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Brief Note On Challenges In Marine Environmental Biology

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Commentary

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DESCRIPTION

The study of marine ecosystems has recently become a popular research topic. Indeed, the number of manuscripts containing the words "marine ecosystems" that have been published since 1970 has skyrocketed, reaching between 1100 and 1500 articles per year in the last five years. The most common topics based on the keywords used in these manuscripts are: (i) marine ecosystems (28.8 percent of the papers); (ii) biodiversity (26.6 percent), which can be used as a keyword at any level of organisation, such as bacteria, phytoplankton, zooplankton, benthos, fishes, mammals, seabirds, and so on; (iii) functionality (10.7 percent), which includes factors such as ecosystem function, biomass, food webs, primary and secondary production, and so on; (iv) environmental research (9.7%), which includes pollution, environmental monitoring, human pressures, impacts, and so on; (v) structural parameters (6.6%), which include abundance, richness, and diversity.(vi) climate change (3.4%); (vii) ecology (3.4%); (viii) systems management (3.2%); (ix) genetic and genomic issues (1.6%); (x) protection (1%); (xi) ecosystem modelling (0.9%); and (xii) others (4.5 percent). Several grand challenges for future research in the field of marine ecosystem ecology can be identified based on the large number of papers published in recent years, as outlined below.

Historically, researchers have studied ecosystems by focusing on individual or few components of biodiversity, such as microbes, phytoplankton, zooplankton, macroalgae, macroinvertebrates, fishes, mammals, seabirds, and so on, in order to better understand the roles of individual species. However, it is now recognised that understanding the entire ecosystem necessitates the study of all biodiversity components, from population genetic structure to species, habitats, and ecosystem integrity, including food-webs and complex bio-physical interrelationships within ecosystems.

Effective long-term monitoring of populations and communities is required to understand marine ecosystem functioning and its responses to environmental and anthropogenic pressures in order to adequately address the aforementioned grand challenges in Marine Ecosystem Ecology. However, monitoring programmes frequently overlook important sources of error (e.g., investigators' inability to detect all individuals or all species in a surveyed area), which can lead to biased estimates, spurious conclusions, and incorrect management actions. Metabarcoding is one of the most recent methods for obtaining reliable, verifiable, efficient, and cost-effective biodiversity monitoring.

In addition to regular data collection, complete maps of habitats, ecosystem services, and so on are required for a better understanding of spatial ecology and marine management. All of this information necessitates the integration of data from various ecosystem components in order to comprehend large-scale patterns and long-term changes.

At long last, the development towards open admittance to logical information and distributions gives more noteworthy admittance to datasets and ebb and flow research, which can possibly bring about better spatial and fleeting examinations, by involving existing data in a significantly more compelling manner through Information and communication technologies (i.e., e-Science). Make information open, open online in a standard configuration accessible for total, joining, investigation and demonstrating, is an essential advance to support the improvement of marine environment biology, to address the above featured difficulties, and to push toward the outskirts of sea life science. Consequently, frontiers in marine ecosystem ecology elevate open admittance to information and data to improve joint efforts, while examining hot marine themes and tending to the great difficulties depicted here.