



The Geographical Society of China Book Series 2008

# Recent Progress **of** Geography in China:

A Perspective in the 21<sup>st</sup> Century

Edited by  
Cai Yunlong



商務印書館  
The Commercial Press

**The Geographical Society of China Book Series 2008**

**Recent Progress of Geography in China:  
A Perspective in the 21<sup>st</sup> Century**

*Edited by*

**Cai Yunlong**

The Commercial Press

2008 • Beijing

**图书在版编目(CIP)数据**

中国地理科学新进展:21世纪展望:英文/蔡运龙主编. —北京:商务印书馆,2008

ISBN 978-7-100-05929-9

I. 中… II. 蔡… III. 地理学—研究—中国—英文 IV. K90

中国版本图书馆 CIP 数据核字(2008)第 108632 号

所有权利保留。

未经许可,不得以任何方式使用。

**Recent Progress of Geography in China:  
A Perspective in the 21<sup>st</sup> Century**

Edited by

Cai Yunlong

---

商务印书馆出版

(北京王府井大街36号 邮政编码 100710)

商务印书馆发行

北京瑞古冠中印刷厂印刷

ISBN 978-7-100-05929-9

---

2008年8月第1版

开本 787×1092 1/16

2008年8月北京第1次印刷

印张 20%

定价: 52.00 元

Supported by

---

Project 2007FY140800, Innovation Method Program,  
The Ministry of Science and Technology of PR China

Program of Research and Publishing on Discipline De-  
velopment, The Chinese Association of Science and  
Technology

All authors of this book shoulder other burdensome tasks in research and teaching. Their time and energy able to be used in this book must be limited. Although everybody has tried to do the best of them, shortcomings and mistakes may not avoided. Moreover, geography is being rapidly developed in China. So this kind of works should be continuously carried on.

On behalf of Geographical Society of China, I appreciate in heart all people who contribute for the writing, compiling and publishing of this book.

Lu Dadao

Academician of Chinese Academy of Sciences

President of Geographical Society of China

June 26, 2008

# Foreword

---

For the development of a discipline, its future can be correctly prospected only if its present is appropriately assessed, and its present can be appropriately assessed only if its past is reasonably respected. Therefore it is absolutely necessary to research the disciplinary progress. In international academic communication, the community of Chinese geographers has deeply received the efforts of abroad geographers. In the quadrennial International Geographical Congress, for instance, geographers in many countries usually present splendid publications on the development of geography in their country. Among them *Rediscovering Geography: New Relevance for Science and Society* is an excellent example. We can see from them the development and innovation of geography, the succession to the tradition and its important roles in practice. Chinese geographers always address to research systematically and continuously on the history, present condition and future trend of their discipline and exchange with international community of geography. Several books were published by Science Press, Beijing, including *Geography in China* (1984), *Recent Development of Geographical Science in China* (1990) and *Progress in Geographical Research* (1990). However, we have to recognize that the effort is not enough because the support is not enough.

In recent years, the highest decision-makers of China strongly emphasize to promote the innovation of disciplines, academic views and research methods. The central government established The National Planning Program of Science and Technology Development in the Middle and Long Term (2006 ~ 2020). Accordingly, The Ministry of Science and Technology of the People's Republic of China starts-up The Innovation Method Program, and The Chinese Association of Science and Technology set-up Program of Research and Publishing on Discipline Development. Geographical Society of China fortunately receives the support of those Programs and catches the opportunity to fulfill the long-cherished wish. A group of geographers standing at the research and teaching front broadly and deeply investigate recent progress in various fields of geography. They struggle to review and evaluate the new progresses, new achievements, new insights, new points of view, new theories, new methods and new technologies of geography in China; and analyze the status quo, dynamic path and future trend of the discipline. At the same time, they try to compare with international geographical community, identify the national needs for geography, and prospect the future trends of academy and direction of research. Then they put forward the objects, perspectives, questions and suggestions of geography development. All the research fruits are presented in this book. Geographers all over China gave their comments and suggestions which have been sufficiently accepted.

This book includes one comprehensive perspective and many special topics. The division of the special topics involves the understanding on the sub-disciplines structure of geography, and therefore has opinions differ from each other. The division of this book tries to focus on the important progresses and as well cover the whole developments of geography in China, although inevitably reflects the attitudes of author themselves.

# Contributing Authors

---

**Cai Yunlong** is a professor in the Department of Resources, Environment and Geography, Peking University. His research and teaching interests include integrated physical geography, land use, agriculture geography, natural resources and graphical thought and methodology.

**Chai Yanwei** is a professor of human geography in the College of Urban and Environmental Sciences, the Centre for Geographical Research, Peking University. His research and teaching interests lie in the area of urban structure, urban social geography and behavioral research.

**Ding Mingjun** is a doctoral candidate of physical geography in the Department of land use/cover change and land resources, Institute of Geographic Sciences and Natural Resources Research, Chinese Academy of Sciences. He has research interests in LUCC, vegetation-climate relationships, vegetation degradation.

