

MEIOBENTHIC RESEARCH: TRENDS AND CHALLENGES IN THE PERSPECTIVE OF GLOBAL MARINE ECOLOGICAL RESEARCH

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The main challenge for fundamental marine research over the past decades has been to explore and understand ocean ecosystems with their vast temporal and spatial scales and dynamics, and their interactions with the continents and the atmosphere, as well as increasingly with socio-economic systems. This formidable challenge to obtain a sufficient understanding of the most extensive and complex system on earth in the face of increasing and largely unmanaged human exploitation, will continue to guide research in the coming decade as well.

Over the last thirty years an incredible advance in knowledge on the oceans has been made through the development of new technologies in earth observation and new analytical techniques in chemistry, microbiology and molecular biology, which has allowed a much better understanding of the functioning of marine ecosystems, but at a pace that leaves no doubt that much remains to be discovered.

The main drivers for marine ecological research have been the necessity of a better understanding of processes such as ocean circulation, sediment transport, evolution of life histories and biogeochemical cycles in order to evaluate and eventually manage the human impact on the oceans. In the 60's and 70's the main societal concern was in pollution and eutrophication. Especially in the last decade this has shifted to climate change and biodiversity loss and most recently acidification and hypoxia - and increasingly also noise have become important concerns for marine ecological research.

Meiofauna research has followed the societal concerns of the time. A large literature has been developed in the 60's and 70's of the last century on the impacts of pollution and eutrophication on meiofauna and the statistical methodology required to study those multivariate phenomena. Some efforts were made to culture harpacticoid copepods and nematodes for experimentation or to elucidate life cycles, but meiofauna research has not been able to sustain such efforts or to define model species useful in other areas of science such as molecular biology. Moreover, most research was coastal and knowledge on deep sea meiofauna has become only gradually available and is still slowly accumulating today.

Many efforts were made to understand meiofauna productivity and its putative impact on mineralization and thus on the carbon and nitrogen cycles because of the abundance of meiofauna in marine sediments. The impact and relevance of

meiofauna research on understanding the new grand challenges has been rather restricted. However, in subject areas where meiofaunal life cycles and metabolism differ from macrofaunal ones there is still scope for new efforts. A few examples may be their role as intermediates between the microbial food web and the macrofauna, survival in and indicators of hypoxic and anoxic environments, general biodiversity in remote and unexplored habitats, the molecular basis of adaptation.

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