

Review of and prospects for China's human and economic geography

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Abstract: The “High-Level Forum of the Development of China's Human Geography Under the Background of Change” was held in Beijing on January 22-23, 2016. More than 30 professors attended this forum. At this conference, they discussed the major progress made towards developing China's human geography, as well as the existing problems, limiting factors, opportunities, international collaborations, emerging directions, and prospects in the development of this discipline. In recent years human geography has boomed, generating many important opportunities for its development. Establishing an academic community for joint research on major research issues and collaborative innovation is a promising and important route to take. We should embrace both domestic and international characteristics, to promote China's human geography onto the world stage. Meanwhile, the cultivation of various scholarly talents is also of great value to enrich and advance the discipline.

Keywords: human and economic geography; research review; prospects; High-Level Forum

1 Introduction

Since the reform and opening-up in the late 1970s, China's human geography has taken the way of “developing the discipline with tasks”, by aligning itself with the nation's needs and devoting power to the “main battlefield of national economy”; in so doing, it has made great achievements which have contributed to national socio-economic development (Lu, 2015a, 2009). In recent years, however, scientific progress also faces a new era of transformation (Gu, 2009). On the one hand, key realistic backgrounds, such as global environmental change, economic globalization, global geopolitical structure, and governance structure, have all undergone great changes. On the other hand, with the development of society and economy and the promotion of its scientific and technological strength, the international status of China has also experienced a strong shock. As the world's second largest economy, the world's largest trading country, and the world's largest foreign exchange reserve country,

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China now needs to establish a new global view and positively adapt to the “New Normal” to carry forward economic development. Furthermore, the discipline of human geography itself is also experiencing reforms in theory and methods. To comprehensively summarize the achievements recently made in human geography in China, and to solve the problems emerging from this development, we must look into future trends in our discipline and discuss the future direction of science.

According to the proposal put forward by Lu Dadao, Academician of the Chinese Academy of Sciences, the “High-Level Forum of the Development of China's Human Geography Under the Background of Change”, sponsored by the Geographical Society of China (GSC), was held in Beijing on January 22-23, 2016. This proposal generated positive responses by nationwide well-known scholars, as more than 30 well-known scholars attended this conference. They hailed from the Institute of Geographic Sciences and Natural Resources Research (Chinese Academy of Sciences [CAS]) and the Northeast Institute of Geography and Agroecology (CAS), Peking University, Tsinghua University, East China Normal University, Nanjing University, Sun Yat-sen University, South China Normal University, Northeast Normal University, Nanjing Normal University, Northwest University, Soochow University, Beijing Normal University, and GSC. Experts attending this conference participated in a wide and deep discussion of several aspects of human geography, such as discipline orientation, practical demands for serving the nation and regions, international development, opportunities and challenges, development prospects, countermeasures and suggestions, etc. The conference was characterized by a full program and heated debate. This present text, based on this forum activities, reviews the latest developments and progress in China's human geography. Besides the cited references given, main standpoints of this paper are all cited from the contents addressed by experts attending this conference.

2 Review of China's human geography in recent years

“Developing the discipline with tasks” goes through the whole developing process of China's human geography. China's human geography plays a significant role in the major plans and tasks for national socio-economic development. These include “National Territorial Planning”, “Main Functional Zone Planning”, “One Belt and One Road”, “Revitalization of Northeast China”, the “Development of Western China”, and the “Rise of Central China”, etc. (Lu, 2015c; Liu *et al.*, 2011; Fang *et al.*, 2011; Li *et al.*, 2014). The history of discipline development since China's reform and opening-up may be roughly divided into three phases: (1) *Renaissance phase*: In this phase, the key representative person is Li Xudan, who positively introduced classical Western regional schools and knowledge structures, especially by putting an emphasis on “cultivating outstanding talents and creating excellent books” to revive the development of China's human geography. (2) *Phase with special characteristics*: In this phase, the key representative person is Wu Chuanjun, who emphasized that we can do everything that is good for the development of China's human geography when we learn from Western countries. Furthermore, he put forward a regional system theory of the human-land relationship, developing human geography with Chinese characteristics by addressing the construction of the national economy. (3) *Phase of deepening development*: In this phase, the key representative person is Lu Dadao, who emphasized that human geography is a humanistic and pragmatic discipline, and that geographers should have national

feelings. On the basis of learning Western regional theory, he proposed a “point-axis system theory” for the first time, and proposed a T-typed spatial structure on the basis of his “point-axis system theory”, which still guides the macro-level thinking of China’s regional development patterns.

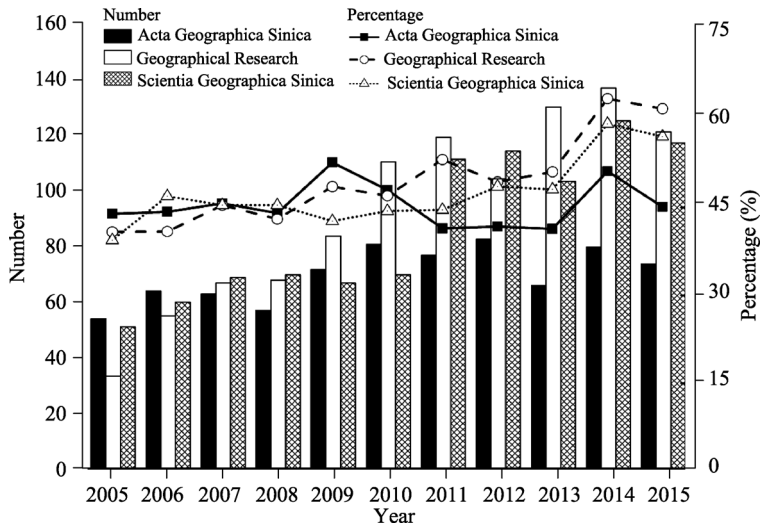


Figure 1 Publications of human geography in three major geographical journals, from 2005 to 2015

In recent years, the number of papers on China’s human geography has continued to increase. The proportion of those published in *Acta Geographica Sinica* has remained steady, at c. 45%, whereas those published in *Geographical Research* and *Scientia Geographica Sinica* have clearly increased, reaching to c. 60% (Figure 1). In general, since the reform and opening-up, China’s human geography has made splendid achievements in many aspects, namely the compilation and publication of academic papers, the policy consultation function for serving the national strategy, and the raising of science and research funds, and so on (Wu *et al.*, 1999), and by greater inclusion of sub-disciplines, namely those of culture geography, time geography, geopolitics, tourism geography, and urban geography (Zhou *et al.*, 2014; Chai *et al.*, 2009; Du *et al.*, 2015; Bao *et al.*, 2012; Xue *et al.*, 2014; Yu *et al.*, 2012).

Six geographical journals (*Acta Geographica Sinica*, *Scientia Geographica Sinica*, *Geographical Research*, *Progress in Geography*, *Economic Geography*, *Human Geography*) and five urban planning journals (*Urban Planning*, *Urban Planning Forum*, *Urban Problems*, *Urban Studies*, *Planners*)—the most representative journals—were chosen as the literature sources, with a time window dating back to 1980, which amounted to 23 342 retrieved articles in all. Next, a comprehensive analysis was made on the high-frequency keywords used in these publications, according to different time periods and the entire time window. Geography at each period paid attention to not only inherited ideas and topics, but also to novel further developments. High-frequency keywords consisted of climatic change, land use, sustainable development, urbanization, spatial pattern, geographic information system (GIS), spatial structure, regional development, geographical science, regional economy, economic development, and index system.

