

Tijs Neutens · Philippe De Maeyer
Editors

Developments in 3D
Geo-Information Sciences

 Springer



Editors

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Preface

Realistically representing our three-dimensional world has been the subject of many (philosophical) discussions since ancient times. While the recognition of the globular shape of the Earth goes back to Pythagoras' statements of the sixth century B.C., the two-dimensional, circular depiction of the Earth's surface has remained prevailing and also dominated the art of painting until the late Middle Ages. Given the immature technological means, objects on the Earth's surface were often represented in academic and technical disciplines by two-dimensional cross-sections oriented along combinations of three mutually perpendicular directions. As soon as computer science evolved, scientists have steadily been improving the three-dimensional representation of the Earth and developed techniques to analyze the many natural processes and phenomena taking part on its surface. Both computer aided design (CAD) and geographical information systems (GIS) have been developed in parallel during the last three decades. While the former concentrates more on the detailed design of geometric models of object shapes, the latter emphasizes the topological relationships between geographical objects and analysis of spatial patterns. Nonetheless, this distinction has become increasingly blurred and both approaches have been integrated into commercial software packages.

In recent years, an active line of inquiry has emerged along the junctures of CAD and GIS, viz. 3D geoinformation science. Studies along this line have recently made significant inroads in terms of 3D modeling and data acquisition. Complex geometries and associated topological models have been devised to approximate three-dimensional reality including voxels, polyhedrons, constructive solid geometry (CSG), boundary representation (B-rep) and tetrahedral networks. As input for these models, new technologies to collect three-dimensional data have become fully operational such as mobile mapping and 3D laserscanning. However, in light of these advances, up until now there is still a pressing need for robust 3D analysis and simulation tools that can be applied effectively in a wide range of fields such as urban planning, archaeology, landscape architecture, cartography, risk management etc.

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In response to the lingering demand for 3D analysis and simulation tools, a workshop on 3D geoinformation was held in Ghent, Belgium on November 4-5, 2009. Following the successful series of past workshops, the Fourth International Workshop on 3D Geoinformation offers an international forum to promote high-quality research, discuss the latest developments and stimulate the dialogue between academics and practitioners with respect to 3D geoinformation, acquisition, modeling, analysis, management, visualization and technology.

This book contains a selection of full-papers that were presented at the workshop. The selection was based on extensive peer-review by members of the Program Committee. Only the most significant and timely contributions are included in this book. Selected contributors were asked to submit a revised version of their paper based on the reviewers' comments. All other papers and extended abstracts that were selected for oral or poster presentation at the workshop are published in a separate proceedings book.

The editors of this book would like to thank the many people who helped making this year's 3D GeoInfo workshop a success. We owe special thanks to Marijke De Ryck, Dominique Godfroid and Helga Vermeulen for their great help in organizing the conference, and Bart De Wit and Lander Bral for their excellent technological support. Thanks also go to Sisi Zlatanova for sharing experiences and advice on various aspects regarding the workshop, Agata Oelschlaeger for guiding us through the publication process and our sponsors for financial support. Finally, we would like to thank the members of the Program Committee for carefully reviewing the full papers and all those who submitted their work and participated in 3D GeoInfo 2009.

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