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Healing Springs of Russia

 Springer

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Preface

Advances in scientific medicine have not diminished the importance of healing natural remedies, the use of which is rooted in ancient times. On the contrary, modern theories of medicine and healthcare, viewed through the prism of existing economic and ecological problems, increase interest in natural healing resources and the age-old experience with them in traditional medicine.

Mineral waters have a physiological effect on the human body because of their biologically active healing properties. They are the main therapeutic agent used at balneological resorts, where they are applied externally in baths and pools, and for inhalation, drinking, and other procedures. Therapeutic mud (peloids) is another important natural healing factor widely used in Russia. The healing properties of the mud are due to its chemical composition, biologically active substances, and thermal and mechanical effects.

This book is a result of the collective efforts of members of the Lomonosov Moscow State University Faculty of Geography, with the assistance of colleagues from related organizations. It was conceived to mark the 300th anniversary of the first exploration of healing springs in Russia. This is the first cartographic synthesis at the national level of comprehensive information about natural healing resources such as healing waters and mud. The database contains information about springs, peloid deposits, and health resorts. Sources of information were cartographic, literary, and archival, along with stock materials, state statistics, and the results of field expeditions. The material sent to us by regional organizations in response to inquiries made through the Russian Geographical Society were of particular importance. The authors are sincerely grateful to all of them.

The monograph summarizes a variety of information about the natural healing resources of Russia at the federal and regional levels, presenting it in a systematic and visual form. It contains 36 maps. Along with the overview maps of Russia, the book contains maps of some regions (Caucasus, Tyva, Far East, etc.), prepared from original research in conjunction with the relevant regional services. Color illustrations and photographs complement text and maps.

The book is intended for the use of workers in the healthcare system, science, and education, as well as a wide range of users interested in natural healing resources and a healthy lifestyle.

Moscow, Russia

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This book was based on Медико-географический атлас России «Целебные источники и растения» (Medico-geographical Atlas of Russia “Healing Springs and Plants”) by Svetlana Malkhazova, et al., published by Lomonosov Moscow State University in 2019.

The Medico-Geographical Atlas of Russia: Healing Springs and Plants was created by collecting, analyzing, and summarizing the stock materials relating to healthcare and tourism organizations with the financial support of the Russian Geographical Society, grants No. 02/2016-I of 04/05/2016, No. 02/2017-I of 06/23/2017 and No. 01/2018-I of 12/12/2018.

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Ministry of International Cooperation and Foreign Economic Relations of Transbaikal region

Ministry of Health of Arkhangelsk Oblast and Solonikha resort;

State Committee for Nature Management and Environmental Protection of Pskov Oblast and Khilovo resort;

Ministry of Economic Development of Tver Oblast and Kashin resort;

Lake Karachi Resort LLC.



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Introduction

Modern areas of medicine and health care contribute to increasing interest in natural healing resources and their centuries-old use in traditional medicine. The issue of using healing resources in medical practice and health care is closely related to its informational support through databases, cadastres, reference books, and cartographic models of various types, purposes, territorial coverage, and scale.

