

# Modelling Geographical Systems

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# Modelling Geographical Systems

Statistical and Computational Applications

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## TABLE OF CONTENTS

Preface	ix–x
1. Introduction <i>Barry Boots, Atsuyuki Okabe and Richard Thomas</i>	1–8
<b>Part I: Statistical Models of Spatial Systems</b>	
SECTION A: SPATIAL STATISTICS	
2. Geographic Patterns of Urban Residential Development <i>Jay Lee</i>	13–31
3. Using Local Statistics for Boundary Characterization <i>Barry Boots</i>	33–44
4. Local Spatial Interaction Modelling based on the Geographically Weighted Regression Approach <i>Tomoki Nakaya</i>	45–69
SECTION B: SPACE-TIME ANALYSIS	
5. Understanding Activity Scheduling and Rescheduling Behaviour: Theory and Numerical Illustration <i>Chang-Hyeon Joh, Theo A. Arentze and Harry J.P. Timmermans</i>	73–95
6. Geographical Model of a Self-Organizing Megalopolis with Time-Space Convergence <i>Isao Mizuno</i>	97–117
7. Epidemic Modelling of HIV/AIDS Transfers between Eastern and Western Europe <i>Phillip Smith and Richard Thomas</i>	119–138

**Part II:  
Computational Methods**

SECTION A: SIMULATION MODELS

8. A Spatial Microsimulation Model for Social Policy Evaluation 143–168  
*Dimitris Ballas, Graham P. Clarke and Ian Turton*
9. Analysis of the Effect of Land Use Patterns on the Anthropogenic Energy Discharged from Air Conditioning and Hot Water Supply Using a Modified CSU Mesoscale Model 169–180  
*Teruhisa Watanabe, Atsuyuki Okabe, Takeki Izumi and Yukio Sadahiro*
10. Generalized Thünen and Thünen-Ricardo Models for Asian Land Use 181–199  
*Kazuyuki Konagaya*

SECTION B: GIS MODELS

11. Balancing Consensus and Conflict with a GIS-Based Multi-Participant, Multi-Criteria Decision Support Tool 203–233  
*Robert D. Feick and G. Brent Hall*
12. Grid-Based Population Distribution Estimates from Historical Japanese Topographical Maps Using GIS 235–249  
*Yoshio Arai and Shiro Koike*
13. GIS Modelling for Rain-Induced Debris-Flow Hazards in a Small Watershed 251–271  
*Shipeng Zhao and Toshikazu Tamura*

SECTION C: THE INTERNET

14. A Geographical Interpretation of Cyberspace: Preliminary Analysis on the Scaling Tendency of Information Spaces 275–293  
*Narushige Shiode*
15. On Modelling Internet Transactions as a Time-Dependent Random Walk: An Application of the Retail Aggregate Space-Time Trip (RASTT) Model 295–316  
*Robert G.V. Baker*

16. Development of Disaster Information Network System in the Asian Region: Internet GIS for Disaster Information Management	317–330
<i>Yujiro Ogawa, Hirotaka Suzuki, Bambang Rudyanto, Kiichi Hirono, Shigeya Yoshikawa and Masami Sugiura</i>	
17. Geographical Conceptualization of Cyberplaces	331–345
<i>Masanao Takeyama</i>	
Contributors	347–351
Index	353–356

## PREFACE

Within the realm of quantitative geography, systems modelling is specifically concerned with understanding those relationships that influence the attributes of phenomena located in space and time. The intention is to replicate the main processes influencing a system's behaviour and, thereby, assist its management through a capability to estimate future change. Over the last few decades, one of the major institutional initiatives for promoting such research has been provided by specialised Study Groups and Commissions established by the International Geographical Union (IGU). These scholarly networks have aimed to co-ordinate international research agendas for geographical systems modelling and their activities have been recorded in both edited volumes (Fischer and Getis, 1997) and special issues of learned journals (Wilkinson and Boots, 2000; Leung and Okabe, 2001). Presently, this facilitative task is the charge of the Commission on Modelling Geographical Systems (CMGS) appointed at the IGU Hague Congress in 1996 and chaired by Barry Boots (1996–2000) and Richard Thomas (2000–present).

Set against this background, this book provides a perspective on the work of the CMGS from 1996 until the IGU Seoul Congress in August 2000 through a collection of papers first presented to our sessions at this event. Moreover, a number of Japanese delegates were attracted to this Asian venue and their contributions provide many new ideas concerning the implementation of systems analysis. The selection of the complete set of materials, however, was guided by our intention of bringing together some of the main innovative ideas currently shaping both the development and testing of geographical systems models. To reflect this state of flux, the book is organised in two parts. The first is focussed on the more long-standing mathematical and statistical approaches to the analysis of geographical systems, while the second concentrates on the more recent opportunities offered by advances in geocomputation and the development of relatively new information technologies like the Internet.

In addition to this methodological stance, we were also conscious of the need to demonstrate the applicability of systems modelling to the wider geographical community. Reflecting current concerns for relevance, each paper has an applied component relating to one or more contemporary issues. Accordingly, the topics addressed by the contributors span both human and physical geography and many tackle key environmental concerns. Themes underscoring this variety of application include the design of warning systems for anticipating physical hazards (earthquakes, floods and new agents of infectious disease) and a contrasting emphasis on the analysis of urban systems (the management



of sprawl and energy consumption, the timing of shopping behaviour, and the local impact of socio-economic policy initiatives). More subtly, the geography of information technology is itself becoming increasingly scrutinised by systems analysts. As with many other phenomena of interest, computing facilities are also distributed unevenly in space and time which is creating fresh issues related to accessibility that are explored in the second part of the book.

Like most edited volumes, this book provides an overview of recent research that is not necessarily directed at beginning students. Instead, the intended readership is researchers, postgraduates, final-year undergraduates and professionals in the areas of quantitative geography, spatial analysis and modelling, and geographical information sciences. Given this audience, the collection of papers will provide a useful supplementary text for courses on quantitative geography and geographical systems modelling in both human and physical geography, and GIS and geocomputation. This role is particularly relevant for the many master's degree courses in these subject areas that have proliferated around the world during the past decade.

Finally, we would like to acknowledge the efforts of the authors contributing to this volume both for keeping to our stringent editorial requirements and for their advice in the form of referee's reports. In this respect, we also thank John Beebe, Marie-Josée Fortin, Houston Saunderson and Eric Sheppard who acted as external reviewers on some of the papers. Invaluable assistance with the production of the electronic version of the manuscript was given by Tim Jenkins (Manchester) and Tomoko Kuroiwa (Tokyo). Further information relating to this book, including coloured versions of many of the figures, is available on [www.ua.t.u-tokyo.ac.jp/okabelab/atsu/mgs.html](http://www.ua.t.u-tokyo.ac.jp/okabelab/atsu/mgs.html).

January, 2002

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