2.1 Study of economic geography under globalization

Under the background of global change and sustainable development, study objects addressed by contemporary geography are becoming more comprehensive and complicated (Song *et al.*, 2006). The development of geography also faces the situation of trying to cope with the significant realistic backgrounds and decision-making demands forced by global environmental change, economic globalization, global geopolitical structure, and governance structure (Lu, 2011). Global environmental change is mainly characterized by biodiversity losses, vegetation cover and its response to change. Economic globalization is mainly concerned with growth, scale, and hotspot regions, regional integration processes (e.g., “One Belt and One Road”), urban and regional development, as represented by new-type urbanization, and technology changes, as represented by Internet+. Together, these will influence the industrial economy, posing significant problems such as supply-side reform and transformation, mitigation of resource and environment pressure, optimization of land use, and so on, which provide the disciplinary study and its fertile development. Against this background, the study of economic geography study includes characteristics of topical humanization and scientific methodology: these topics are to positively cope with new problems arising from reform and development, ceaselessly developing toward the direction of humanization, socialization, and functionization. However, the method of study used consistently displays an attempt of scientization, by combining qualitative and quantitative analyses, which reveals the strong trend of technicalization in this field.

Compared with the paradigm-oriented discussion and theoretical construction tradition of Western economic geography, the study of Chinese economic geography is strongly flavored by its practice-oriented approach (Liu, 2014; He *et al.*, 2014). This pragmatism is justified by China's national situation and its developing mode of “developing the discipline with tasks”, which fosters a close relationship with system and policy characteristics as applied to the complicated problems that inevitably occur during periods of transformation and development. Additionally, the planning guidance, regional guidance and comprehensive guidance are the concentrated embodiment of China's economic geography as it participates in nationally important strategic decision-making. With the ongoing development of China's market economy, to further promote discipline construction while also sustaining the deepening of international communication, our thinking on the problems, scales, and methods of economic geography study will vary accordingly. Under the edifice of economic geography, as a whole, the important scientific problems it must address vis-à-vis the change of globalization should include the following: change and governance of global politics, economy, society and environment; influence of state systems; policy and governance structures; regional collaboration and trans-regional governance; novel factors, and the power of urban and regional development; mechanism of interactions among many interested communities over multiple spatio-temporal scales, as well as their spatial effects; economic geography analysis; and visualization methods in the era of big data.

2.2 Study on the decision-support of urbanization and economic growth

In March 2014, China issued its “New Urbanization Plan (2014–2020)”, which marked the great transformation of China's urbanization development, changing it from one that was urbanization oriented to an “urbanization of people”. However, the transformation of state

urbanization policy cannot be implemented without the long-term promotion by numerous scholars and their collective intelligence on the study and exploration of urbanization; in this respect, the series of consultation reports on urbanization, led by Lu Dadao, are symbolic achievements that played a key role in the transformation of urbanization policy.

Four consultation reports on urbanization brought substantial influences on the transformation of state urbanization policy. On August 30, 2013, the State Council of People's Republic of China held the urbanization achievement report meeting of CAS and the Chinese Academy of Engineering. At the meeting, Prof. Lu Dadao gave a speech called "Cognition and Suggestions on Taking the Urbanization Road Suitable for China's National Conditions", on behalf of the expert group for the urbanization project of CAS. By focusing thematically on series of consultations for urbanization, relatively systematic fundamental research was carried out for better understanding and predicting urbanization, and much progress has been made in the following areas: scientific thinking and the cognition of urbanization progress; expansion of basic theoretical methods, e.g., Northam Curve and Chenery Mode, and so on; developing characteristics and so-called rules of the world's urbanization; analysis on the developing process of China's urbanization and the identification of radical urbanization; strategy selection for promoting the new-type urbanization (namely, the "urbanization of people"); regional patterns and differing urbanization policies, and so on, which provide for consultation research that has a strong scientific basis (Lu *et al.*, 2015a).

In 2015, Lu Dadao completed a consultation report titled, "Analysis and Suggestions on the Supporting System of China's Economic Growth Rate". This was based on his systematic study and comprehensive discussion on the supporting system and trends of economic growth in China, performed for the first time; it entailed a deep analysis on the supply-side while also stressing the possibility and sustainable supply levels for the material basis of economic growth. In this report, Lu Dadao held that the predicted value of economic growth in China would be adjusted to a moderate growth rate with the implementation of the "13th Five-Year Plan" (2016–2020) (Lu, 2015b). Indeed, critical structural problems have been caused by the long-term, hyper economic growth that has unfolded in China. The developing mode in terms of high-speed economic growth and mass spatial expansion of urbanization has already shown itself to be unsustainable. China is thus stepping towards moderate economic growth, which should provide important opportunities and room for building economic power while achieving a harmonious society. These prospective conclusions provide China's policy-making with a decision-making basis.

2.3 Study of the development route map in the science and technology field of China's 2050 regional development

The study of economic geography of regional development in China insists upon working to meet the demands of a nationally important strategy, by following the development road of "precisely raising the key scientific argument from the realistic demands, realizing science and technology innovation, and promoting the building of science in problem-solving". Regional development research mainly focuses on the evolution mechanism of regional system, the analysis/simulation methods for describing the human-land relationship, the evolution rule for regional development patterns and its regulation approach, the process of urbanization, and the evolution of urban and rural structures and its effects of resources and environment. Main trends for science and technology are relatively straightforward. The chang-

ing global climate and economic globalization will exert a substantial impact on China's regional development. The future population of China will exceed 1.5 billion people, of which approximately 70% will live in the cities. The demands for land and space necessary for food security, ecological guarantees, and urbanization will all increase concurrently. Hence urbanization and regional development must address the core problem of sustainably adjusting and reconstructing the interactive relationship between human and natural systems.

Until 2030, the key demands for science and technology in China in the field of regional development are as follows: economic growth in future phases and spatial patterns of social development; scientific progress and the mode of China's urbanization; development mechanisms, as well as regional development trends in a "3D-target space"; application of simulation techniques and spatial analysis; problems of regional development against the background of globalization and from a global perspective; ecological compensation and transfer payments from the treasury.

2.4 Study on comprehensive regionalization of human geography

In China, there are different kinds of physical geographic regionalizations as well as a humanity regionalizations based on single factors, but as of yet there is no comprehensive regionalization of human geography. The fundamental basis for this includes eight elements: nature, population, economy, culture, landscape, nationality, urbanization, and agriculture. Of which, natural factors include terrain, landforms, climate, ecology and physical geography, etc. Based on these, an index system could be built for the comprehensive regionalization of human geography. Indexes of nature: aridity, altitude, and accumulated temperature ($\geq 10^\circ$); indexes of population: population density and gross population size; indexes of economy: GDP per capita, economic density, and the industrial structure indicators; index of culture: area-weighting in a region occupied by certain kind of culture; index of settlement landscape: area-weighting in a region occupied by certain kind of landscape; index ethnics and religion: proportion of population of minority nationality to the region's total; index of urbanization: level of urbanization. Considering the great complexity and differences inherent to human geography, this prescribed regionalization scheme can safeguard the integrity of the county-level administrative division; and since the county-level administrative region is seen as the basic unit of regionalization, region divisions may be carried out according to a four-level classification system: "large region of human geography—region of human geography—sub-region of human geography—small region of human geography". In the preliminary regionalization scheme, there are eight regions ascribed to Level I (i.e., Northeast region, North China region, East China region, Central China region, South China region, Northwest region, Southwest region, Qinghai-Tibet region) and 62 Level II regions.