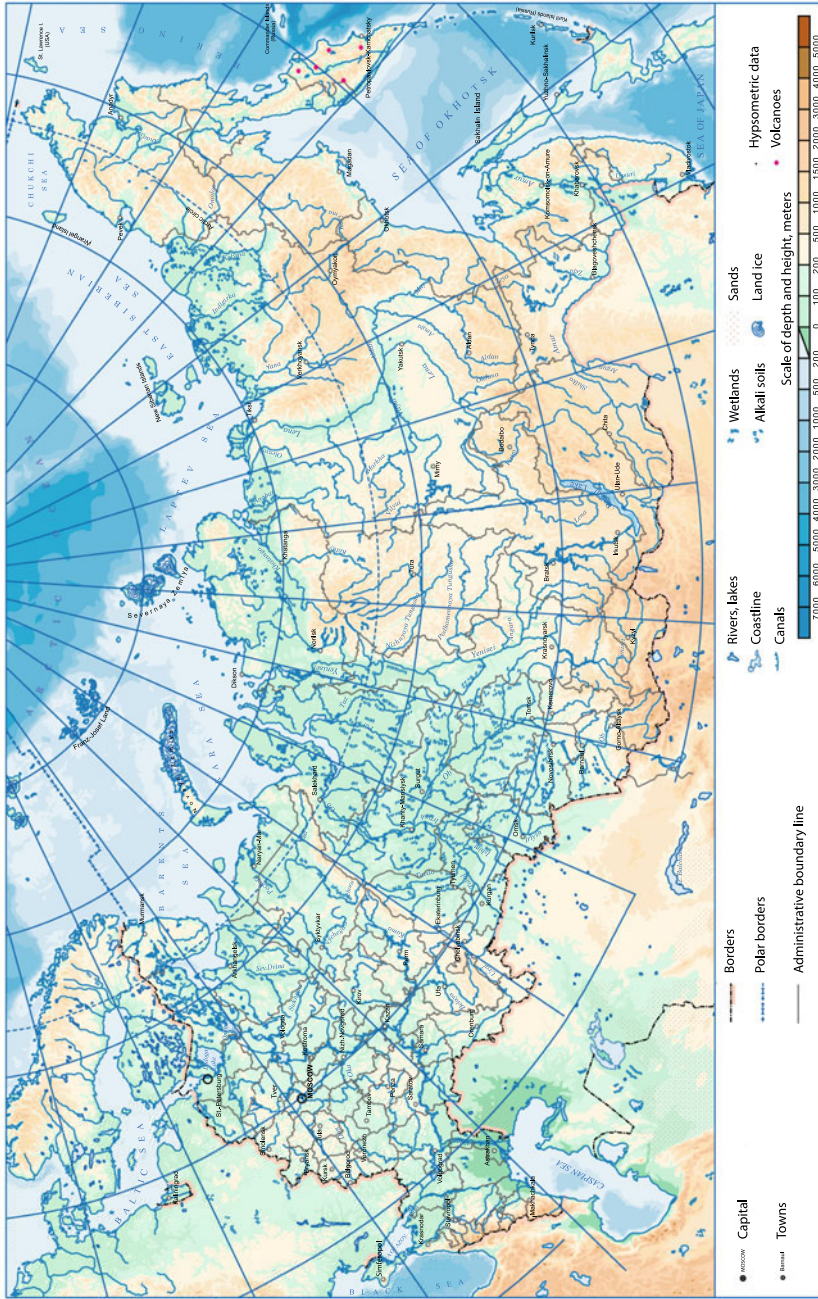
Based on the processing and systematization of the materials collected, a relational database with the spatial references of all objects under study has been prepared. After the processing of statistical information, maps were compiled in ESRI, ArcGIS, Bentley's, MicroStation, and Adobe Illustrator.

The preparation process of the monograph included several stages, and shaped around the following tasks:

