

# Volume Preface

Freshwater systems in Europe are threatened by a variety of stressors (chemical pollution, geomorphological alterations, changes in land uses, climate variability and change, water abstraction, invasive species, and pathogens). Chemical aquatic pollution today comprises a wide range of emerging chemical substances, such as pharmaceuticals, personal care products, or pesticides, among others. Stressors are of diverse nature but cause adverse effects on biological communities and ecosystems. It is well known that the relationship between multiple stressors might determine changes in the chemical and ecological status, which are the key objectives of the European Union Water Framework Directive (WFD). This important piece of legislation has pushed the EU River Basin Authorities to carry out advanced monitoring programs in collaboration with universities and research centers.

These two volumes of *The Handbook of Environmental Chemistry* we introduce here (Volume I: *Experiences from Surface Water Quality Monitoring: The EU Water Framework Directive Implementation in the Catalan River Basin District (Part I)* and Volume II: *Experiences from Ground, Coastal and Transitional Water Quality Monitoring: The EU Water Framework Directive Implementation in the Catalan River Basin District (Part II)*) correspond to an excellent collaborative example between the River Basin Authority from the Catalan River Basin District (NE Spain), the so-called Catalan Water Agency (ACA), with the Catalan Universities and Research Centers. These books cover the main research outcomes achieved during the last 10 years following WFD implementation. It contains a total of 26 chapters and over 75 authors who explain how, from the interaction between the ACA and several academic centers, the different quality elements included in the WFD have been adapted to Mediterranean aquatic ecosystems. We want to remark the importance of this interaction between the members of the ACA and the members of academia or experts in a collaborative effort that probably is unique in the WFD implementation in Europe.

Why ACA has developed such collaborative effort? First of all because for most of the biological elements, no or few experience in how to use such elements

existed in Spain Water authorities. ACA had more experience in the analysis of chemical parameters, i.e., priority substances. Second, the methods to be used by WFD guidelines should be inter-calibrated; therefore ACA was aware that a set of methodologies with a robust scientific background was needed, so their results could be compared to other European countries. Third, most of the streams in Catalonia are in a Mediterranean climate area, and for this reason, taxa present in aquatic ecosystems and their environmental constraints are different from those of more temperate ecosystems from Europe. Scientifically robust methodologies should be adopted by ACA to explain why our aquatic ecosystems are different and how these differences affect the way in which the water quality is measured.

The ACA has easily found the way to build up from the scientific knowledge the tools needed by the administration to measure the status of the water. Catalonia has a long tradition on water quality studies which is grounded in the shoulders of several Masters and Commanders of Science. We think that at least two of them should be quoted: the former professors of the University of Barcelona Ramón Margalef and Enric Casassas. Margalef was a well-known ecologist and the first professor of Ecology in Spain, and Cassassas was the introducer of modern analytical techniques in Spain. In a postwar situation, after Spanish civil war (1936–1939) and the second world war (1939–1945), scientific research in Spain was very poor and many times under scientifically unreliable people. The late professors Ramon and Enric were extremely clever and open-minded people, and despite many obstacles, they found a way to put the roots of what now is one of the best schools of aquatic studies in Europe. Both were excellent professors and researchers and generous people with new ideas and solutions. Certainly they were an example of scientists with a global vision but with a local action, with a real compromise with their homeland, Catalonia. This school has produced an array of young scientists (not so young anymore) that have studied in-depth many aspects of ecology or chemistry in freshwater systems with a deep vision on the Mediterranean water bodies. At the same time, most of these students formed many other students and these to other, so the first grand-grand-children are at this moment at the front line of water quality research studies. Other masters exist also in Catalonia in hydrogeology, microbiology, or fish ecology, that several of the authors of this book have taken advantage.

Thanks to the effort of Margalef, Cassassas, and others and his students; when ACA started to think what to do for the implementation of the WFD, most of the fundamentals for such work were there. But in many cases the scientific research is not applied for the administration because the two worlds are hardly in contact. The merit to understand that such relationship is necessary should be given to some of the directors of the ACA and some of the ministers of the environment of the regional government of Catalonia who recognized the importance of such collaboration. It was of help too that some of the disciples who did their Ph.D. with students of the two masters already mentioned took a position in ACA. These people are now coeditors, with Prof. Prat, of these two books: Antoni Munné and Antoni Ginebreda. Both are Ph.D. from Catalan universities and understand that without the collaboration of scientist and managers, it is almost impossible to produce

enough robust tools to be compared with other well-known tools developed elsewhere. We, the scientists, should be very aware of the role of these two people because without their effort these two books could never be produced.

We hope that this book will be of much interest for many international readers too. We think that it will be a useful guide for other European river basins, as well as in other parts of the world, as a good example of the added value of collaborative research on aquatic sciences. Indeed the books contain a comprehensive list of monitoring programs of importance for WFD implementation to the Mediterranean climate aquatic ecosystems. The literature references of the different chapters contain great amount of work produced by these numerous groups of academics and managers working and publishing together in the most relevant journals of ecology, fishes, microbiology, analytical chemistry, etc. We thank all of them for their time spent writing all the different chapters and making these books unique in this series.

We, as the most senior authors and former students of Margalef and Cassasas, are very proud of this work. We thank very much the ACA and the government of Catalonia for continuously supporting such work. We encourage as well, even under the present economic difficulties, to maintain such effort. It is obvious that new methodologies and tools will need to be incorporated to monitor programs in the future. We believe that the best way to do it is by establishing bridges of collaboration between scientist and managers.

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