

Editorial

Benthic Species and Habitats

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The term benthos, coined by the German naturalist Ernst Heinrich Philipp August Haeckel in 1891 [1], comes from the Greek βένθος, which means “depth (of the sea)”. It includes the community of organisms that live on, in, or near the bottom of a sea, river, lake, or stream, from shallow rivers or tidal pools down to the unseen depths of the ocean. The benthic zone hosts a striking variety of species and habitats, many of which are barely known or still undescribed. In spite of the critical role played by benthic life, the species distribution and their main features are often unknown. Moreover, in many cases we have not comprehensively understood the patterns and processes shaping the presence of benthic life. Thanks to the use of cutting-edge technologies (e.g., technical diving, underwater vehicles, and autonomous devices) and sophisticated molecular techniques, scientific research is advancing remarkably, unveiling the secrets of the benthos from the poles to the tropics, from the coastal zones down to the most inaccessible deep habitats. This Special Issue presents relevant scientific work from large-scale patterns to detailed aspects and case studies about benthic habitats and species. In detail, it includes contributions that benefit from imaging techniques, such as non-invasive approaches based on visual census and video analyses to describe habitat features and their conservation status [2,3]. Some of the studies in this Special Issue also show how imaging techniques are useful for developing 3D approaches for animal descriptions [4] and size-structured models for the study of vulnerable species [5]. In addition to the visual approach, sampling can support the study of the population structure of endangered or particularly important species to deepen our knowledge, especially regarding their biology [6] or conservation status [5,7]. Since ad hoc sampling is sometimes inevitable, powerful approaches are benefiting from fishery bycatch and other forms of sample collection [8]. Certain benthic species are also habitat formers, as they can form the physical place where a number of species live, feed, or breed, such as, for instance, seagrass meadows, coral reefs, marine animal forests, and rhodolith beds [2,9–11]. The work by Shmuel et al. [12], for instance, reports some observations about the different habitat uses of crabs in the genus *Trapezia* living in a marine animal forest. In addition, some of the contributions to this Special Issue provide new information about species distribution coupled with environmental drivers and human activities, as in the cases of the Moulay Bousselham Lagoon (Morocco, Atlantic Ocean) [13], the Siboglinidae annelid *Nereilinum murmanicum* in the Barents Sea [14], and the Korean Top Shell *Turbo sazae* expanding its habitat northward in the Korean Peninsula [15]. Benthic species can be also involved in restoration initiatives, such as for the mangrove *Kandelia obovata* used to replace the invasive *Spartina alterniflora* in an intertidal macrobenthos community at Maoyan Island (Zhejiang, China) [16], as well as oyster restoration mats on dock pilings to help restore water quality and benthic habitats in the Indian River Lagoon [17]. Finally, this Special Issue proudly includes the description of a new species, the sponge *Spongilla manconiae*, from Cahong Lake in Northeast Vietnam [18].

