

# THE NATIONAL PHYSICAL ATLAS OF CHINA

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The National Physical Atlas of China is a large-sized comprehensive science reference atlas representing national achievement on atlas compilation. It consists of five sections, that is Preface Maps, Physical Environment, Natural Resources, Natural Disasters, Natural Utilization and Reservation, divided into 18 groups. It contains 540 map sheets, 115 charts and photos, and map explanation of nearly 300 thousands words. It is a quarto atlas of 283 pages. Its Chinese version and English version are published simultaneously. The Atlas comprehensively depicts the natural environment, natural resources, natural disasters, utilization and reservation of Nature in China. It is a systematic collection of the investigation and research results on geo-science in China in the 20<sup>th</sup> century, and also a great scientific innovation work on earth science in China in the 20<sup>th</sup> century.

*The National Physical Atlas of China* takes full advantage of and generalizes the results of integrated scientific surveys and specialized investigation on geo-science, biology, and environmental science, the scientific data on climate, hydrology, earthquake, geo-magnetic, and ocean accumulated during the long-term observation since the founding of the People's Republic of China, and the extensive historic record accumulated in the past thousands of years. It synthesizes the latest progress of regional investigation on geo-science and environmental science in China, comprehensively and systematically reflects the varied natural conditions and rich natural resources, and reveals the characteristics of the formation and evolution of the natural environment in China as a visual and intuitionistic atlas. It also reveals the distribution of natural disasters and unfavorable natural factors, and the great achievement on utilization and reservation of Nature in China, which provides important scientific basis to the analysis, evaluation, and exploitation of natural resources, the conservation of ecological environment, the prevention and cure of natural disasters, and the overall distribution of economic construction and social development, and also provides important information to the construction to the digital earth of China. The Atlas realizes the transformation from conventional mapping technology to automatic compilation and plate making for thematic maps and large-sized comprehensive atlas aided by whole digital and computer technology for the first time. It makes a timely contribution to the establishment of natural resources and environmental background database, promotion of whole digital thematic mapping, unfolding studies on resources and environment map form spectral system, and enhancement of networking and information sharing. In the meantime, the Atlas makes for the inter-reference and inter-fusion between geo-science, biology and environment science, and enhances the development of these disciplines. Besides, the Atlas will bring important influence to the scientific communication with other countries, enhancing their understanding of our country, and promoting the reputation of our country.

The compilation of the national atlas series, of which the national atlas of China is a part, is one of the key projects of scientific research defined in the “Twelve Year National Plan for the Development of Science”, which was drawn up under the direct supervision of the late Premier Zhou Enlai(1898-1976) in 1956. Work on the project started in 1958 when the planned series was initially divided into four volumes-general, physical, historical and economic. *The Physical Atlas of the People’s Republic of China* was compiled in 1965 and published restrictedly in 1967. Due to the Cultural Revolution(1966-76), however, the general volume was only partly finished and consequently published in 1969 under the title *Provincial Maps of the People’s Republic of China*, while work on other volumes came to a halt. In December 1980, a motion proposed by seventeen members of the fifth National committee of the Chinese People’s Political Consultative Conference that the National Atlas Series be brought into the state plan and that its compilation and publication be resumed was carried by the Conference’s standing Committee at its Fourteenth Plenary Session. In May the following year, the State Council approved the “Report on Resuming the Compilation and Publication of the National Atlas Series” submitted by the State Science and Technology Commission, the Chinese Academy of Sciences, the Chinese Academy of Social Sciences, and the National Bureau of Surveying and Mapping. In this report, one more volume-an agriculture atlas-was added to the series.