**Duan Xiaofeng** is a doctoral candidate of physical geography in the Department of Resources, Environment and Geography, Peking University.

**Li Shuangcheng** is an associate professor in the Department of Re-



sources, Environment and Geography. He has research and teaching interests in integrated physical geography and ecological modeling.

**Liu Weidong** is a professor of Economic Geography in the Institute of Geographical Sciences and Natural Resources Research, Chinese Academy of Sciences. Areas of interest include economic globalization and its impacts on local development, spatial impacts of new information and communication technologies, and regional development and disparities in China.

**Qi Qingwen** is a professor in the Institute of Geographical Sciences and Natural Resource Resources, Chinese Academy of Sciences. Major in theoretical, methodological and technological researches geo-information science, specifically in 3S integration, map generalization, Geo-info TUPU and application of GIS & RS.

**Sui Wenjuan** is a graduate student in the Key Laboratory of Geographic Information Science, Ministry of Education at East China Normal University. She has research interests in regional development and management decision support systems.

**Wang Jun** is a graduate student of physical geography in the Department of Resources, Environment and Geography, Peking University.

**Wang Xiuhong** is associate professor in the Institute of Geographic Sciences and Natural Resources Research, Chinese Academy of Sciences. He has research interests in land resource evaluation, land degradation and rational land use.

**Wang Zheng** is a professor in the Institute of Policy and Management, Chinese Academy of Sciences. He has research and teaching inter-

ests in theoretical geography, geo-computation, regional science and policy modeling.

**Weng Guilan** is a Ph. D. candidate in the Department of Geography, University of Washington, USA. Her research interest lies in urbanization, migration and residential mobility.

**Wu Jing** is a research assistant in the Institute of Policy and Management Science, Chinese Academy of Sciences. She has research interests in geo-computation, including fields of agent-based simulation, policy modeling of climate protection.

**Wu Liping** is a PhD candidate in the School of Geography at Beijing Normal University. Her major is socio-cultural geography.

**Xu Jianhua** is a professor in the Key Laboratory of Geographical Information Science, Ministry of Education at East China Normal University. He has research and teaching interests in quantitative geography and geo-computation.

**Xu Xuegong** is a professor in the Department of Resources, Environment and Geography, Peking University. She has research and teaching interests in integrated physical geography and environmental management.

**Yan Lei** is a doctoral candidate of physical geography in the Department of Resources, Environment and Geography, Peking University

**Yang Xuchao** is a PhD graduate student of physical geography in the Institute of Geographic Sciences and Natural Resources Research, Chinese Academy of Sciences. His research field focuses on LUCC and its

climatic effects.

**Yue Qun** is an associate professor in the School of Resources and Environmental Science, East China Normal University. He has research and teaching interests in climate change and modeling, urban air environment and complexity data mining.

**Zhang Yan** is graduate student of human geography in the College of Urban and Environmental Sciences, the Centre for Geographical Research, Peking University, China. Her research interests include urban social and behavioral geography.

**Zhang Yili** is Professor of biogeography and physical geography in the Institute of Geographic Sciences and Natural Resources Research, Chinese Academy of Sciences. He has pursued various research fields since 1980, including synthesis study of physical geography, land use and land cover change (LUCC), interaction of impacts of environment factor and land cover change, floristic geography, plant geography and bio-diversity.

**Zhou Shangyi** is a professor in the School of Geography, Beijing Normal University. She has research and teaching interests in socio-cultural geography and cultural industry.

**Zhu Huiyi** is associate professor in the Institute of Geographic Sciences and Natural Resources Research, Chinese Academy of Sciences. He has research interests in land use/cover change and its effects on economic development, grain production and environment.

# Contents

## Foreword

## Contributing Authors

<b>Chapter 1</b>	<b>Overview</b>	1
1.	<i>Major Achievements and Key Problems of Geography in China</i>	2
1.1	Breakthroughs in academic field	2
1.2	Contributions to national construction	4
1.3	Innovation in methodology and research means	5
1.4	Contributions to science and education	6
1.5	Contribution to the society	9
1.6	Problems of geography in China	10
2.	<i>Demands of Sustainable Development in China to Geography</i>	14
2.1	Demands of industrial optimization and promotion to geography	16
2.2	Demands of agriculture development to geography	16
2.3	Demands of High-tech industry development to geography	17
2.4	Demands of international trade to geography	18
2.5	Demands of urbanization to geography	18
2.6	Demands of population health to geography	19