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References

1. Haeckel, E. Plankton-Studien. *Jena. Z. Für Nat. -NF* **1891**, *18*, 232–336.
2. Chimienti, G.; Rizzo, L.; Kaleb, S.; Falace, A.; Frascchetti, S.; Giosa, F.D.; Tursi, A.; Barbone, E.; Ungaro, N.; Mastrototaro, F. Rhodolith Beds Heterogeneity along the Apulian Continental Shelf (Mediterranean Sea). *J. Mar. Sci. Eng.* **2020**, *8*, 813. [[CrossRef](#)]
3. Kim, T.; Lee, D.-W.; Kim, H.-J.; Jung, Y.-H.; Choi, Y.-U.; Oh, J.-H.; Kim, T.-H.; Kang, D.-H.; Park, H.-S. Estimation of the Benthic Habitat Zonation by Photo-Quadrat Image Analysis along the Fringing Reef of Weno Island, Chuuk, Micronesia. *J. Mar. Sci. Eng.* **2022**, *10*, 1643. [[CrossRef](#)]
4. Pulido Mantas, T.; Bavestrello, G.; Bertolino, M.; Cerrano, C.; Pica, D.; Roveta, C.; Calcinai, B. A 3D Innovative Approach Supporting the Description of Boring Sponges of the Precious Red Coral *Corallium rubrum*. *J. Mar. Sci. Eng.* **2022**, *10*, 868. [[CrossRef](#)]
5. Chimienti, G.; Di Nisio, A.; Lanzolla, A.M.L. Size/Age Models for Monitoring of the Pink Sea Fan *Eunicella verrucosa* (Cnidaria: Alcyonacea) and a Case Study Application. *J. Mar. Sci. Eng.* **2020**, *8*, 951. [[CrossRef](#)]
6. Oh, I.-K.; Lee, S.-W. Population Structure and Reproductive Biology of the Endangered Crab *Deiratonotus japonicus* (Brachyura, Camptandriidae) Surveyed for Nine Years in the Kita River, Japan. *J. Mar. Sci. Eng.* **2020**, *8*, 921. [[CrossRef](#)]
7. Chimienti, G. Vulnerable Forests of the Pink Sea Fan *Eunicella verrucosa* in the Mediterranean Sea. *Diversity* **2020**, *12*, 176. [[CrossRef](#)]
8. Morán-Silva, A.; Cházaro-Olvera, S.; Chávez-López, R.; Montoya-Mendoza, J.; Vázquez-López, H.; Rodríguez-Varela, A.d.C. Relative Growth and Size Structure of *Achelous spinicarpus* Stimpson, 1871 Associated with Shrimp Trawling in the State of Veracruz. *J. Mar. Sci. Eng.* **2021**, *9*, 1097. [[CrossRef](#)]
9. Hemminga, M.A.; Duarte, C.M. Seagrass ecology. In *Limnology and Oceanography 2*; Cambridge University Press: Cambridge, UK, 2000. [[CrossRef](#)]
10. Rossi, S.; Bramanti, L.; Gori, A.; Orejas, C. *Marine Animal Forests. The Ecology of Benthic Biodiversity Hotspots*; Springer International Publishing: Cham, Switzerland, 2017; 1366p.
11. Ingrosso, G.; Abbiati, M.; Badalamenti, F.; Bavestrello, G.; Belmonte, G.; Cannas, R.; Benedetti-Cecchi, L.; Bertolino, M.; Bevilacqua, S.; Bianchi, C.N.; et al. Mediterranean bioconstructions along the Italian coast. *Adv. Mar. Biol.* **2018**, *79*, 61–136. [[PubMed](#)]
12. Shmuel, Y.; Ziv, Y.; Rinkevich, B. Trapezia Crabs That Dwell in Distinctive Day/Night Canopy Compartments of a Marine Animal Forest, Forage on Demersal Plankton. *J. Mar. Sci. Eng.* **2022**, *10*, 1522. [[CrossRef](#)]
13. Boutoumit, S.; Bououarour, O.; El Kamcha, R.; Pouzet, P.; Zourarah, B.; Benhoussa, A.; Maanan, M.; Bazairi, H. Spatial Patterns of Macrozoobenthos Assemblages in a Sentinel Coastal Lagoon: Biodiversity and Environmental Drivers. *J. Mar. Sci. Eng.* **2021**, *9*, 461. [[CrossRef](#)]
14. Karaseva, N.; Kanafina, M.; Gantsevich, M.; Rimskaya-Korsakova, N.; Zakharov, D.; Golikov, A.; Smirnov, R.; Malakhov, V. Distribution of *Nereilinum murmanicum* (Annelida, Siboglinidae) in the Barents Sea in the Context of Its Oil and Gas Potential. *J. Mar. Sci. Eng.* **2021**, *9*, 1339. [[CrossRef](#)]
15. Son, M.H.; Lee, C.I.; Park, J.M.; Kim, H.J.; Riedel, R.; Hwang, I.; Kim, Y.-N.; Jung, H.K. The Northward Habitat Expansion of the Korean Top Shell *Turbo sazae* (Gastropoda: Vetigastropoda: Turbinidae) in the Korean Peninsula: Effects of Increasing Water Temperature. *J. Mar. Sci. Eng.* **2020**, *8*, 782. [[CrossRef](#)]
16. Wang, Q.; Duarte, C.; Song, L.; Christakos, G.; Agusti, S.; Wu, J. Effects of Ecological Restoration Using Non-Native Mangrove *Kandelia obovata* to Replace Invasive *Spartina alterniflora* on Intertidal Macrobenthos Community in Maoyan Island (Zhejiang, China). *J. Mar. Sci. Eng.* **2021**, *9*, 788. [[CrossRef](#)]
17. Gilligan, M.; Hunsucker, K.; Rech, S.; Sharma, A.; Beltran, R.; White, R.T.; Weaver, R. Assessing the Biological Performance of Living Docks—A Citizen Science Initiative to Improve Coastal Water Quality through Benthic Recruitment within the Indian River Lagoon, Florida. *J. Mar. Sci. Eng.* **2022**, *10*, 823. [[CrossRef](#)]
18. Calcinai, B.; Cerrano, C.; Núñez-Pons, L.; Pansini, M.; Thung, D.C.; Bertolino, M. A New Species of *Spongilla* (Porifera, Demospongiae) from a Karst Lake in Ha Long Bay (Vietnam). *J. Mar. Sci. Eng.* **2020**, *8*, 1008. [[CrossRef](#)]

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