2.5 New developments for agriculture and rural geography

Wu Chuanjun has repeatedly emphasized that geography should provide services for "agriculture, rural areas, and farmers". The mode of "developing the discipline with tasks" promotes agricultural development and rural geography in tandem. Research on agricultural geography and rural development, disciplinary development and the building of talented teams in China were weakened at a time. But in the 21st century, Chinese development of agriculture and rural areas has already stepped into the new phase of transformation (Long *et*

al., 2014). The problems related to “agriculture, rural areas and farmers” are now of great significance to the implementation of the “Scientific Outlook on Development” and the overall situation of the modernization construction. At the beginning of 2006, Shi Yafeng, Wu Chuanjun, Lu Dadao, and She Zhixiang jointly advocated “Suggestions for Active Research on Geography to the Issues of Agriculture, Farmers and Rural Area”. The Institute of Geographic Sciences and Natural Resources Research, CAS, built the Research Department of Agricultural Geography and Rural Development; in 2008, the Committee of Agricultural Geography and Rural Development of GSC was also established.

In recent years, however, more and more geographers are attaching greater importance to the comprehensive study of agricultural geography and rural development. Especially so with respect to several strategic themes centered on agricultural innovation, food security, construction of a new countryside, rural valley economy, poverty relief, and the development and management of rural land. Hence, many young and middle-aged scholars as well as relevant research institutes are emerging, which have promoted the development, both in depth and in breadth, of the agricultural and rural discipline. With the aid of the China Urban and Rural Development Think-Tank Alliance (CURTA) (Long, 2016), third-party assessment on the working achievements and effects of nationally-targeted poverty relief has been carried out nationwide. Research works have substantial influence worldwide, and many outcomes have been published in international journals.

2.6 Study of transport geography

Following the basic theory and research methods of transport geography, analyses have been made on traffic construction and the traffic network, including material facility networks, such as a comprehensive transportation network, railways, highways, airports, and ports (Jin *et al.*, 2011; Wang, 2008). Considering the spatial rule and regional mode of traffic flow, “four fundamental rules” of generation, growth, distribution, and communication as related to the transportation connection were put forward, and subsequently verified by empirical research at different spatial scales in China.

Based on the evaluation methods for traffic flow, relatively more extensive research has been carried out on the passenger flow of railway, coal flow, container flow, etc. Based on the analysis of the spatial structure and the evolution path of the logistics network organization, it has been found that the axis-radiation network is the universal mode of allocation for spatial flow and socio-economic elements. Empirical research of traffic accessibility evaluates the accessibility of traffic networks, analyzes the advantage level of regions, and strengthens the application and correction of various methods (i.e., time accessibility, day accessibility, timeline accessibility, etc.). Considering the comprehensive transportation advantage formed by various kinds of traffic facilities, the methods to evaluate such comprehensive transportation advantages is defined from the perspective of “quality, quantity, and advantage”. Given the interactive mode between traffic network and regional development, the idea that a traffic-economic belt forms a mechanism, with rules and types, has been put forward. In general, a great deal of work has been carried out in this vein, by combining theoretical research and practical applications, while paying close attention to quantitative evaluation and analysis. More attention should be focused on conducting theoretical research

and upgrading the influence of traffic industry.

2.7 Study of geopolitics

Because geopolitics was the expansion theory of German fascists in World War II, studies in this field were mostly restricted in China, from the founding of the People's Republic of China in 1949 to the early 1990s. With the collapse of the Soviet Union, huge changes took place in the world's political landscape and the geographic environment of China, so the study of geopolitics became gradually "unrestricted". Since 2000, more and more geographers are engaged in researching geopolitics, relevant achievements continuously emerged, disciplinary teams became stronger and stronger, and a "High-Level Forum of China Global Strategy and Geography" has been convened three times. This field has constantly expanded, and now encompasses the basic theory and framework of geopolitics, the geographic strategy of China and world superpowers, the geopolitical environment in global hotspots, the geo-economic cooperation and the geopolitical environment of countries surrounding China, global resources geopolitics and China's resources strategy, the marine geopolitics, and China's marine strategy, etc. In recent years, geographers continued to focus on the significant issues underpinning a national geographic strategy, while also making efforts to do fundamental research related to geopolitics; they have finished many nationally important decision-making consultation research topics, and compiled a series of internal special reports related to important theories and realistic problems, many of which have since been approved by leaders in the CPC Central Committee or adopted by the departments concerned.

2.8 Important role in local socio-economic development

The human geography discipline and its research teams play an important role in regional socio-economic development. For example, Northwest University has finished a series of influential works: planning and series application for main functional zones in Shaanxi Province; planning for the city system in Shaanxi Province; planning for the urbanization and urban-rural integration in Shaanxi Province; development of different-scale industries and their planning for industrial parks; planning for the protection and utilization of great ruins; and "Multiple Planning Integration", etc. Based on the research addressing the regional strategy demands of Shaanxi province, human geographers—being concerned with the major problems of urbanization and regional sustainable development—provide the Provincial Government of Shaanxi and its relevant sectors with multiple copies of significant consultation reports and consultation suggestions, all of which have played a critical role in the development of Shaanxi sciences over time.

2.9 New directions

Regional interactions. Local comprehensiveness, scale correlation, and correlative dependence among regions are the three research perspectives of geography. The research by geographers on the correlative dependence among regions has been done for many years now; however, in the past 30 years, economic geographers have paid much greater attention to local development power mechanisms and economic globalization, attaching lesser importance to the interactions among regions. Correlative dependence and interaction among

regions have already been the important and influential factors of regional development, especially in the process of economic globalization, whereby production “fragments” distributed all over the world are integrated within a production network having various scales. By carrying out research on the dependence among regions, it is possible to better understand how the development of certain region may influence other, interacting regions. An input-output analysis among regions can completely define the trade links between sectors of key regions, which has a vital role to play in the analysis of regional interactions.

Human geography against the background of the Internet era and technology change. Internet and technology have never promoted the transformation of the discipline and socio-economic development so thoroughly, and so quickly. The related domains mainly include the digital gap, city network, urban and rural development; the spatial differences of network activities; a city network based on the Internet fundamental facilities; the urban system and an inner space structure of cities, as well as website, trip and tourism geography; cities dealing with tourists and residents; the trends, influences, and countermeasures of city tours and leisure under the background of “time-space compression”; influences of e-commerce, industrial organization, economic geography, and Internet technology on the spatial organization of enterprises; location of “Taobao villages” and e-commerce enterprises, and their spatial organization; and the development path of e-commerce, etc. ICT, online shopping, behavior geography, and information technology will jointly influence the traveling of urban residents and buyer behaviors. The planning for big data and intelligence cities, new urbanization, and city-countryside should be pursued.

