

Preface

The shape, extent, and location of spatial objects and environmental phenomena as well as the spatial distribution of physical and environmental characteristics are increasingly being described using three-dimensional (3D) geospatial representations today. In general, 3D modeling does not only affect the dimensionality of the spatial representation but also introduces the thematic structuring and decomposition of objects and phenomena along an additional – often the vertical – axis, leading to models that are typically much higher structured than 2D models. However, building modeling, urban and landscape modeling, modeling of the lithosphere and topography of the Earth, and Earth system modeling all have different requirements on the specific spatial representation and have brought forward a multitude of different 3D modeling frameworks and paradigms.

With the additional consideration of temporal aspects another representational dimension is reflected, often being referred to as 4D modeling. One of the most active research fields has been recently the integration of spatial and spatio-temporal aspects together with thematic information from diverse application domains. Semantic 3D modeling addresses the thematic attribution and thematic interrelationships according to multiple domains. Representing the 3D/4D spatio-temporal properties along with the thematic aspects of the different domains is sometimes also called n -dimensional (nD) modeling. The complex structuring of geospatial information according both to spatial representations and semantic representations raises issues of spatio-semantic coherence that the scientific community has started to investigate only recently.

Three-dimensional, four-dimensional, and n -dimensional models require efficient methods for the storage, retrieval, analysis, and visualization. Furthermore, standards are required that ensure the lossless exchange of information between the distributed components of spatial data infrastructures. New application domains require the development of new concepts for the representation of 3D space and three-dimensional spatial properties of real world entities and phenomena.

In order to present the current state of the art in 3D geoinformation science and to further discuss these research topics the International Conference on 3D GeoInformation 2010 was held in Berlin, Germany. It is the successor of the four workshops on 3D GeoInformation that were carried out in the years 2009

(Ghent, Belgium), 2008 (Seoul, South Korea), 2007 (Delft, The Netherlands), and 2006 (Kuala Lumpur, Malaysia). The 3D GeoInfo 2010 conference was conducted under the auspices of Working Group IV/8 of the International Society for Photogrammetry and Remote Sensing (ISPRS), the Open Geospatial Consortium (OGC), European Spatial Data Research (EuroSDR), the German Society for Photogrammetry, Remote Sensing, and Geoinformation (DGPF), and Berlin University of Technology. With more than 150 participants the 3D GeoInfo Conference 2010 offered an extensive interdisciplinary forum for international researchers from academia, industry, and government in the field of 3D geoinformation. In two keynote talks given by Maik Thomas from the GeoForschungsZentrum Potsdam (GFZ) and Ron Lake from Galdos Inc., 30 oral and 19 poster presentations, and an industry exhibition many different aspects of 3D geoinformation science were addressed and discussed.

This book contains selected papers of highest quality that were presented at the conference. They have gone through a rigorous double-blind review process and were examined by three members of the program committee each. Afterwards the papers have been edited by the authors again in order to reflect the comments and suggestions of the reviewers. All other conference papers and extended abstracts that were accepted for oral and poster presentation are provided in a separate proceedings volume published by ISPRS within their International Archives of Photogrammetry and Remote Sensing (IAPRS), Vol. XXXVIII-4, Part W/15.

Such a big event could not be realised without the help of many people. We thank the organising committee chaired by Bernd Stary (in alphabetical order): Thomas Becker, Andreas Fuls, Javier Herreruella, Robert Kaden, Andreas Krüger, Rosemarie Kunkel, Hartmut Lehmann, Alexandra Lorenz, Sven Weisbrich. We owe special gratitude to Herbert Krauß from DGPF for taking care of the financial transactions and accounting. We would also like to thank Sisi Zlatanova for her advice and help in setting up the conference. We appreciate very much the support of Mrs. Agata Oelschläger from Springer Verlag in the planning and preparation of this book.

We further thank the scientific organisations ISPRS, EuroSDR, DGPF, and the international standardisation body OGC for taking over patronage of this event. Thanks go also to the program committee and the additional reviewers. We express our gratitude to the sponsors whose contributions helped us much in keeping the registration fees at a reasonable height. Last but not least we thank the invited speakers and all colleagues who have submitted papers about their research and especially those who finally joined the conference and presented their work in either oral or poster presentations.

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