

Preface

The idea for this book emerged in 2007 at the annual meeting of the Ecological Society of Germany, Austria and Switzerland. When the European Ecological Federation met in Leipzig, in the following year, we had drafted a concept that was well received by various colleagues, and which also caught the interest of the publisher.

For many years we have been working in different fields of ecological modelling with the purpose of solving ecological questions, broadening existing approaches and exploring new advances in the modelling of plants, animals, communities, landscapes, terrestrial and aquatic environments and the application of simulation models. In the light of this background and encouraged by discussions with our colleagues, we agreed that a textbook was needed to provide a broad overview in the field of ecological modelling to our students. Thus, we wanted to compile a broad scope of different perspectives and practices in ecological modelling: an introduction to the diversity of model approaches, model development and model evaluation.

Such a compendium and orientation is vital, in particular for young scientists who are less experienced with the various levels of complexity in ecological research and who are looking for the right model type to help solve a specific scientific question. We believe that the era of one-trick ponies in ecological modelling will soon be phased out. No user should be limited to an inappropriate tool, spending endless time and energy “adapting” and working around inherent limitations before being able to apply a model – there are many alternative pathways. Therefore, the focus of this book is to highlight the diversity of different views, methods and approaches. Being able to choose from a multitude of approaches allows a much better understanding of diversity and variability within natural systems. Studying ecology means an attempt at understanding the complex dynamics of natural processes and we must be aimed at capturing these with a maximum of clarity and conceptual ease. This can only be achieved by considering the available options. International experts and competent colleagues have been invited to communicate the key areas of their expertise in a clear and straightforward way, emphasizing the merits and limitations of individual methods along case studies.

Favouring a theory-guided, application-oriented perspective, we reduced the extent of mathematical formalisms. This does not mean that the book is free of mathematical expressions, but it is written in a comprehensive and encompassing style providing easy access to the central ideas and concepts. The entire textbook can serve as a curriculum for studying ecological modelling, but it is equally suitable for reading only single chapters that cover your focal interest. Since the rule “everyone to his/her own taste!” is also true for modellers, we do not advocate any specific model or software programme: please feel free to develop your own applications and codes, and provide them to your colleagues when possible, as this will aid in advancing the repertoire of options.

Finally, we very much enjoyed the inspiring teamwork that made this book possible. Many individuals have helped us during the last years by providing feedback, ideas, and in particular, revisions of parts of this book. Especially, we would like to thank Kathryn L. Berry for her invaluable help with all aspects of text handling. Sincere thanks are expressed to Stefanie Wolf, editor at Springer, who pleasantly and professionally guided us through the project ... and to the entire Springer team.

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