

Series Preface

With remarkable vision, Prof. Otto Hutzinger initiated *The Handbook of Environmental Chemistry* in 1980 and became the founding Editor-in-Chief. At that time, environmental chemistry was an emerging field, aiming at a complete description of the Earth's environment, encompassing the physical, chemical, biological, and geological transformations of chemical substances occurring on a local as well as a global scale. Environmental chemistry was intended to provide an account of the impact of man's activities on the natural environment by describing observed changes.

While a considerable amount of knowledge has been accumulated over the last three decades, as reflected in the more than 70 volumes of *The Handbook of Environmental Chemistry*, there are still many scientific and policy challenges ahead due to the complexity and interdisciplinary nature of the field. The series will therefore continue to provide compilations of current knowledge. Contributions are written by leading experts with practical experience in their fields. *The Handbook of Environmental Chemistry* grows with the increases in our scientific understanding, and provides a valuable source not only for scientists but also for environmental managers and decision-makers. Today, the series covers a broad range of environmental topics from a chemical perspective, including methodological advances in environmental analytical chemistry.

In recent years, there has been a growing tendency to include subject matter of societal relevance in the broad view of environmental chemistry. Topics include life cycle analysis, environmental management, sustainable development, and socio-economic, legal and even political problems, among others. While these topics are of great importance for the development and acceptance of *The Handbook of Environmental Chemistry*, the publisher and Editors-in-Chief have decided to keep the handbook essentially a source of information on "hard sciences" with a particular emphasis on chemistry, but also covering biology, geology, hydrology and engineering as applied to environmental sciences.

The volumes of the series are written at an advanced level, addressing the needs of both researchers and graduate students, as well as of people outside the field of

“pure” chemistry, including those in industry, business, government, research establishments, and public interest groups. It would be very satisfying to see these volumes used as a basis for graduate courses in environmental chemistry. With its high standards of scientific quality and clarity, *The Handbook of Environmental Chemistry* provides a solid basis from which scientists can share their knowledge on the different aspects of environmental problems, presenting a wide spectrum of viewpoints and approaches.

The Handbook of Environmental Chemistry is available both in print and online via www.springerlink.com/content/110354/. Articles are published online as soon as they have been approved for publication. Authors, Volume Editors and Editors-in-Chief are rewarded by the broad acceptance of *The Handbook of Environmental Chemistry* by the scientific community, from whom suggestions for new topics to the Editors-in-Chief are always very welcome.

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Editors-in-Chief

Volume Preface

The emission of emerging contaminants as an environmental problem has raised increasing awareness and widespread consensus that this kind of contamination deserves special attention. Emerging contaminants are used in large quantities in everyday life, such as in human and veterinary pharmaceuticals, personal care products, surfactants, plasticizers, and various industrial additives. Thus, they can cause negative environmental effects even if they are not persistently produced, since their high transformation/removal rates are compensated by their continuous introduction into the environment.

Although emerging contaminants constitute a very trendy research topic, resulting in hundreds of studies and papers published every year, their potential ecological effects in the aquatic environment are still not well understood. This is especially so because of a lack of data regarding their effects resulting from long-term low-dose exposure. Such analysis of chronic toxicity on organisms is essential to obtain a realistic environmental risk assessment. This is especially the case for biologically active compounds such as pharmaceuticals, which are selected for their distinct molecular modes of action. Estimating their potential effects on ecosystems is not straightforward, and today, one key objective for environmental scientists is to establish causal links between their presence and the quality of ecological systems. Emerging contaminants today appear in complex mixtures that differ according to the prevalence of agriculture, industrial activities, or human conurbations, and potential effects depend, among others, on the dilution capacity of the receiving river.

Mediterranean rivers are among those most vulnerable to climate and global change, due to their natural water scarcity, which is often compounded by other stressors such as dams (which prevent the biological migration across river networks), water withdrawal that reduces dilution capacity, and the occurrence of invasive species. Intermittency and low flows associated to water scarcity affect biogeochemical processes and reduce the ability to attenuate organic contaminants by river biota.

This book aims to fill some of the current knowledge gaps, by summarizing the main findings of project Consolider SCARCE. More specifically, it seeks to summarize information on the presence of emerging organic contaminants and their links with chemical and ecological quality of Mediterranean rivers. The book provides an in-depth view of the occurrence of emerging contaminants and their effects under multiple stress conditions. The observations collected in the book are applicable also to other parts of the world with Mediterranean climate (Australia, California, etc.) and to other regions where water scarcity is an issue.

We hope that the book will be of interest and useful for a broad audience of researchers, including environmental chemists, ecologists, environmental engineers and ecotoxicologists, together with other professionals responsible for water management, and decision-makers. The book is also aimed for anyone with interest in the environment who wants to gain new insights and reach new perspectives in the field.

Finally, we would like to thank all contributing authors for their effort in preparing this comprehensive compilation of research papers. Special thanks are due to the editorial staff of Springer and especially to Andrea Schlitzberger, who helped us during the process.

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Occurrence and Effects Under Multiple Stress
Conditions

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