Regional innovation geography. Regional innovation and development will become the important content of the post-industrial age, which is also the key factor determining whether or not the industries along coastal regions are transformed successfully. Therefore, it is necessary for us to go beyond the industrialization thinking of standardization and scale, and instead to set up a post-industrial thinking of differentiation, small mass, and personalization; to go beyond the pure technology innovation thinking so as to better set up the comprehensive innovation thinking of “triple helix”; to go beyond pure physical space and entity space thinking, and quicken the construction of new-type knowledge spaces, cyberspaces and maker spaces, etc.; to go beyond the developing concept of traditional “economy on stocks”, to establish a kind of development concept of a new “economy on data”; to go beyond the linear longitudinal industry chain thinking, to establish a new mode of non-linear horizontally-networked industrial organization. Industrial clustering guided by innovation is still the important selective factor for the transformation of industries along China’s developed coastal regions.

Financial geography. Compared with foreign countries, domestic research in this field has a bigger gap. With rapid development of China’s economy and society, financing has become more prominent than ever, embodied by a series of policies, i.e., state-level plans to build a financial supervision system and seek opportunities to establish global financial dominance, the internalization of the yuan (RMB), the Asian Infrastructure Investment Bank, the Silk Road fund, and the BRICS Bank to further promote the construction of an International Finance Center, and finally, to set up stock exchanges: a main enterprise stock market, a small and medium enterprise stock market, a growth enterprise market, and a national equities exchange and quotations, etc. Local governments even frequently use and depend on financial innovation and means to promote the growth of their economies. Nevertheless, in

China, much of the human geographic phenomenon is inextricably linked to finance, such as the rapidly accumulated debts of local governments trying to promote urbanization quickly, the spatial agglomeration of listed companies and their far-reaching influences, the development of risk investment industry, the construction of financial center for transactions, etc. Therefore, it is necessary to pay more explicit attention to financial geography in the future, including research on finance industry itself and influence of financing on other industries, as well as the relationship between finance and patterns in regional development.

3 Research review of the human geography team at the Institute of Geographic Sciences and Natural Resources Research (IGSNRR), CAS

Human geographers in CAS are playing multiple roles in the classification reform of CAS, as part of their assignment to the Center of Science and Education Integration of UCAS (University of Chinese Academy of Sciences), the Institute of Science and Development, etc. Major regional plans are formally carried out in our country (e.g., Regional Planning of Beijing, Tianjin and Hebei metropolitan area, Yangtze River Delta Regional Planning, Northeast Revitalization Plan, West Development Plan, Plan to promote the rise of Central China, transformation of resources-dependent cities, and Land Use Planning of Guangdong Province). Human geographers are mainly responsible for researching and developing (or technology guiding); they have completed the research for a regional development route map, collectively obtained awards for outstanding scientific and technological achievements from CAS, succeeded in applying the key laboratory protocol of CAS, and launched the simulation of China's regional sustainable development and the construction of its decision support system (DSS). The overall orientation of this laboratory is characterized by a fertile cross-over between the natural and social sciences, especially regarding the regional resources and the environment; the coordinated socio-economic development process and pattern as the object of study; setting up of the regional sustainable development theoretical system; promoting the advancement of the discipline to provide science and technology support to the regional development strategy decision-making and national territory spatial planning. Main research activities cover three aspects: Studies on the mechanism of regional sustainable development, on the construction of regional sustainable development models, and on the simulation technology of regional-scale sustainable development. There are plentiful and diversified outputs, of which the representative achievements are summarized as follows.

3.1 Theoretical methods and simulation decision-making research for regional spatial planning

Globalization and informatization promote so-called production "segments". Although these are distributed all over the world, they are being integrated to a production network spanning various scales, which has disrupted the traditional administrative boundary; a "city-region", with organic links consisting of a "gateway city" and its central region, are now becoming the basic unit of global economic competition. "Time cost" is the core mechanism to determine the new location, while a quick response and fast delivery also become two important factors; by creating a large scale of "time compression", economic activities are collectively concentrated to the big cities and their surrounding regions through a high level informatization; some industries have broken away from the restraint of traditional transportation modes

and traffic locations. Accompanying the globalization process, both location and space of the world's economy are being replaced by flow space, as space structure is established on the flow, connection, network, and node. A "point" refers to different-level residents' point and central city, and the point scale, once purely strengthened in the past, is now gradually transformed to the level of a point strengthened in flow space. The "axis" refers to the "fundamental facilities cluster", a traffic axis mainly strengthened in the past is now transformed to the comprehensive passage of regional development. IGSNRR opened up regional interaction research and utilized the geographic weighting regression method to construct the industry of trade flow among estimated regions—spatial statistical model to simulate the input-output relation of regions by re-constructing gravity model weighting industries differently.

3.2 Development and research for the planning scheme of the main functional zone and provincial-level technical procedures in China

IGSNRR put forward a regional functional theory, to contribute towards a comprehensive geographical regionalization. This theory attached great importance to the comprehensive impacts of the functional patterns of natural and ecosystem services, the changes in land use and cover, the concentration and dispersion process of people and industries, etc. on the formation and development of regional functions and the space-time pattern. In so doing, its proponents established a comprehensive and equilibrium model of regional sustainable development to improve the classical theory of a core-driving force in the change of regional patterns. This model provides references to the design of regional policies; initially it was used to investigate the evolution rule of the spatial proportional relation of functional regions, which has enriched the basic theory of space structure consisting of the "point-axis" system. As far as methods are concerned, IGSNRR developed a theme to determine the type of regional function which incorporates a policy meaning and planning guidance; researched and prepared the index system and the algorithm of function regionalization; carried out the single-element index evaluation, as well as a comprehensive evaluation on the adaptability of the land space in China; compiled the provincial-level technical procedures and conducted application demonstrations; and finally, successfully integrated the main function regionalization of two levels and also implemented their dynamic monitoring and evaluation.

3.3 Research on new factors of regional development and a series of China's regional development reports

In recent years, research on new factors and patterns of regional development has clearly made great progress. New factors focused upon include globalization, informatization, technology innovation, etc. Research of new patterns is concerned primarily with the status monitoring of regional development, regional policies, strategy of regional development, evolution of regional economic pattern, space configuration of regional elements, etc. Since 1996, the China Regional Development Research Group has tracked and studied regional development problems in China, with a long term view, and it has accomplished many excellent research achievements that possess significant meaning according to the national strategic demands. To date, this report has been published in 10 versions; it has become the

brand report of CAS, thus having a great impact on levels of both government and society. Six reports have been published in the last 10 years: the 2006 report focused on the urbanization process and its space expanding; the 2007 report provided the “Rise of Central China” with crucial support; the 2009 report provided the 10-year Western China Development with its decision basis; the 2011 report made an analysis of the regional development trends against the background of the financial crisis; the 2013 report discussed the regional development trends in the context of overall transformation; the 2015 report analyzed in-depth Western China Development under the “New Normal”, and its numerous viewpoints were later absorbed and accepted into Western China Development’s “13th Five-Year Plan”.

