history (age, growth, reproduction) of corals and other organisms. The homonym COLETA database, besides the taxonomic identification and photography of the specimen, has metadata including geographic location, depth, and the method of collection (e.g. survey, fishing). Thus, COLETA has also been instrumental in the mapping of distribution of biodiversity and vulnerable marine ecosystems such as coral gardens, sponge grounds, hidrarian gardens and sea pen fields in the Azores Exclusive Economic Zone (EEZ). Efforts have been made to make COLETA compatible with other databases, such as the database of historical records of cold-water coral occurrences in the Azores (e.g. Prince Albert of Monaco Campaigns in the 19th century) and other fisheries databases, in order to maximize its potential to study trends in biodiversity loss related to climate change and fisheries impacts. Underwater images of live specimens from video surveys have also been cross-referenced with specimens stored at COLETA in an effort to join taxonomists and ecologists in the characterization of new habitats.

Curated collections and datasets based on vouchered records, which can be continuously consulted, are essential to study deep-sea biodiversity. A continuously growing collection has also the potential of adding a time frame to the study of the impact of climate change, fishing and pollution on the deep-sea. In an era of biodiversity loss, COLETA represents a good example of where physical specimens and associated metadata databases can be combined to research and discover species, to achieve ecosystem conservation and guide marine spatial planning.

Figure 1.
COLETA database on marine invertebrates of the Azorean deep sea.
Keywords

collection, deep sea, invertebrates, marine biodiversity, vulnerable marine ecosystems

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References

• Institute of Marine Research (IMAR - Azores), Portugal, Department of Oceanography and Fisheries (DOP) - UAC, Portugal (2015) COLETA - IMAR/DOP-Uac reference collection from 1977 to 2012. URL: https://doi.org/10.14284/23