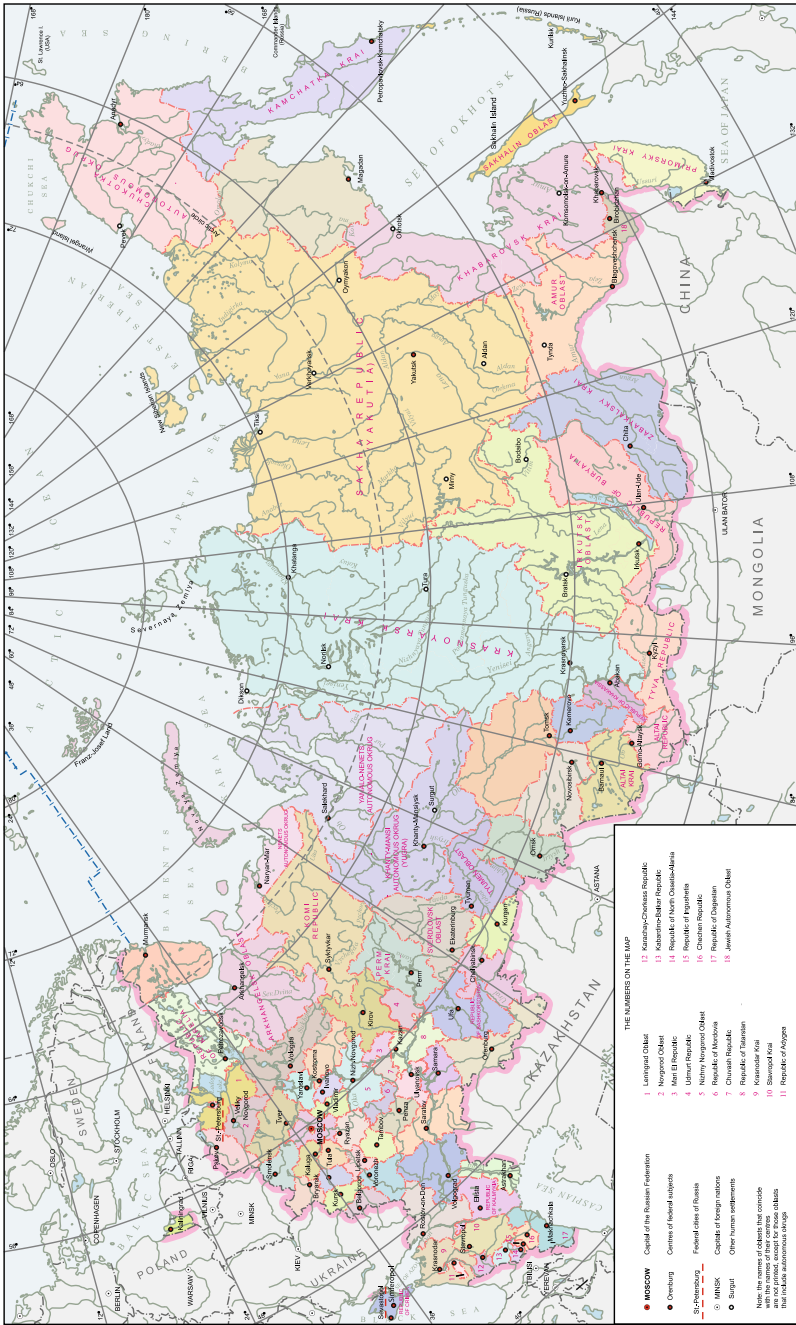
- a review of historical experience using medicinal springs and mud in this country and abroad;
- a systematization and analysis of data on the role of medicinal springs and mud in modern scientific and practical medicine;
- creation of a database of healing waters and mud deposits;
- mapping of the location of major healing waters and mud deposits, according to their physicochemical and therapeutic characteristics;
- development and generalization of recommendations on the use of healing waters and mud deposits in relation to certain categories of diseases.

The purpose of physical and administrative structure maps of the Russian Federation (Maps I, II) is to serve as a basis for linking thematic content of subsequent maps to the geographical objects and 85 administrative units of the Russian Federation.

Natural conditions largely determine the territorial organization and living conditions of the population, its economic activities, as well as the availability of therapeutic and recreational resources: mineral springs and peloids.



Map I Physical map



Map II Administrative divisions of the Russian Federation

The large latitudinal (more than 4,000 km) and meridional (more than 10,000 km) extent of the territory of Russia led to its natural diversity. Landscapes, as territories with a homogeneous geological foundation, a homogeneous relief, a common climate, a regular set of soils, plant and animal communities, are considered a specific human environment.