3.4 Sustainable development mechanism of urban agglomeration and the research and application of dynamic simulations

IGSNRR put forward the identification standard for the spatial scale of China’s urban agglomeration and the spatial organization pattern of “5+9+6” for urban agglomeration; revealed the formation and development phase of a structure system for China’s urban agglomeration and regional differentiation rule; calculated the ecosystem service values and the carrying capacity of resources and the environment of urban agglomeration; developed a computational experimental system and sustainable development simulation system for the spatial expansion of China’s urban agglomeration. By revealing the ecological response mechanism for the spatial expansion of urban agglomeration, the ecological status diagnosis and ecological function zoning system of urban agglomeration were both developed, and the integrated measurement model for the input and output efficiency of urban agglomeration has been constructed. Urbanization and ecological environment interactions coupling theory with dynamic simulation systems have been developed, namely via the double exponential curve formed by the superposition of a power function and an exponential function. These two functions are obtained from the interaction describing the relationship between urbanization and the resources and environment of urban agglomeration.

3.5 Research and demonstration of rural sustainable development and comprehensive land management

IGSNRR revealed the “life cycle” of rural hollowing and its spatial evolution pattern. It put forward the mode of “three-in-one integration”—rural reorganization, industry, and space, as well as the discipline system of land management. A zoning scheme for rural idle and waste land was also put forward: in it, 10 large regions and 47 sub-regions were established, covering c. 114 million mu (15 mu=1 ha) of land, with respective to different regions all over the country, thus lending the management of rural waste land a sounder scientific basis. As far as method innovations are concerned, IGSNRR developed the multi-scale transformation technology paths and its methods based on the survey of land use in hollow villages, the measurement and calculation of county-level land, and the potential production evaluation of provincial-level and state-level cultivated land as derived from remote sensing and GIS; developed the land management theory and management platform (i.e., the “Overall Information Management for Urban and Rural Land and the Planning of Decision-Making Support System”; the “Information Management Database System for House Site in Villages”); and set up an information platform for use in urban and rural land allocation.

3.6 Evaluation of the carrying capacity of environmental resources

Based on the functional zone, the theoretical basis for evaluating carrying capacity was formulated. IGSNRR put forward the index of regional carrying capacity, which is restricted by the regional function, and solved the scientific problem of the carrying object being not clear by the function estimation; constructed and reconstructed adaptability single-element evaluation and integration evaluation technology, which has filled the “blanks” in both quantitative and comprehensive evaluations of Chinese resources and environmental conditions. Depending on the development intensity, the method for measuring and calculating the carrying capacity has been improved. By expanding the spatial structure, land development intensity, and space interaction comprehensive analytical techniques, the development intensity-calculating model was put forward and later applied, the method for measuring and calculating the reasonable population capacity has been improved, and the reasonability and degree of accuracy for measuring and calculating the population capacity were promoted, with the policy connotations of the calculation results for population capacity also being enriched. Comprehensive processing on damage data was carried out by an emergency-integrated innovation: comprehensive remote sensing, investigations on the ground and geosciences, and simulation analysis by computers. A space-time scenario model was established that was driven by stochastic factors, such as the estimation of dammed lakes and land management effects, etc. A way to evaluate the carrying capacity of different planning accuracy demands was designed in a complete technology process, for the first time, and an evaluation process of different accuracies was established to strengthen their accuracy, which is suitable for improving multi-type and multi-scale layout planning.

4 Changes in Western human geography and the internationalization road of China

4.1 Western human geography

Western human geography has also experienced a period of flourishing and chaos. The global natural environment has changed dramatically, and some elements, namely the human, society, politics, economy, and culture are undergoing a major period of transformation and change. Since the World War II, the thinking, theory, and methods of geography all over the world have frequently changed: Positivistic Geography, Humanism Geography, Behavior Geography, Structuralism Geography, Marxism, Radicalism Geography, Moral Geography, New Region Geography, New Culture Geography, Realism, Postmodernism, Feminism, and Post Colonialism emerged in an endless stream. Western human geography is still experiencing significant changes, as the crossover between it and other disciplines happens more frequently. At present, the Western countries—represented by European and American countries—still dominate the discourse on power and knowledge, and occupy the central position in the development of human geography in the world. But, geography, from the very beginning, has meant different things to people in different times and places. The geography tradition, not unlike a species, evolves as it adapts to different social and academic circumstances, trying to explore the shifting differences and inherent features of the Earth’s surface. Now geography is developing prosperously by relying on communication and diversity.

In this new century, human geography shows an inter-disciplinary trend of crossing and

diversified development. Its three main directions are governance, globalization and urbanization. According to the journals with the highest impact factor, and the rankings list of scholars and research institutes, European and American countries are still the main regions contributing most of the highly influential papers on human geography, accounting for >90% of the highly cited literature and leading scholars. With the ongoing internationalization of human geography, and the increasing international attention paid to the problems of China's human geography, we expect that in the next 5–10 years more scholars of China's human geography will join the world-class stage, and increasingly more world-class organizations and institutes will emerge for them to work at.

4.2 Internationalization road of China's human geography

The international communication process of China's human geography can be roughly divided into four stages.

The first stage, *visits to Europe and America (1909–1949)*: In 1909, Zhang Xiangwen, who knew the Japanese well, founded the China Society of Geology in Tianjin. One after another, outstanding geography talents went to Europe and America for study. In 1934, Zhu Kezhen, Ding Wenjiang, Weng Wenhao, and Hu Huanyong (among others) returned to China after finishing their studies and founded the Geographical Society of China (GSC) in Nanjing. They were pioneers in human geography, as they introduced the human geography system of Western countries to China, and initially established the first sub-disciplines of China's human geography. Economic geography: Ren Meie (US), Li Xudan (UK), Wu Chuanjun (UK), Lin Chao (UK), *et al.* Population geography: Hu Huanyong (France), Zhang Yintang (UK), *et al.* Settlement geography: Wang Yiya (France), Zhou Lisan (US), *et al.* Historical geography: Hou Renzhi (UK), *et al.* Political geography: Zhang Qiyun (US), Huang Guozhang (US), *et al.*

The second stage, *learning from the Soviet Union (1950s–1960s)*: From the 1950s through to the 1970s, China's human geography learned from the Soviet Union, and the field of economic geography was developed rapidly. The Soviet Union regional school (Nikolay Nikolayevich Baransky, Klossowski, Y. G. Saushkin, *et al.*) and the sector statistics school (Fegen, Konstantinov, *et al.*) were introduced to China. In 1962, the “Specialized Committee of Economic Geography” was founded. Mutual communications in the field of geosciences among the countries in the socialist camp was frequent, but the communication with Western countries was now blocked.

The third stage, *learning from the Western countries (1979–2000s)*: From the end of the 1970s through the 1980s, came the revival of human geography. Li Xudan, at the end of 1979, put forward the revival of human geography in the 4th session of the Geographical Society of China. In 1983, under the promotion of Li Xudan and Wu Chuanjun, the “Specialized Committee of Human Geography” was founded, which sent young and middle-aged scholars to foreign countries. In 1980, Lu Dadao went to Germany to study at the Ruhr University Bochum. In 1982, Xu Xueqiang went to the University of Hong Kong to engage in collaborative research. In 1985, Cui Gonghao went to the University of Akron as a visiting scholar. In 1986, Zhou Yixing went to England to continue his studies at the University of Nottingham. In 1987, Ning Yuemin went to London to pursue his further education.

The fourth stage, *the establishment of the human geography school with China's characteristics (since 2000)*: more and more young and middle-aged scholars went to the foreign

countries for either an academic visit or to study. Many of them made good use of the theories learned abroad to carry out empirical research after they coming back to China, and thus became the backbone of all branches of human geography currently practiced in China. Some of these scholars are trying to establish a concept, pattern, and model endowed with Chinese characteristics, so that one day they can be part of the typical human geography school in China.