The National Physical Atlas of China was re-compiled by the Institute of Geography and Resources, Chinese Academy of sciences under the supervision of Chinese Academy of Sciences and the National Bureau of Surveying and Mapping. It was published in August 1999 by China Atlas Press. The Atlas is a collective effort of over 300 experts and scholars from 40 institutions, and a crystallization of collective wisdom of scholars and specialists from different disciplines. It has several innovation characteristics:

**1. Basic scientific material and data are extended and updated at both spatial and temporal dimensions, which expresses the scientific accumulation more comprehensively on geo-science, biology and environment science in the 20<sup>th</sup> century.**

The Atlas summarizes and generalizes the abundant first-hand data on natural environment acquired since 20<sup>th</sup> century, especially in the last 50 years since the founding of the People’s Republic of China. On the basis of them, the Atlas reflects the characteristics of natural environment, the distribution pattern of various elements and their relationship comprehensively, systematically, accurately and in detail in China. In the meantime, the Atlas reveals the complexity, diversity, and particularity of natural environment of China. Every map of the Atlas is based on long-term observation data or in depth investigation and research material. For example, *Earthquake Epicenters Distribution Map* of China depicts all earthquakes above 4<sup>th</sup> grade during 1883 BC and 1969AD, and all earthquakes above 2<sup>nd</sup> grade since 1970.

**2. The Atlas carries out “sustainable development” strategy and combines with the focus that current society concerns, concentrating on the description of natural**

**resources, natural disasters, utilization and conservation of Nature, and emphasizing the relationship between human being and Nature.**

The Atlas uses three sections to represent the distribution characteristics, relative quantity, and development prospect of various resources in China; reveal the distribution scope, dangerousness degree, and formation process and causes of various natural disasters and unfavorable factors in China; and reflect the great achievement on utilization of Nature and arduous mission to reserve Nature. For instance, the Atlas depicts varied mineral resources and energy resources such as coal, coal formed gas, oil shale, petroleum, natural gas, geothermal, water power resources, solar energy, and wind energy. As another example, the Atlas illustrates earthquake, landslide, debris flow, drought, waterlogging, ice-jam flood, hail, thunder storm, typhoon, storm tide, soil degradation, salinized soil, soil erosion, land desertification, and endemic related to selenium, iodine, and florin. The above mentioned practical maps consist of 40 percents of the Atlas, which provides scientific basis for planning and decision making on reasonable utilization of resources, disasters prevention and harnessing, and Nature conservation.

**3. Substantial maps on plants and animals reveal biologic diversity and relevant in-depth investigation and research in China.**

Plant maps include category map, regionalization map, and flora division map of various peculiar species of plants. Besides, we selectively compiled edible and industrial wild plant maps, medical wild plant map, marine phytoplankton map, and rare endangered plant under protection map. We compiled relatively more maps on beneficial animals, original species of domestic fowls and livestock, economic animals, medical animals, marine zooplankton, marine nekton, marine zoobenthos, harmful animals, major protected wildlife, rare and protected freshwater fish, and marine rare and protected mammals. All these maps reflect the intensive attention and in-depth research on biological sphere, which is of far-reaching significance to strengthen the biological diversity conservation and for the planning and construction of natural reserves.

**4. Added new topics and contents highlight the new progress and new contribution on geo-science investigation and research in China, which efficiently reveals the regular pattern of the formation and evolution of natural environment in China.**

The atlas includes relatively more maps reflecting the important achievements in every discipline, especially new discipline branches and research fields. For example, geo-tectonic maps reflect four different kinds of viewpoint, this is, Plate tectonics, geologic mechanics, fault-block theory, and Diwa/geodepression theory; *Paleo-geography Maps* reflect the evolution of land and ocean in different geological times. Besides, it selectively compiled *Lithospheric Dynamics Map*, *Geo-scientific Transaction*, *Geothermal flow Map*, *Geothermal Gradient Map*, *Quaternary Glacial Distribution Map of Qinghai-Xizang Plateau*, *Distribution Maps of Loess*, *Chang Jiang Drainage Basin Aquatic Body Environmental Background Values Map*, *climate-vegetation zone*, *potential first net productivity and the prediction of its response on global change*, *Farmland Productive Potential Map*, *Earthquake Activity Features and Spatial-Temporal Migration*

*Map, landslide disaster map, endemic related to selenium, iodine, and fluorine.* Great progress is also attained in ocean surveying and research. In order to reflect the deepened research on ocean, more ocean maps are compiled, including submarine tectonics, coastal and submarine relief, submarine sediment, hydrochemical elements of offshore surface, sea swell, oceanic tide, submarine mineral deposits, and nearshore storm surge. These maps reflect the important achievements and breakthrough of state key scientific research in recent 30 years, which have great scientific significance.