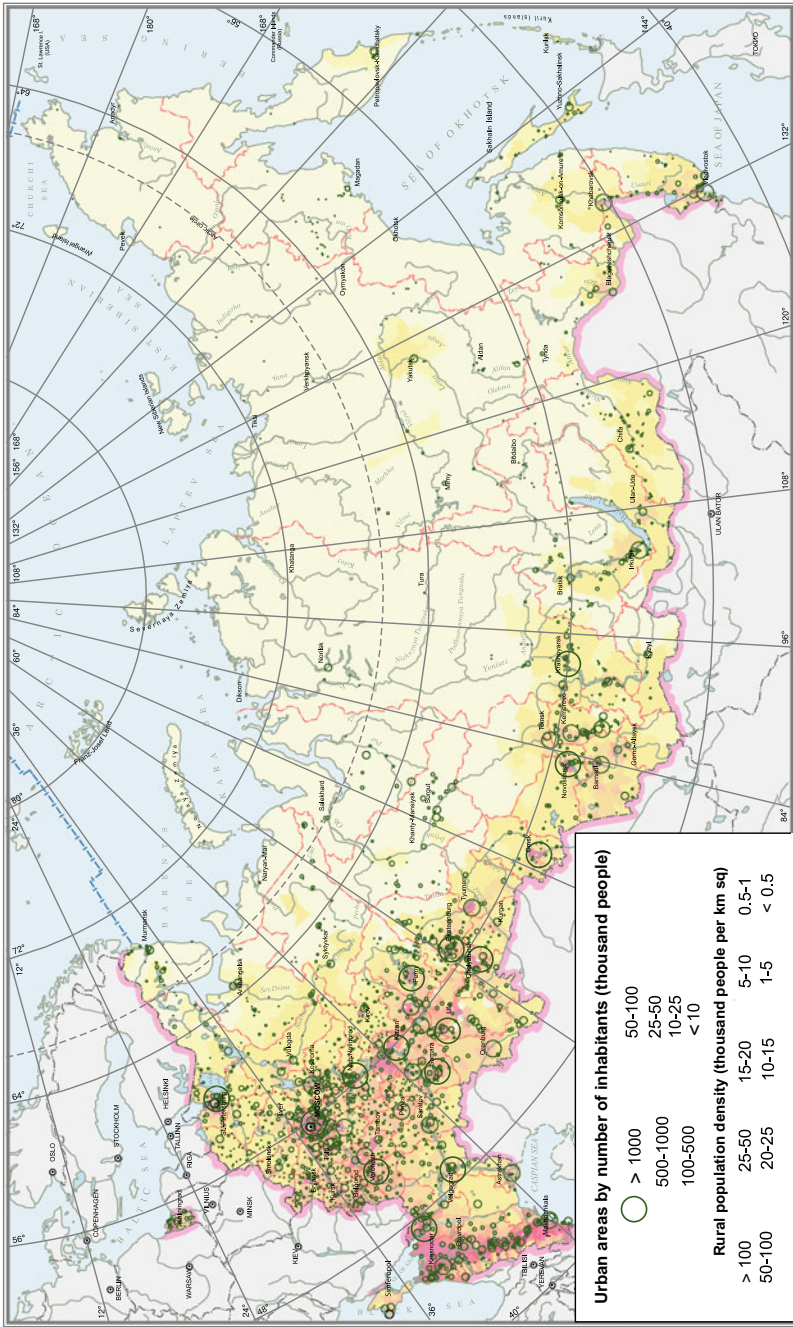
For effective and reasonable use of healing springs, it is highly important to be aware of the specifics of population distribution. The population of Russia is extremely unevenly distributed (Map III). The highest population density is observed in Central Russia, then it declines incrementally toward the north and south. Overall, the European part of the country can be considered the main population band.

The greatest number of people live in the Moscow region (Moscow and Moscow Oblast), as well as St. Petersburg and Leningrad Oblast, which are large economic centers of the country. There is an obvious association of population distribution not only with the level of socioeconomic development of the territories, but also with the comfort level of the natural conditions.

