

Geography of the Physical Environment

Batchuluun Yembuu *Editor*

The Physical Geography of Mongolia

 Springer

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Editor

The Physical Geography of Mongolia

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Editor
Batchuluun Yembuu
Department of Geography
Mongolian National University of Education
Ulaanbaatar, Mongolia

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Preface

Mongolia is a unique country for geographers, and it has very diverse geographical features, natural landscapes, a long history, as well as all the geomorphological processes. Even many scientific articles and research papers can be found in a variety of sources, such as the internet, related to Mongolia's geography, but no integrated and systematic academically oriented book that we are planning to compile. The chapters of the book will provide readers with general information and features of the physical geography of Mongolia, as well as new findings of the latest research.

Mongolia is a country that occupies vast areas in the center of the continent and has a rich and ancient history with many natural and geographical features. For these reasons, many foreigners came here out of interest to study the natural features. Especially in the second half of the nineteenth century and the beginning of the twentieth century, the research on Mongolian geography progressed considerably. On the basis of these researches, the Institute for Geography of the Geography of Mongolia (1969) published a full-fledged monograph "Physical Geography of Mongolia" (edited by Sh. Tsegmid), which is still the main source of research.

Since then, significant progress has been made in the field of physical geography research, and many new studies were carried out on the subject, but no complete book has been written. In particular, there are no books in English, and readers are very limited to the information on geography of Mongolia, which is only briefly presented at sessions of tourism organizations and in other reports. In this regard, most of the foreign sources of research on Mongolian geography use creations of foreigners, and materials of local authors are not widely available in English.

For example, with regard to foreign studies on Mongolia and the material used, the work of national authors is very rare, and although in some cases projects are implemented with foreign assistance, this is often only one aspect of the issue that is very common. To this end, this book was used as a result of the studies by many national scientists, and each member of the author group has many years of experience in writing the physical geography textbooks.

Therefore, it should be noted that the purpose of this book is to consider a simple form of writing for readers, students, and beginners, rather than for professional researchers. The primary goal of this book is to provide its readers with a more comprehensive picture of Mongolia and its geographical features.

There are numberless materials related to the physical geography of Mongolia, permafrost, and glaciers in foreign languages, internet sources, articles, encyclopedias, and so on. Owing to the published languages (Russian, German, Chinese, etc.), the geographical names of places are written differently in a number of sources. For instance, the historical area of Zuungar Gobi (in Mongolian) is a desert area located between the Mongol Altai mountains in the north and the Tian Shan in the south; it derives its name from the local tribe of Jungar, or Oirat; it is written as “Jungaria”, “Jungar”, “Dzungaria”, and so on. Similar examples are *Huh Nor* or Khukh nuur (nuur means lake in Mongolian), *Hara Hoto* (in Russian), *Khar Khot* (in Mongolian); and *Ejnii gol* (gol is a river) is in Chinese inner Mongolian dialect and it is written as *Eznii Gol* in this book. Thus, we used the standard of written foreign words in the Mongolian language to unify the different types of names.

It is a challenge to publish a comprehensive work on the physical geography of Mongolia. Voluminous excellent works have been written from various points of view. I believe that the book provides an intermediate depth material coverage that is appropriate for the public.

The data in this book, related to the height of the mountain peak, elevation of the weather stations, and river length, are based on official information of the National Statistical Office and the National Authority of Geodesy and Cartography. In terms of geographical coordination, the places were determined from the GPS data of the Google Maps, while the sources of the climate parameters are based on the National Institute of Meteorology and resource materials of the Ministry of Environment and Nature.

This book consists of 11 chapters, including color maps, pictures, and tables. The main structure of the chapters consisted of abstract and key terms, and then begins with a discussion on the overview of the research history in the field, followed by the main issues depending on the field. In addition, the readers would probably note that the book is extensively illustrated with full-color maps, diagrams, and photos.

Chapter 1 briefly presents the general characteristics of Mongolia and some important concepts. The chapter begins with a discussion of detailed descriptions of geographical location, physical features, climate conditions, water resources, population, and culture. Chapter 2 provides a brief history of the territorial transformation and administration of Mongolia. The chapter summarizes an overview of studies on physical geography of Mongolia.

Geomorphology of Mongolia is the subject matter of Chap. 3 encompassing geological formations, landforms, and relief, a scheme of geomorphological zonation. The last part of the chapter describes the morphological characteristics of each geomorphological region, which have been modified and updated based on the results of research by well-known scientists.

Climate and climate change of Mongolia are addressed in Chap. 4. This chapter begins with an overview of climate research in Mongolia conducted by national and foreign scientists. Furthermore, it shows the driving factors of the Mongolia's climate condition, and the spatial features of the main parameters of climate are introduced. Lastly, it presents about the climate change in the country and its impacts. Chapter 5 covers the hydrography of

Mongolia. In the first section of the chapter, an overview of Mongolian hydrological research is introduced. The geographical background of the surface water is introduced in the second part, describing the morphological, hydrological, and ecological characteristics of rivers and lakes, including the description of the genetic lake types. The third section introduces groundwater resources and its geographical distribution.

Glacial and periglacial processes are presented in Chap. 6. The first part of this chapter relates to the Mongolian glacier study review factors such as climate, depressions, surface elevation, sedimentation, geographical distribution, and latitude correlation. The following section illustrates the distribution of glaciers Mongolian Altai, Khangai, and Khuvsgul mountains, as evidenced by changes in the ancient and modern glacial traces and the extent of the area as a result of climate change impacts, causes, and consequences. The effects of glaciers on the surface caused by the surface forms and the changes in the hydrological network due to the global warming process were discussed.

