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Editorial

Structure and Biodiversity of Rhodolith Seabeds: A Special Issue

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Abstract: Rhodolith seabeds function as 'ecosystems engineers', which globally provide a range of 'ecosystem services'. However, knowledge on the structure, composition and distribution of rhodolith seabeds is still lacking. This Special Issue comprises six articles, addressing specific questions of rhodolith seabeds, and covering a wide range of topics. Two papers provide new large-scale information on the presence, structure and distribution of rhodolith beds at two southern hemisphere areas, in particular continental shelfs off South Africa and Brazil. Another two studies contributed to the discovery on new algal species from rhodolith beds, including *Sporolithon franciscanum*, a new rhodolith-forming species from Brazil, and the small benthic alga *Schizocladia ischiensis*. In terms of associated fauna, the taxonomic composition and patterns of abundance of decapod crustaceans are described in another article, including the description of a depth-partitioning in the abundance of juveniles and adults of the crab *Nanocassiope melanodactylus*. Rhodoliths are often present in fossilized deposits, so we can track changes in their presence with climate fluctuations. High temperatures during the Eocene and widespread oligotrophic conditions are finally connected with low abundances of rhodolith beds at mid and high latitudes, despite a larger presence at equatorial regions.

Keywords: coastal habitats; biodiversity; maerl; coralline

Rhodolith seabeds globally cover large subtidal environments, functioning as 'ecosystems engineers', which provide a range of 'ecosystem services' [1]. These communities are mainly composed of non-geniculate, free-living, calcareous macroalgae, belonging to the division Rhodophyta, which have a rugged coralline shape and diverse morphology and size. Rhodolith bottoms are a relevant component of nearshore habitats across all oceans, where a range of organisms find food and shelter [2]. However, knowledge on the structure, composition and distribution of rhodolith seabeds is majorly lacking, in particular relative to other coastal habitats such as seagrass meadows and coral reefs. This Special Issue comprises 6 articles, addressing specific questions of rhodolith seabeds, covering a wide range of topics.

Initially, two papers of this Special Issue provide new large-scale information on the presence, structure and distribution of rhodolith beds at two southern hemisphere areas, in particular the historically unexplored continental shelf off the Eastern Cape in South Africa [3] and the Doce River Shelf in Brazil [4]. This last study is particularly relevant, because it points out that rhodolith beds are less abundant, or even absent, likely due to the long-term deposition of fine sediments in this region, as a result of human actions. Without a doubt, these two works provide a useful baseline knowledge for future environmental monitoring.

Another two studies of this Special Issue contributed to the discovery on new algal species from rhodolith beds. First, *Sporolithon franciscanum*, a new rhodolith-forming species of non-geniculate coralline algae, is described from the São Francisco river mouth, Brazil [5]. In another paper, Rizouli et al. [6] isolated the small benthic multicellular alga *Schizocladia ischiensis* of the poorly known

monotypic Schizocladiophyceae, the sister group of the brown algae (Phaeophyceae). Both studies have used cutting-edge molecular tools to describe both algal species.

As I anticipated before, rhodoliths provide a key habitat for a plethora of fauna. Sanchez-Latorre et al. [7] provided the taxonomic composition and patterns of abundance of decapod crustaceans inhabiting a rhodolith bed at Gran Canaria Island, including their seasonal and bathymetric variation. In particular, they described a depth-partitioning in the abundance of juveniles and adults of the crab *Nanocassiope melanodactylus*.

Last, but not least; because of their carbonated structures, rhodoliths are often present in fossilized deposits, so we can track changes in their presence with climate fluctuations. Aguirre et al. [8] linked the impact of high temperatures, due to high levels of atmospheric CO_2, during the Eocene and widespread oligotrophic conditions with low abundances of rhodolith beds at mid and high latitudes. In contrast, they showed that more productive equatorial regions would have favored the formation of rhodolith beds.

As a final remark, I hope readers will be inspired by the articles of this Special Issue. Still, much needs to be done to provide more insight into the biology and ecology of rhodolith beds and their associated inhabitants, particularly in the context of increasing human impacts on coastal waters of the world. Conservation of these valuable habitats should be a priority in any environmental agenda at local and global scales. Finally, I would like to express my gratitude to the authors for their contributions, and to the staff members at the MDPI editorial (in particular, Ms. Wei Zhang) for their encouragement and support.

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