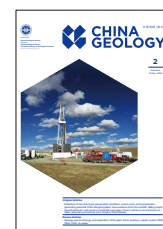




# China Geology

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## Editorial

### New book recommendation—*Strategies for Geological Work in the New Era*

In today's world, population, resource, environment and disaster problems are intertwined, extreme climate phenomena are frequent, the fourth wave of industrial revolution is sweeping in, the uncertainty of the future world is significantly increased, and geological work is facing unprecedented new situation, new challenges and new demands. In this context, Shi Jun-fa, a research professor of the Development Research Center of China Geological Survey, published the book "*Strategies for Geological Work in the New Era*" (ISBN:978-7-116-13508-6), based on decades of profound understanding of the development process of global geological survey and forward-looking thinking of the future development of geological survey. The book is a compilation of 65 papers, divided into 6 parts: 7 papers in the section of comprehensive discussion, 16 papers in the section of energy, critical minerals and water resources survey, 12 papers in the section of integrated surveys of natural resources, 11 papers in the section of Earth System Science and basic geological survey, 12 papers in the section of ecology geological survey, and 7 papers in the section of geological big data and data service.

Historically, the rise and fall of geological work has been closely linked to the cyclical development pattern of the mining industry. On the one hand, this phenomenon reflects the limitations of traditional geological work in terms of connotation and extension in the times. On the other hand, it also reflects that the penetration and integration of geological science and other disciplines are still in the primary stage. How to get rid of the historical cycle of "rise and fall due to mining" is a question we must answer now. The book "*Strategies for Geological Work in the New Era*" focuses on "what kind of geological work should be done in the new era, for whom and how to do it", and proposes a broader view of geological foundation, geological resources and resource benefits, reflecting from different perspectives for the question of "how geological work in the new era can get rid of the mining cycle".

In order to get rid of the law of historical cycle, the survey of mineral resources must be placed at a more important position of geological work. At present, the Russia-Ukraine conflict is prolonged and fermented, geopolitical conflicts and regional disputes are frequent, global competition for resources is intensified, and the situation of resource security is becoming more and more complicated and severe, and "structural" shortages of energy, critical minerals and water resources are expected to occur in the future. Meanwhile, under the situation of global climate change and carbon peaking and carbon neutrality goals, countries around the world are speeding up the green low-carbon energy transition. Traditional energy resources such as coal and oil have been transformed into clean and low-carbon energy sources such as natural gas, geothermal energy, wind energy and solar energy, and critical minerals such as lithium, cobalt and nickel have become the focus of international competition because they play a key role in the new energy supply chain system. The papers in the energy, critical minerals and water resources survey section focus on the current international and China's energy, critical minerals and water resources status, problems and development trends, and propose to accelerate the implementation of a new round of strategic actions to find breakthroughs in mining.

To get rid of the law of historical cycles, the new foundation of geological work must be firmly rooted in the implementation of comprehensive survey and evaluation of natural resources. Human activities have had an unprecedented impact on the natural environment. Problems such as vegetation reduction, soil erosion, desertification and environmental pollution have become increasingly serious. Natural ecosystems have been comprehensively degraded, and the relationship between man and nature is seriously unbalanced. Promoting the harmonious co-existence between man and nature is the inevitable choice for human's sustainable development. Comprehensive consideration of the comprehensive effects of land, mineral, biological, water, air and other resources, risk assessment and monitoring and early warning of major security issues in the national land space, evaluation of the carrying capacity of resources and environment and evaluation of the suitability of national land

space development have become the basic work for rational planning of human activities at present. The spatial planning of land under the new perspective of human-earth relationship requires geological work to change its concept and expand its field. On the basis of traditional geology and minerals, geological work should synthesize the research results of other fields such as water, land, air and biology, and conduct comprehensive analysis of various natural resource factors. The papers in the section of integrated surveys of natural resources conduct exploratory practical research on integrated surveys of natural resources, providing references for geology to better support and serve natural resources management.

To get rid of the law of historical cycles, research in Earth System Science must be elevated to a new dimension. Traditional geoscience is being profoundly transformed into earth science, the chain of geological survey work is being extended, the research field of earth system science continues to expand, and deep Earth exploration, deep sea exploration and deep space exploration become the theme of the times in earth system science research. Earth System Science is a research method to understand the Earth with a holistic and systematic view and multiple spatial and temporal scales, which can help to solve complex geoscientific problems, thus enabling human beings to better understand the environment on which they depend and predict future changes. The papers in the section of earth system science and basic geological survey provide research directions for using Earth system science theory to solve fundamental and complex geoscientific problems.

To get rid of the law of historical cycles, ecological geology must be opened up as the second main business of geological work. Global ecological-climate change has become a major challenge to the economic and social development of all countries in the world, and ecosystem protection, restoration and climate governance have become global political issues, in which geological work will be able to play an important role. This requires geological work to deepen the understanding and knowledge of natural ecosystem. Under the perspective of ecosystem, we should reconceptualize the ecosystem function of lithosphere, strengthen the mechanism research on the influence of geological processes on ecosystem, deepen the research on the mechanism and technology of geological carbon storage and sink, promote the diversity, stability and sustainability of ecosystem from geological perspective, enhance the carbon sink capacity of ecosystem, participate in the global governance of climate change, and support the construction of ecological civilization and the achievement of carbon peaking and carbon neutrality goals. The papers in section of ecology geological survey are based on the perspective of ecosystem and explore the role of geological work in the ecological and climate change crisis, and provide guidance on how geological work can support and serve the construction of ecological civilization.

To get rid of the law of historical cycles, the level of informationization of geological work must be raised to a new

height. The new round of technological revolution and industrial change is developing deeply, and new technologies such as big data, cloud computing and artificial intelligence are constantly empowering, which will likely drive geological work from a problem-driven to a data-driven working paradigm. Under the new paradigm, the process of big data mining can not only speed up the process of finding answers to questions, but also promote scientific and technological innovation by discovering and defining problems that are not yet known. The papers in the section of geological big data and data service combine the background of the times to explore and practice the strategic direction of geological survey informatization and the innovative service mode of geological data, leading the “digital revolution” of future geological work.

By 2050, geological elements will be fully integrated into the production and life of human beings, and will continuously give rise to new industries. Geological work will support China to reach a new development realm of energy independence, national beauty, ecological security, advanced science and technology, and harmony between human and nature. Geological work will help China realize the transformation from a large geological and mining country to a strong geological and mining country, and will serve the world to realize a common world where people and nature live together in harmony.

This book can be used as a reference for those engaged in geological work management, geological survey and scientific research, as well as for college students, graduate students and teachers of geology and minerals.



Shi Jun-fa, ed. 2022. Strategies for Geological Work in the New Era. Beijing: Geological Publishing House. 449 pp. Price: 298 RMB. ISBN:978-7-116-13508-6.