5 Problems, challenges, and opportunities in the development of human geography

5.1 Problems

Methodology system for theory is not yet perfected. Although many important achievements have been made, there is a lack of significant innovations in the theory of human geography with Chinese characteristics, and the theoretical system of this discipline is still incomplete. Empirical research is driven solely by the theory of foreign countries, whereas theory upgrading or synthesis remains insufficient (Leng *et al.*, 2005). Parts of discipline are deemed of little importance, which leads to an imbalance in the development among branches of the discipline. Due to the uncertainties of the study object and the particularities of methodology (Lu, 2011), technological methods of the discipline's research require improvement. Unfortunately, a large number of valuable works are not completed in time via the standard system of research methods, which is not good for the inheritance and spread of the discipline's knowledge system, and it is prone to make other disciplines mistakenly believe that the threshold for entering into our disciplines is relatively low. Hence it is necessary to make the discipline more rigorous and scientific (Liu *et al.*, 2014; Tang, 2013; Lu, 2014).

The trend for disciplines becoming assimilated by related fields of science has increased significantly. For geography (including human geography), the sense of identity of this discipline is also waning. Some scholars engaged in both geographical science and the teaching have abandoned the research discipline they have engaged in for decades and their name in this field. Some, surely, have gained new vitality, while others cannot win a "first-level" position because of the lack of approval of discipline's value, so they become confused again. With the increase in comprehensive problems and crossover research among disciplines, the boundaries of human geography tend to show signs of being blurred (Leng, 2013). Tourism and resource geography are both in danger ("tourism science" and "resource science"). There are substantial risks that the discipline as a coherent field is fast being eroded and marginalized.

The professional evaluation system makes scholars pay less attention to the core issues of their discipline. At present, SCI and SSCI have become the most important evaluation indexes of domestic universities and research institutes. However, some important geographical journals are still outside of this corresponding evaluation system, and so it is difficult for papers published in these geographic periodicals to be included in it. Under such a single evaluation system, some scholars choose to try and publish their most relevant papers in those journals with the highest impact factors, but these may not best reflect the core issues of our discipline.

Crisis in that the discipline is turning into a social science. In European and American countries, humanism, structuralism, realism, and post modernism geography have prevailed. The social phenomenon of human geography became more and more serious, which strays far away from the scientific road of real geography. Domestic human geography is more or less affected by this, thus tends to be a social science.

Construction of talents team at all levels should be urgently strengthened. As a result of the various problems in the evaluation index system, it is difficult for our leaders in scientific research to win prestigious titles (such as academicians (senior professors), “Outstanding Youth”, “One-Hundred-Talents”, and other similar titles). Famous scholars of human geography must cleverly apply for the title of Yangtze River Scholar by stepping into other discipline fields, like that of land resource management. Nonetheless, the cultivation of young talents, especially of young academic leaders, should be further strengthened.

Major scientific problems ought to be solved cooperatively. At present, due to the many practical needs and the strong instrumental value of this discipline, the works and tasks of all organizations in our country are relatively abundant. But the research practices, as carried out by collaborative projects between trans-organizations, in addressing the major pressing issues we face are simply not enough.

5.2 Restrictions and challenges that the evaluation of the first-level discipline brings to the development of human geography

Why is the status of human geography not so high in colleges and universities? One important reason is the evaluation of the first-level discipline, which is the baton of university development. Universities and colleges attach great importance to the ranking and evaluation of first-level disciplines, and, accordingly, the second-level disciplines are not so highly valued in some sense. However, the most important evaluation indicators are talents that hold a title, such as the Yangtze River Scholar, Outstanding Youth, and the platform-like state-level key laboratory, provincial-level and ministerial-level key laboratory (and so on), as well as your major projects and representative papers as determined by impact factor. But papers on human geography cannot meet this threshold for entrance. Therefore, in the evaluation of first-level geography, human geography has been neglected for the most part, and in fact, the evaluation of geography has become an evaluation of physical geography.

But geography has its own particularities, and its branches are different and incomparable. Physical geography without human geography is just pure physical geography lacking certain characteristics and advantages, similar to sister disciplines, such as geology, environmental science, ecology, and so on. Conversely, compared with social disciplines like sociology, economics, and so on, human geography without the basis of physical geography also missed certain characteristics and advantages. The evaluation principle and index system of the first-level discipline should be adjusted. Considering the particularity of geography, it should instead consider the evaluation of second-level disciplines, as only the evaluation of these disciplines can fully promote the overall development and advancement of geography in colleges and universities. The cultivation of students majoring in human geography cannot ignore some basic training in physical geography.

5.3 Important opportunities facing the development of human geography

Strengthening the integration of disciplines and guiding decision-making are the important

direction for the new-round reform of science and technology at home and abroad. The international frontier science program advocates the integration of “research-decision making” and “nature-humanity”. This view originates from the research of global environment change and accords with the “Future Earth” Plan researched by CAS (Fu *et al.*, 2015). It intends to research the theories, means, and methods necessary for achieving global sustainable development, and finally sets a goal to solve problems in both global and regional sustainable development. The integration of “scientific research–government decision” with “natural science and humanity science”, thus becomes an important symbol of the required transformation. It makes explicit efforts to strengthen the integration of nature and human, and puts forward solutions for problems stifling sustainable development at different special scales (Fan and Jiang, 2015). The CAS has established a policy for running institutes in this new era, namely, “Three Orientations & Four Leadings”, which have highlighted and strengthened the main battlefield of serving the national economy and the construction of a state high-level science and technology think tank.

In the new period, the state and major regional development strategies have made great demands on the discipline. Due to the rapid development of China’s society and economy, both its physical structure and socio-economic structure has been experiencing dramatic change. This change has brought about a series of important scientific problems to geography, such as the “New Normal” of the economy and the scientific judgment of reasonable economic growth, the scientific connotation of “One Belt and One Road” initiative (Liu, 2015); the evaluation of the carrying capacity of environmental resources, and the assessment on the planning and implementation of main functional area (Fan *et al.*, 2015); the third-party assessment on the working achievements and effectiveness of national poverty relief; the sustainable development of the new urbanization and urban agglomeration, and the collaborative development of Beijing, Tianjin, and Hebei; the protection and development of the Yangtze River Economic Belt; the overall revitalization of Northeast China; the promotion for the Rise of Central China; the development of Western China, etc.

Research paradigms of human geography are also being perfected and becoming scientific. The developing history and current situation show that the research paradigm of geographical empirical science lays the basic characteristic for geography. The research paradigm of geographical demonstrative science is the current trend in geography research; it perpetually studies pattern and process in-depth, which signifies the achievement of geography. The research paradigm of geographical science is the frontier, which is a key to fully understand the behavior of land surface systems and to make geographical knowledge more practical.

The discipline team has already had a good foundation and social reputation. For a long time, scholars of China’s human geography insisted upon the development road of “developing the discipline with tasks”, thereby directly influencing decision-making with good science and research achievements, at the forefront of the world by serving the decision-making. The famous scholars of China’s human geography actively participated in many major national and local planning projects, and they were consulted for strategic decision-making purposes; those who have made an important contribution to the scientific decision-making at all levels of government also have established a good social reputation. Meanwhile, the quantity and quality of papers published by young and middle-aged scholars in the international SCI/SSCI journals has continuously increased.

