Preface

We, the three authors, have experience working as engineers in the private sector, but we all now work in the academic field. We feel very fortunate about the range of learning opportunities we have in our roles as professors. We are able to continue our own learning through our daily activities: by teaching and having direct interactions with students in the classroom; by supervising research students and participating in MSc and PhD examinations; by serving on the scientific committees for conferences and serving as peer-reviewers or editors for academic journals; by preparing research proposals, working on projects with colleagues, attending and presenting our work at national and international symposiums, conferences and congresses, and by submitting our own manuscripts for publication and receiving feedback from other peer reviewers.

We feel very indebted about this continuous learning opportunities available to us, and we strongly believe that knowledge needs to be shared in a way that is open and accessible to all. The knowledge we learn needs to be freely and openly passed on, so that others may build upon it, further develop on these concepts and ideas, and disseminate them to future generations of students and practitioners. In our experience, we have seen several cases of excellent water quality studies of natural systems and engineered treatment plants that involved a lot of hard work to obtain high-quality monitoring data, but unfortunately fell short in terms of the way the data were presented and analysed. In many cases, data were not presented in a way that was clear and transparent, the statistical methods used were limited or inappropriate, or the monitoring results were not fully integrated with the authors' knowledge of the processes associated with the system being studied. This leads to a situation where the knowledge generated from these excellent studies is limited and not very generalizable. Throughout all these years, we have been able to identify the major difficulties encountered by researchers and practitioners when processing and reporting their data and results. We realized some important gaps in the way that

we teach the analysis of data from water quality and treatment plants that needed to be filled in order to teach others how to allow the findings to become useful (i.e., making your findings generalizable so that they may be more useful to others who are working with similar systems in different environments).

This was our motivation for writing this book. We aim to guide you through the conceptualization of your research, the design of your experiment, the presentation of your experimental data, the use of basic descriptive statistics, as well as more advanced statistical analyses to interpret your data and integrate it with your knowledge of the processes and the governing principles of the system you are studying. Our subject matter is the analysis of monitoring data from water and wastewater treatment plants and water bodies. We believe that our book encompasses the following elements:

- A problem-oriented approach, working from practice to theory, in a clear and didactic way
- Innovative approach of combining process knowledge with statistical analysis
- Major concepts supported by fully worked-out examples and Excel spreadsheets
- Completely open-access material

We have the following target readership in mind and possible uses of the book:

- **Research students, postdoctoral scientists and professors** may find the book useful if they are assessing water quality or the performance of treatment systems or treatment technologies and they want to extract the most out of their data, to make findings that are both insightful and of broader interest.
- **Environmental engineers, water and wastewater sector practitioners, and environmental (water quality) policy makers** who use this book will develop a better understanding about how to set and ensure compliance with water quality norms, guidelines and regulations through the use of statistical inference.
- **Master's students, PhD students and upper-division undergraduate students** may utilize this book as support material for a course they are taking as part of an engineering degree program or another program that emphasizes the use of applied sciences to assess water quality.

We hope you enjoy the book!

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