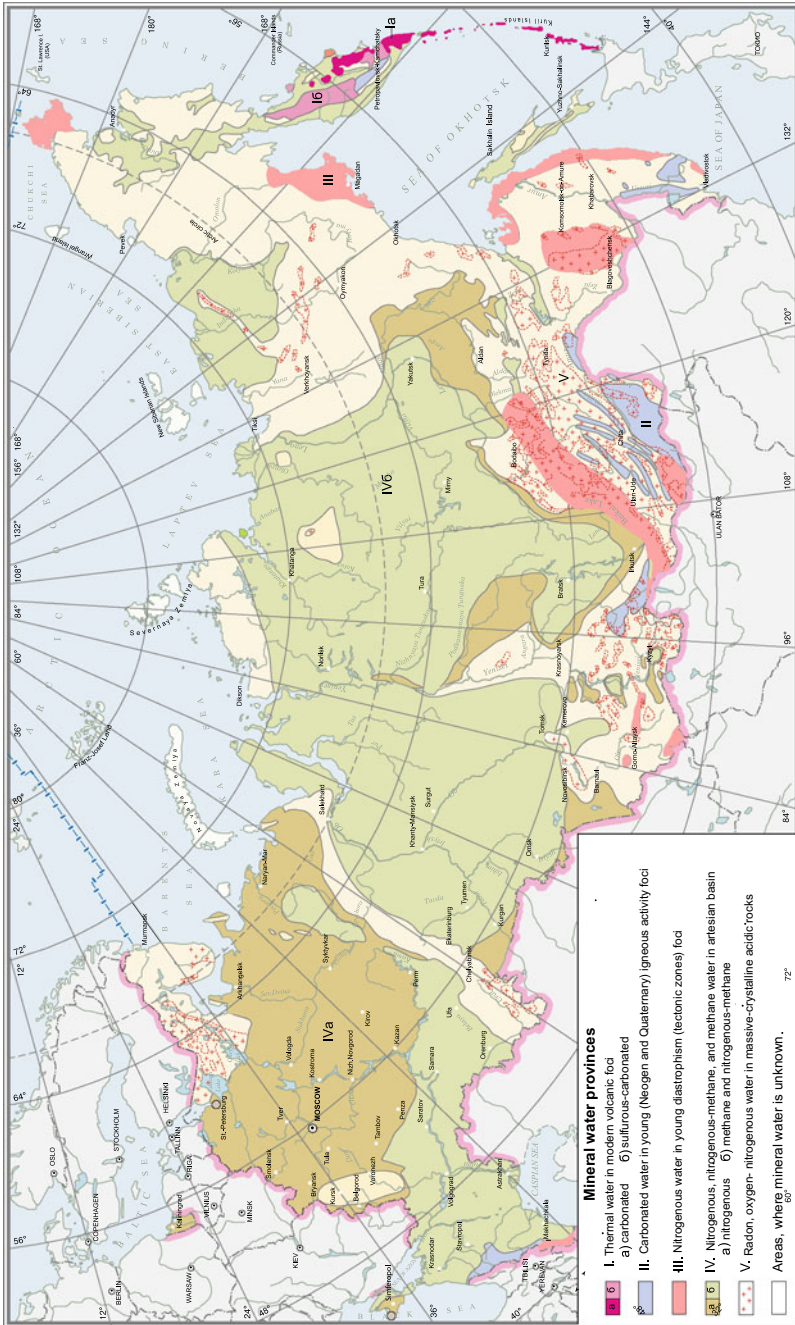
The potential healing mineral water resources of Russia are great. The types of mineral water distributed in country are very diverse in quality. The close relationship between water chemistry, composition of rocks, and hydrological conditions makes it possible to divide them into the large groups represented on the hydrogeological map "Mineral water provinces" (Ivanov 1968), where characteristic types of mineral water are presented (Map IV).