The arrival of the big data era provides the innovation of human geography with new ideas. Big data is the product of the next great development in digital information technology. It is nothing less than the vast collection of primarily non-structural data, in very large quantities, in complex structures, and of numerous types. *Science* and *Nature* journals have respectively set up a special column to discuss the advent of big data. For our discipline, big data can provide the analytical perspective of a time-space behavior traces, pattern and mode based on a massive sample of individuals. Big data provides the study of human geography with important data and methodological support.

6 Broad prospects for the future development of human geography

At present, the development of China's human geography finds itself in an important transformative period (Song, 2016). In general, it has a broad developmental prospect, and with the further application of this fundamental discipline, its decision supporting capacity to solve the major problems on the sustainable development of earth's surface will obviously increase. As an important component of geographical science, human geography is of great value to science as it can reveal the processes, patterns, and mechanisms of the interplay between humanity and the earth's surface.

6.1 Build up the academic community and carry out joint research and collaborative innovation in light of the major issues

Autonomy of Science referred to such people with special professional skills, having the same or similar value orientation, cultural life and inner spirit, who, for the purpose of a common value idea or interest, observe a certain code of conduct to form a group. Scholars of China's human geography should work closely together to further strengthen their academic communication and cooperation, and to jointly build the academic community. They should focus on investigating some significant or leading theories and practical issues, and promote the formation of a collaborative innovation center or alliance of trans-organization and sectors, and work to carry out joint research that enhances the inclusiveness. At present, there are several possible urgent and important topics, as detailed below.

Firstly, the construction of "One Belt and One Road" against the background of economic globalization. Globalization means studying human geography in a broader space, and thus in a more complex relationship, so it is necessary to reconstruct the understanding on core concepts, such as time-space relationship, space and local, state and region, as well as the appropriate scale. "One Belt and One Road" means "Economic Belt of Silk Road" and "the 21st Century Maritime Silk Road", which is a new mode of international and regional economic cooperation through which China can promote the development of economic globalization. Several important topics related to "One Belt and One Road" include geopolitics, geography of different countries, foreign trade and economic cooperation, world cities and urban systems, optimization organization for traffic and transportation, etc. (Liu, 2015).

Secondly, devising a new urbanization and collaborative development of Beijing, Tianjin, and Hebei (Lu, 2013; Chen, 2015). This work ought to be upgraded to a national strategy at the same time, given the close relationship between the two. The issuing of a new urbanization plan is just the new starting point of relevant research. To further promote healthy and

sustainable development of China's new urbanization, there are still many scientific problems worthy of discussion, which are related to the pathway for realizing human urbanization in different types of regions (Xue *et al.*, 2016), and for the sustainable development of key resource-based cities, as well as that of rural areas, and for the mode of urban-rural integration development. Strengthening the study of sustainable development of urban agglomerations constitutes another topic (Fang, 2014; Huang *et al.*, 2015). The Beijing-Tianjin-Hebei synergetic development is an important demonstration zone of the new urbanization, which clearly defines the function orientation of different cities, and makes an in-depth analysis of population distributions, of industries, of consolidation, protection, and utilization of land, and layout of different cities in space and collaborative development, etc.

Thirdly, the regional governance system in the "13th Five-Year Plan" against the background of the "New Normal". As the modernization of the governance system and governance capacity in China increases to new heights, it is now required to strengthen the study of causes for regional function and the evolution rule of space structure, to deepen the evaluation and research on the carrying capacity of resources in the environment, and to strengthen and enhance research on regional policy and space planning systems (Fan and Guo, 2015). It is also needed to observe the economic geography phenomenon, from the perspective of the national governance structure, to carry out studies in human geography of space governance, and to improve the ability of this discipline to serve national strategic decision-making. Carrying out precise poverty alleviation research in concentrated and contiguous poor areas (Liu *et al.*, 2016) constitutes another urgent topic for study.

Fourthly, the response of human geography in the era of Internet and big data. With the rapid development of mobile communication technology and the popularization of orientation-type application programs—providing immense datasets, such as for abundant individual behaviors and their time-space tracks, etc.—new possibilities arise for building much more complex models, for dynamically analyzing the relationship between individual and local governments, for describing the interactive process and pattern of human and the land surface (Zhen *et al.*, 2015).

6.2 Be compatible with features of localization and internationalization, lead China's human geography into the world

Localization and internationalization form contradictory dialectical unity, which are two indispensable aspects of one problem. On the one hand, there is the regionality, locality, aboriginality, and integrity, which are the most basic characteristics of geographic science and also make its evaluation differ from those of other disciplines. Regionality will generate the locality, and human geography is a kind of practical knowledge, so scholars should have strong national feelings and pay much attention to the research of national situations with localization characteristics. On the other hand, we must continue to expand international academic communications and bring China's human geography out to the world stage. Scholars should be more active in letting our academic researchers go out and promote the international development of our scholarship and activities through thoughtful communications and cooperation. Both the international frontier and China's own national demand are the main directions and key tasks of our discipline.

6.3 Strive for more support from National Natural Science Foundation of China and other departments, while promoting the growth of young and middle-aged talents

Giving priority to the scholarly talents is the successful experience of many countries and regions seeking to rapidly improve their comprehensive strength. The same is true for the development of our discipline, which is impossible without nurturing talent. We should insist on combining self-cultivation with the accelerated introduction of talents, and to make greater efforts to foster the talented scholars at different levels, such as those for outstanding talents, young and middle-aged backbone talents, and young reserve talents, etc. An endeavor is needed to win the support from relevant sectors—such as National Natural Science Foundation of China, the Ministry of Science and Technology of the People's Republic of China, and the Ministry of Education of the People's Republic of China—and to encourage that the evaluation mechanism be made much more scientific and reasonable. We should also actively apply for various kinds of academic titles—academicians, One-Thousand-Talents, One-Hundred-Talents, Outstanding Youth, Yangtze River Scholars, Excellent Youth and so on—and thereby increase the number and proportion of scholars with such titles, and go on to place a group of young talents into important positions of our discipline's team. All in all, we should spare no effort to create such a good and inviting situation so that more and more talents emerge in human geography to play their role.