**5. The method and technology to design and compile the Atlas prove to be an great innovation, which realizes the revolutionary transition from conventional map production technology to digital map design, compilation, and automatic plate making.**

The new re-compiled National Atlas of China developed many experiments on integrated mapping, remote sensing mapping, computer-aided mapping and automatic plate making, carried out a great deal of work on the unification and harmonization of the scientific content and representation method, which makes the Atlas a comprehensive organic whole. The Atlas established a new technological flow of computer-aided design, compilation and automatic plate making, so that the large-sized comprehensive national physical atlas with varied map type, detailed patch, and vast volume data is carried out through whole digital computer-aided design, compilation and automatic plate making for the first time. The compilation and plate making technology reach the most advanced international level in the latest 1990s.

The compilation and publication of national atlas represent the science, technology and cultural level of a country, and is hold in high regard by the government and scholars in every country. China has compiled and published large-sized atlas several times during prosperous times in history. Up to now, more than 80 countries have compiled and published their national atlas. These atlases include some physical map respectively. Some of them are divided into several volumes, but there isn't unattached physical atlas volume. Therefore, it is the first national physical atlas in the world, which contains vast topics and contents on natural environment, natural resources, natural disasters, utilization and reservation of Nature. Besides, the Atlas includes many sheets in every map section and map groups, and every map depicts detailed materials, providing a great deal of basic information and innovative research results, which is unexampled by national atlas of other country. The large-sized complicated Atlas was carried out with whole digital technology, which is also rare in the world.

The Atlas brings about great influence and holds high regards after its publication. More than 10 key newspapers including People's daily, Guangming Daily, Science and Technology Daily, and Science Times, China Center Television Station and Beijing Television Station, China Broadcast Station and Beijing Broadcast Station reported and introduced the Atlas. Chen Shupeng, famous scientist in cartography, remote sensing application, and geographic information systems in China, academican of International Eurasian Academy of Sciences, highly praises the Atlas "innovating in mind, winning honor for our country, and standing in the forest of nations in the world", "deepening the

understanding of the natural resources and environment, and the geo-science characteristics in China”, “having important practical significance on carrying out ‘science and technology rejuvenating China’ and sustainable development strategy, and promoting socialism in China toward the 21<sup>st</sup> century”. Gao jun, famous cartographer, academician of Chinese Academy of Sciences regards that the Atlas “absolutely reach the leading position in the world”. Four professors of Geography Department, Moscow University issued paper, systematically introducing the content and characteristics of *the National Physical Atlas of China*, regarding that “the Atlas is the most excellent atlas published in the world in recent 10 years”. Shiryaev, famous specialist in cartography and geographical information systems, president of International Eurasian Academy of Sciences, pointed out that “the publication of the large-sized comprehensive scientific reference atlas of China in 1999, a huge scientific and technological work, is an epoch-making event in the science and technology life of China. The extensiveness of its contents and the thematic variety of physical atlas, and the quality of map analysis and interpretation of natural environment, are unexampled in the world.” Prof. B.Rystedt, President of ICA, and Prof. F.Ormilng, Secretary General of ICA, regarding that the Atlas “provides particularly good examples for other nations, who are in the process of national atlas production.” Prof. K.Milan, Vic-president of ICA, regarding that *The National Physical Atlas of China* “is done on the highest world scientific and technological level. Atlas has unique importance not only for China but also for development of the world cartography”.

We are engaged in the establishment of national physical atlas information system of China. On the basis of them, the electronic version of *The National Physical Atlas of China* will be published. The electronic version won’t be the simple replication of the paper version. It will include dynamic and 3D representation, and analytical functionality will be added. In the meantime, some map sheets in the Atlas will be published on the Internet, providing important information resources to the Digital China, and exerting its social benefit more extensively.

**Key Words** National atlas, Physical atlas, Knowledge innovation, Characteristics

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