The map shows five mineral water provinces. Province I is characterized by the formation of strongly overheated mainly nitrogenous-carbonated thermal water in modern volcanic foci, which, when it reaches the surface, forms boiling springs and powerful gas-vapor and steam-water jets. In the upper oxidizing zone, under the direct influence of volcanic gases, very acidic, sulfurous-carbonated water is formed. Carbonated hot springs are quite common in the province. Province II is characterized by diverse and complex geological and structural conditions. Carbonated water prevails here. If there is nitrogen, methane, and hydrogen sulfide in them, nitrogenous-carbonated, methane-carbonated water is formed, and water with even more complex gas composition. In Province III, nitrogenous mineralized hot springs are common. Hot springs are often associated with granitoid rock massifs and with water rising from great depths and appearing as high-temperature springs. In Province IV, the distribution of nitrogenous, nitrogenous-methane, and methane water is subordinated to the general hydrochemical zonation, which can get more complicated depending on the lithological rock composition, paleo-hydrogeological, and other conditions. The most important feature of the gas composition of the province's water is the presence of hydrogen sulfide. The water of Province V is characterized by low temperature and low mineralization increasing in cases of its enrichment with radon.

The monography presents the geography of springs in Russia as a whole and for its individual regions (mainly for large areas of spring concentration or for the oldest resorts). For the Russian territory, it is developed and detailed in a series of analytical maps grouped in two main sections: Mineral water and Mud springs (peloids), indicating the locations of various types of deposits. In a separate chapter,



Map III Urban and rural population



Map IV Mineral water provinces

regional information on healing springs is displayed. They include areas of international importance with a highly developed culture of medical services: Caucasus, Crimea, and promising remote areas (Tyva, Zabaykalsky Krai, Kamchatka) with great natural and healing potential, but so far poorly equipped and designed mostly for tourist groups. The special chapter is about the history of healing springs in Russia. The final chapter deals with health resort organizations, including the oldest Russian resorts using treatments based on natural water and mud deposits.

Reference

1. Ivanov VV (ed) (1968) Map of mineral healing waters of the USSR (1:4000000). Moscow (in Russian)

Chapter 1

Mineral Water



Abstract The chapter presents the classification of types of mineral waters based on their physical and chemical characteristics. Such parameters of mineral waters as mineralization, ionic and gas compositions, biologically active substances, temperature, and acidity (pH) are considered. Maps of the distribution of different types of mineral waters supplement the text. The therapeutic effect of mineral waters, including their external (balneological) and internal (drinking) applications is analyzed. The distribution and use of radioactive (radon) water for therapeutic purposes are examined. A specific section is devoted to the analysis of current health status of the population in Russia and the possibilities of healing effect of mineral water in those diseases where mineral water is in most common use.

Keywords Mineral water · Physical and chemical characteristics · Classification · Types of mineral waters · Distribution of mineral water springs · Radon water · Therapeutic effect · Balneological application · Health status · Russia

Water is the basis of life on the Earth. No known form of earthly life can exist without it. Water is a strongly polar universal solvent that can incorporate and retain many gaseous, mineral, and organic substances and compounds in various concentrations, thereby providing both living conditions and the internal homeostasis or metabolism of living organisms.

Water containing dissolved salts, trace elements, and other biologically active components is considered mineral water. Natural mineral water is a complex dispersed system containing a variety of minerals, organic additives, and gases. Moreover, it has been shown that absolutely chemically pure water (without impurities and substances dissolved in it) does not exist in nature (Gall 2015).

During the compilation of the electronic database of mineral water and preparation of the book, materials on 1075 springs located in various regions of Russia were generalized and analyzed (Malkhazova et al. 2019). The distribution of healing mineral water springs in the Russian Federation is shown in Map 1.1

There are many works on mineral waters and peloids (Jackson 1990; Guthrie, Mossman 1993 ; Reinbacher 1999; Van der Linden 2002; Van Tubergen, Varga