In particular, the chapter analyzes key geographical studies aimed at exploring the physical features of the natural patterns and conditions related to the geomorphology, geology, hydrography, climate and soil characters, glacier, as well as regional variations.

Chapter 7 presents the permafrost distribution in Mongolia, general characteristics of permafrost, cryogenic features and analyzes the degradation of permafrost. The distribution of permafrost is controlled by the climate in the north part of Mongolia and local environmental factors in the middle of the country or the edge of Siberian permafrost, with continuous, discontinuous, sporadic, and isolated types. Also, some examples of permafrost monitoring in Mongolia and the impacts of permafrost caused by climate change are introduced in this chapter.

Soil and processes of degradation and erosion are discussed in Chap. 8. It includes the introduction of the majority type of soils in the country and its distribution. Mongolia has almost all types of soil in the temperate zone of the world, from the mountain tundra to the over desert. But the same type of soil occurs in the mountains and hills, and it is difficult to classify and diagnose. Major classification of a total of 10 types of soil morphology is written and explained its geographic distribution in the chapter.

Chapter 9 describes the biogeographical characteristics of Mongolia in context of physical geography. Thus, it focused on result issues related to the research of vegetation and zoogeographical regions of Mongolia. Landscape diversity and extreme climatic conditions contribute to the diversity of ecosystems of the country. Mongolia's fauna includes 141 mammal species, 502 bird species, and 79 fish species. More than 3127 species of vascular plants, 574 species of mushrooms, 1056 species of lichens, 2003 species of algae, and 580 species of mushrooms have been found in Mongolia.

Chapter 10 briefly presents the development and compilation of a revised map of a physiographic region of Mongolia and gives an overview of physiographic mapping in Mongolia, and zonation on the natural components has been defined. Due to the different landscape forms and natural conditions, especially from south to the north and also vertical layers caused

by high mountain ranges, the distributions and patterns of natural zones are more complicated. They form a series of altitudinal belts in the mountainous area and latitudinal zones across the country from north to eastern plains and plateaus and southern desert regions. In the mountain zones of the north and west, the pattern is more complex because elevation rather than latitude is the dominant factor, and there are striking changes over relatively short distances. Within Mongolia, there are six main environmental zones and belts (with subdivisions): High mountain and mountain taiga, mixed and deciduous forest, and forest steppe, steppe, Gobi (desert-steppe), and desert zones.

Land use and nature conservation issues were dealt with in Chap. 11. It presents agricultural and urban land resources, protected areas, deforestation, and reforestation. The chapter discusses the issues of forest cover, protected areas, and anthropogenic changes in Mongolia.

Ulaanbaatar, Mongolia
2020

Prof. Dr. Batchuluun Yembuu

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Prof. Dr. Batchuluun Yembuu

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Editor and Contributors

About the Editor

Batchuluun Yembuu is a professor in the Department of Geography at Mongolian National University of Education. She has published widely in the areas of the Earth Science, General Physical Geography and Geography Education, with more than 200 publications. She is also the author of several books, such as Earth Science, General Physical Geography, The Dictionary of Physical Geography and so on, and several geography textbooks. She is the founder and an executive director of the Mongolian Association for Geographic Education (MAGE) and editor-in-chief of Geoforum-Mongolia journal.

Contributors

Avirmed Dashtseren is a leading researcher and Head of the Permafrost Division at the Institute of Geography and Geocology, Mongolian Academy of Sciences. He obtained his Ph.D. degree from the Graduate School of Environmental Science, Hokkaido University in Japan. His research is focused on the state of the marginal of permafrost and glaciers in Mongolia in nexus with the interaction of climate change and ecosystem.

Dash Doljin is a professor of geography at Mongolian National University of Education. He was formerly employed at the Institute of Geography and Geo-ecology of the Mongolian Academy of Science for more than 30 years. Besides more than 200 publications and maps related to the physical geography, he had developed updated versions of the physiographic, landscape regionalization of Mongolia, which include the National Atlas of Mongolia (1990, 2009). He is the author of the maps related to physical geography of Mongolia in the Desertification Atlas of Mongolia (2014).

Sandag Khadbaatar is an associate professor in the Geography Department of the Mongolian National University of Education. He obtained his Ph.D. degree in Moscow, Russia in 2005, at the Soil and Landscape in the Selenge river basins. His research interests are physical geography, soil science, and geomorphology. He authored and coauthored many books. The most recent

one is titled, *Transformation of land ecosystems in the southern part of the Baikal basin*, published in Russia (in Russian) in 2018.

Bat-Erdene Tsedev Ph.D. in Geography, Associate Professor of Mongolian National University of Education. His research interest includes GIS, remote sensing and geospatial technologies, and urban land use.

Ser-Od Tsedevdorj holds a doctoral degree and is a senior lecturer at the Department of Geography. He teaches the courses on Physical Geography of Mongolia. His current research interests include physical geography, landscape studies and glacier environment. He is a member of Joint Russian–Mongolian complex geographical expedition to the Tavan Bogd mountain massif since 2015.

Khurelbaatar Tsogbadral is concurrently the head of the Department of Geography, Mongolian National University of Education. His research interests include tourism and recreational geography. He holds a Ph.D. on the geocological issues of Mongolia. His current research interests include recreational geography and the environment study.

Navchaa Tugjamba obtained M.Sc. in Environmental Sciences from UNESCO-IHE, The Netherlands and holds Ph.D. She has been working in the field of geography research and teaching for around 20 years. Her research results were published in the international peer-reviewed journals and presented at the international level conferences. She has written several books on environmental management, water resources management and tourism education. Her research interests are water and ecosystem management, ecotourism and sustainable development.

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