

**Stefano Goffredo • ZvyDubinsky**  
**Editors**

# **The Mediterranean Sea**

Its history and present challenges

**Springer**

# Coimfteinitts

## Part I Geology, Chemical and Physical Oceanography

- 1 The Geological Origins and Paleooceanographic History of the Mediterranean Region: Tethys to Present** 3  
Vincenzo Picotti, Alessandra Negri, and Bruno Capaccioni
- 2 A Channeled Shelf Fan Initiated by Flooding of the Black Sea** 11  
William B. F. Ryan, Dina Vachtman, Cecilia McHugh, M. Namik Qagatay, and Yossi Mart
- 3 Past, Present and Future Patterns of the Thermohaline Circulation and Characteristic Water Masses of the Mediterranean Sea** 29  
Nikolaos Skliris
- 4 Past, Present and Future Patterns in the Nutrient Chemistry of the Eastern Mediterranean** 49  
Michael Krom, Nurit Kress, Iana Berman-Frank, and Eyal Rahav
- 5 Marine Chemosynthesis in the Mediterranean Sea** 69  
Marco Taviani

## Part II Ecology: Taxa and Trophic Levels

- 6 Microbial Components** 87  
Marta Estrada and Dolors Vaque
- 7 The Mediterranean Sea – Primary Productivity** 113  
Noga Stambler
- 8 Autochthonous Seaweeds** 123  
Felix L. Figueroa, Antonio Flores-Moya, Juan J. Vergara, Nathalie Korbee, and Ignacio Hernandez
- 9 Autochthonous Seagrasses** 137  
J. Lucas Perez-Llorens, Juan J. Vergara, Irene Olive, Jesus M. Mercado, Rafael Conde-Alvarez, Angel Perez-Ruzafa, and Felix L. Figueroa
- 10 Alien Benthic Algae and Seagrasses in the Mediterranean Sea and Their Connection to Global Warming** 159  
Razy Hoffman
- 11 The Zooplankton** 183  
Enric Saiz, Ana Sabates, and Josep-Maria Gili
- 12 Zoobenthos** 213  
Josep-Maria Gili, Rafael Sarda, Teresa Madurell, and Sergi Rossi

<b>13</b>	<b>Foraminifera</b>	<b>237</b>
	Anna Sabbatini, Caterina Morigi, Maria Pia Nardelli, and Alessandra Negri	
<b>14</b>	<b>Mediterranean Corals Through Time: From Miocene to Present</b>	<b>257</b>
	Agostina Vertino, Jarostaw Stolarski, Francesca R. Bosellini, and Marco Taviani	
<b>15</b>	<b>Mediterranean Coral Population Dynamics: A Tale of 20 Years of Field Studies</b>	<b>275</b>
	Erik Caroselli and Stefano Goffredo	
<b>16</b>	<b>The Making of the Mediterranean Molluscan Biodiversity</b>	<b>285</b>
	Bruno Sabelli and Marco Taviani	
<b>17</b>	<b>Recent Changes in the Distribution of Autochthonous Marine Molluscs in the Mediterranean Sea</b>	<b>307</b>
	Paolo G. Albano	
<b>18</b>	<b>Advances in Predicting the Impacts of Global Warming on the Mussels <i>Mytilus galloprovincialis</i> in the Mediterranean Sea</b>	<b>319</b>
	Basile Michaelidis, Hans-O. Portner, Inna Sokolova, and Lars Tomanek	
<b>19</b>	<b>Holoplanktonic Mollusca: Development in the Mediterranean Basin During the Last 30 Million Years and Their Future</b>	<b>341</b>
	Arie W. Janssen and Katja T.C.A. Peijnenburg	
<b>20</b>	<b>Ocean Acidification and Warming Effects on Crustacea: Possible Future Scenarios</b>	<b>363</b>
	Awantha Dissanayake	
<b>21</b>	<b>Bryozoan Constructions in a Changing Mediterranean Sea</b>	<b>373</b>
	Chiara Lombardi, Paul D. Taylor, and Silvia Cocito	
<b>22</b>	<b>The Fishes of the Mediterranean: A Biota Under Siege</b>	<b>385</b>
	Menachem Goren	
<b>23</b>	<b>Physiological Responses of Marine Animals Towards Adaptation to Climate Changes</b>	<b>401</b>
	Elena Fabbri and Enrico Dinelli	
<b>Part III Global Climate Change and Ecosystem Effects</b>		
<b>24</b>	<b>A Comparative Analysis of Trophic Structure and Functioning in Large-Scale Mediterranean Marine Ecosystems</b>	<b>421</b>
	Alberto Barausse and Luca Palmeri	
<b>25</b>	<b>Bioconstructions in the Mediterranean: Present and Future</b>	<b>435</b>
	Petar Kruzic	
<b>26</b>	<b>Marine Bioerosion</b>	<b>449</b>
	Christine H.L. SchOnberg and Max Wisshak	
<b>27</b>	<b>Metamorphoses: Bioinvasions in the Mediterranean Sea</b>	<b>463</b>
	B.S. Galil and Menachem Goren	
<b>28</b>	<b>Future Trends of Mediterranean Biodiversity</b>	<b>479</b>
	Jose Templado	
<b>29</b>	<b>Regime Shifts in the Marine Environment: How Do They Affect Ecosystem Services?</b>	<b>499</b>
	Alexandra C. Kraberg and Karen H. Wiltshire	

<b>Part IV Mediterranean Man and Sea: Myths, Origins, Challenges and Opportunities</b>		
<b>30</b>	<b>Mediterranean Culture and Climatic Change: Past Patterns and Future Trends</b> Anna Maria Mercuri and Laura Sadori	<b>507</b>
<b>31</b>	<b>The Mediterranean Human Population: An Anthropological Genetics Perspective</b> Marco Sazzini, Stefania Sarno, and Donata Luiselli	<b>529</b>
<b>32</b>	<b>The Mediterranean and the Voices Transported by Time</b> Maria Helena Trindade Lopes	<b>553</b>
<b>33</b>	<b>Mediterranean Royal Purple: Biology Through Ritual</b> David Iluz	<b>559</b>
<b>34</b>	<b>Socioeconomic Aspects: Human Migrations, Tourism and Fisheries</b> Dafna M. DiSegni and Mordechai Shechter	<b>571</b>
<b>35</b>	<b>Effect of Climatic and Anthropogenic Disturbances on Sponge Fisheries</b> Thierry Perez and Jean Vacelet	<b>577</b>
<b>36</b>	<b>Seafood Safety and Human Health Implications</b> Antonio Marques, Rui Rosa, and Maria Leonor Nunes	<b>589</b>
<b>37</b>	<b>Mediterranean Aquaculture in a Changing Climate</b> Rui Rosa, Antonio Marques, and Maria Leonor Nunes	<b>605</b>
<b>38</b>	<b>Climate Change, Extreme Weather Events and Health Effects</b> Francesca de' Donato and Paola Michelozzi	<b>617</b>
<b>39</b>	<b>Conflicts and Security Risks of Climate Change in the Mediterranean Region</b> Jürgen Scheffran and Hans Günter Brauch	<b>625</b>
<b>40</b>	<b>Developing Resource Management and Marine Policy for the Eastern Mediterranean Sea</b> Michelle E. Portman	<b>641</b>
	<b>Index</b>	<b>655</b>