2. 7 Demands of rational utilization of resources and social sustainability to geography .....	20
2. 8 Demands of energy structure optimization to geography .....	20
2. 9 Demands of environmental protection and improvement to geography .....	21
2. 10 Demands of national security to geography .....	21
3. <i>Strengthening Basic Scientific Research of Geography</i> .....	22
3. 1 Basic scientific issues .....	22
3. 2 Innovation of theoretical system .....	24
3. 3 Development of methodology .....	24
3. 4 Organization of large research projects .....	26
3. 5 Strengthening the collection of first-hand data .....	27
4. <i>Advancing Application of Geography</i> .....	27
4. 1 Current orientation of geography application .....	27
4. 2 Key themes of geography application .....	28
4. 3 Main application areas of geography in China .....	34
5. <i>Development Strategies of Geography in China</i> .....	36
5. 1 Strategies .....	36
5. 2 Objectives .....	38
5. 3 Supporting system for the development of geography in China .....	40
<i>References</i> .....	44
<b>Chapter 2 Physical Geography</b> .....	46
1. <i>Advances of Physical Geography in China</i> .....	46
1. 1 The development background of geography in China .....	47
1. 2 Recent progress of theory and methodology of physical geography in China .....	50

1. 3 Progress of applied physical geography .....	54
2. <i>Physical Geographical Researches Oriented Key Issues</i> .....	58
2. 1 Global change and regional response .....	58
2. 2 Land use/cover change and its effects .....	62
2. 3 Ecological constructions and evaluations .....	65
2. 4 Integrated research on natural disasters .....	68
3. <i>Contributions to Important Projects and Policy Making</i> .....	72
3. 1 Contributions to key engineering projects .....	72
3. 2 Contributions to policy making for sustainable development .....	76
4. <i>Prospects of Physical Geography in China</i> .....	81
4. 1 Development trends .....	81
4. 2 Research frontiers .....	84
<i>References</i> .....	88
<b>Chapter 3 Economic Geography</b> .....	92
1. <i>Introduction</i> .....	92
2. <i>Factors Affecting the Development of Economic Geography         in China</i> .....	94
2. 1 Foreign influences .....	94
2. 2 Political factors .....	96
2. 3 Factor of economic development stage .....	96
2. 4 Institutional reform and changes .....	97
2. 5 Cultural traditions .....	97
3. <i>Development of Economic Geography in China during 1949-2000</i> .....	98
3. 1 Pre-reform development .....	98
3. 2 Development in transition in the 1980s and 1990s .....	103

4. <i>Recent Progress in Economic Geography in China Since 2000</i>	110
4.1 General features of recent development	110
4.2 Major progresses	113
4.3 Practice-based research and government-designated tasks	122
4.4 Major contributions to policy-making	132
5. <i>Summary</i>	141
<i>References</i>	142
<b>Chapter 4     Urban, Cultural, Tourist and Historical Geographies</b>	148
1. <i>Introduction</i>	148
2. <i>Urban Geography Research in the Context of Globalization and Socio-Economic Transition</i>	150
2.1 More diversified and in-depth researches on urbanization	152
2.2 Increasing researches on urban transition and spatial restructuring	164
2.3 High degree of concern on urban social problems	171
3. <i>Cultural Geography Research in the Globalization Trend and Cultural Turn</i>	172
3.1 Extensive researches on cultural landscape	174
3.2 Deeper researches on cultural realm or cultural region	175
3.3 Emergence of researches on cultural space	175
4. <i>Tourism Geography Research and Tertiary Industry Development</i>	177
4.1 Spatial features in tourism	178
4.2 Tourism planning and management	180

5. <i>Historical Geography Research on Human and Environment</i>	181
5.1 Modernization of research techniques	181
5.2 Study groups and research orientations	182
6. <i>Prospect</i>	185
6.1 Research trends	185
6.2 Suggestions	192
<i>References</i>	194
<b>Chapter 5   Geo-Information Science</b>	213
1. <i>Summary of Geo-Information Science Development</i>	213
1.1 Brief review of geo-information science development in the world	213
1.2 Brief review of geo-information science development in China	214
1.3 Recent progress of geo-information science in China	217
2. <i>Theory and Method Progress of Geo-Information Science         in China</i>	220
2.1 RS based geo-object dynamic monitoring	220
2.2 Geo-information TUPU	222
2.3 Spatial-temporal data models	226
2.4 Geo-spatial analysis modeling	230
2.5 Spatial information grid	233
2.6 Cartographical theories and methods	239
2.7 Map or GIS database generalization	243
2.8 Geo-visualization, simulation and virtual reality	251
2.9 Location-based service	256



3. <i>Application Progress of Geo-Information Science in China</i>	260
3.1 LUCC pattern and process computation and simulation	260
3.2 Urbanization and sustainable development	262
3.3 Observation, mechanistic analysis on terrestrial ecosystem	266
3.4 Study on global change	268
3.5 Application on the river delta	270
3.6 Application on marine environment and seashore region	272
3.7 Resource and environment database construction and sharing in China	273
3.8 National atlases of China	276
4. <i>Geo-Information Science's Contribution to the Society in China</i>	277
4.1 Typical application system for the key industries and trades	277
4.2 Promotion to China's spatial information industry development	278
5. <i>Prospect of Geo-Information Science in China</i>	280
5.1 Advances and shortages of China's information science in the world	280
5.2 Directions of China's information science	281
<i>References</i>	282
<b>Chapter 6 Quantitative Geography and Geo-Computation</b>	291
1. <i>Origin</i>	291
2. <i>Diversified Development Stage</i>	292