References

- Bao Jigang, Yin Shoubing, Liang Zengxian *et al.*, 2012. Development report on tourism geography in China. *Progress in Geography*, 30(12): 1506–1512. (in Chinese)
- Chai Yanwei, Zhao Ying, 2009. Recent development in time geography. *Scientia Geographica Sinica*, 29(4): 593–600. (in Chinese)
- Chen Mingxing, 2015. Research progress and scientific issues in the field of urbanization. *Geographical Research*, 34(4): 614–630. (in Chinese)
- Du Debin, Duan Dezhong, Liu Chengliang *et al.*, 2015. Progress of geopolitics of Chinese geography since 1990. *Geographical Research*, 34(2): 199–212. (in Chinese)
- Fan Jie, Guo Rui, 2015. Discussing some core issues of innovated regional governance system oriented to the thirteenth national five-year plan period. *Economic Geography*, 35(1): 1–6. (in Chinese)
- Fan Jie, Jiang Zilong, 2015. Trend of human-economic geography in relation to the Future Earth initiative for systemic solutions of regional sustainable development. *Progress in Geography*, 34(1): 1–9. (in Chinese)
- Fan Jie, Wang Yafei, Tang Qing *et al.*, 2015. Academic thought and technical progress of monitoring and early-warning of the national resources and environment carrying capacity. *Scientia Geographica Sinica*, 35(1): 1–10. (in Chinese)
- Fang Chuanglin, 2014. Progress and the future direction of research into urban agglomeration in China. *Acta Geographica Sinica*, 69(8): 1130–1144. (in Chinese)
- Fang Chuanglin, Zhou Shangyi, Chai Yanwei *et al.*, 2011. Updated progress and perspective of the discipline of human geography in China. *Progress in Geography*, 30(12): 1470–1478. (in Chinese)
- Fu Bojie, Leng Shuying, Song Changqing, 2015. The characteristics and tasks of geography in the new era. *Scientia Geographica Sinica*, 35(8): 939–945. (in Chinese)
- Gu Chaolin, 2009. Chinese human geography in transition. *Acta Geographica Sinica*, 64(10): 1175–1183. (in Chinese)
- He Canfei, Guo Qi, Ma Yan *et al.*, 2014. Progress of economic geography in the West: A literature review. *Acta Geographica Sinica*, 69(8): 1207–1223. (in Chinese)
- Huang Jinchuan, Chen Shouqiang, 2015. Classification of China's urban agglomerations. *Progress in Geography*, 34(3): 290–301. (in Chinese)
- Jin Fengjun, Zhang Wenchang, Zhang Xiaolin *et al.*, 2011. Growth and development of transport geography in IGSNRR. *Progress in Geography*, 30(4): 417–425. (in Chinese)
- Leng Shuying, Song Changqing, 2005. Challenges and opportunities of Chinese geography. *Acta Geographica Sinica*, 60(4): 553–558. (in Chinese)

- Leng Shuying, 2013. The researching features of human geography in NSFC. *Acta Geographica Sinica*, 68(10): 1307–1315. (in Chinese)
- Li Xiaojian, Fan Xinsheng, Luo Qing, 2014. The development of Chinese economic geography: A review on papers published in *Acta Geographica Sinica* from 1934 to 2013. *Acta Geographica Sinica*, 69(8): 1093–1108. 1108. (in Chinese)
- Liu Weidong, 2014. Economic geography for spatial governance. *Acta Geographica Sinica*, 69(8): 1109–1116. (in Chinese)
- Liu Weidong, 2015. Scientific understanding of the Belt and Road Initiative of China and related research themes. *Progress in Geography*, 34(5): 538–544. (in Chinese)
- Liu Weidong, Jin Fengjun, Zhang Wenzhong *et al.*, 2011. Progress in economic geography (2006–2011). *Progress in Geography*, 30(12): 1479–1487. (in Chinese)
- Liu Yungang, Li Zhigang, Li Bin, 2014. A critical review of research methods of Western human geography: A combination of knowing and doing for Chinese human geography. *Acta Geographica Sinica*, 69(8): 1224–1233. (in Chinese)
- Liu Yansui, Zhou Yang, Liu Jilai, 2016. Regional differentiation characteristics of rural poverty and targeted poverty alleviation strategy in China. *Bulletin of Chinese Academy of Sciences*, 31(3): 269–278. (in Chinese)
- Long Hualou, 2016. The establishment ceremony of China Urban-Rural Development Think Tank Alliance and expert seminar held in Beijing. *Acta Geographica Sinica*, 71(2): 352–353. (in Chinese)
- Long Hualou, Liu Yansui, Zhang Xiaolin *et al.*, 2014. Recent progress in agricultural geography and rural development research. *Acta Geographica Sinica*, 69(8): 1145–1158. (in Chinese)
- Lu Dadao, 2009. A tribute to the geographers for their contributions to China and mankind. *Acta Geographica Sinica*, 64(10): 1155–1163. (in Chinese)
- Lu Dadao, 2011a. The methodology of human-economic geography and its characteristics. *Geographical Research*, 30(3): 387–396. (in Chinese)
- Lu Dadao, 2011b. Development of geographical sciences and research on global change in China. *Acta Geographica Sinica*, 66(2): 147–156. (in Chinese)
- Lu Dadao, 2013. Characteristics of human geographical proposals of National Natural Science Foundation of China. *Scientia Geographica Sinica*, 33(8): 897–901. (in Chinese)
- Lu Dadao, 2015a. The value of geographical science and the feelings of geographers. *Acta Geographica Sinica*, 70(10): 1539–1551. (in Chinese)
- Lu Dadao, 2015b. Moderate-speed growth: Sustainable development of China's economy. *Scientia Geographica Sinica*, 35(10): 1207–1219. (in Chinese)
- Lu Dadao, 2015c. Splendid achievements, greater mission: Write before the 33rd International Geographical Congress in Beijing. *Advances in Earth Science*, 30(10): 1075–1080. (in Chinese)
- Lu Dadao, Chen Mingxing, 2015. Several viewpoints on the background of compiling the “National New Urbanization Planning (2014–2020)”. *Acta Geographica Sinica*, 70(2): 179–185. (in Chinese)
- Lu Yuqi, 2014. The major objectives and implementation methods for human geography toward the tendency of physical science. *Acta Geographica Sinica*, 69(8): 1224–1233. (in Chinese)
- Song Changqing, 2016. On paradigms of geographical research. *Progress in Geography*, 35(1): 1–3. (in Chinese)
- Song Changqing, Leng Shuying, 2006. Some important scientific problems of integrative study of Chinese geography in 5–10 years. *Acta Geographica Sinica*, 60(4): 546–552. (in Chinese)
- Tang Maolin, 2013. Problem-dominated versus method-dominated? The reflection on the methodology of human geography research in mainland China. *Human Geography*, 28(5): 19–23. (in Chinese)
- Wang Chengjin, 2008. Research prospect and progress of modern port geography. *Advances in Earth Science*, 23(3): 243–251. (in Chinese)
- Wu Chuanjun, Zhang Jiazhen, 1999. Review the development of geography in the 20th century and prospect for geography in the 21st century: Congratulation on the 90th anniversary of the founding of the Geographical Society of China. *Acta Geographica Sinica*, 54(5): 385–390. (in Chinese)
- Xue Desheng, Wang Li, 2014. Progress of urban geography research in China since the 1980s. *Acta Geographica Sinica*, 69(8): 1117–1129. (in Chinese)
- Xue Desheng, Zeng Xianjun, 2016. Evaluation of China's urbanization quality and analysis of its spatial pattern transformation based on the modern life index. *Acta Geographica Sinica*, 71(2): 194–204. (in Chinese)
- Yu Taofang, Lu Lachang, Liu Yungang *et al.*, 2012. Progress of urban geography in China. *Progress in Geography*, 30(12): 1488–1497. (in Chinese)
- Zhen Feng, Qin Xiao, Xi Guangliang, 2015. The innovation of geography and human geography in the information era. *Scientia Geographica Sinica*, 35(1): 11–18. (in Chinese)
- Zhou Shangyi, Dai Juncheng, 2014. Logic analysis of concept and theory of cultural geography: Progress in cultural geography in China's mainland during the past decade. *Acta Geographica Sinica*, 69(10): 1521–1532. (in Chinese)