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HYDROLOGY AND LIMNOLOGY OF CENTRAL ASIA

Preface

Water resources of Central Asia are formed mainly in mountainous areas and occupied more than 20% of the Aral Sea basin area (3,50,000 km²). About 90% of the surface runoff is formed in this area that is 115 billion m³ of water (in the average water year). Mainly, they are located within two large river systems: Amudarya and Syrdarya rivers. Lakes are a source of significant water resources, organic and mineral raw materials. Lakes are used for water supply, irrigation, watering of livestock, and for the development of fishing. Some salt lakes are deposits of valuable mineral raw materials for the chemical, food, and other industries (sodium and magnesium chlorides, sodium sulfates, etc.). In addition, most of the highly mineralized lakes contain significant reserves of medicinally valuable mud (mineral mud), and they have a great balneological significance. In addition, some lakes have a great recreational value. Lakes are original water complexes and one of the most important elements of natural landscapes. They differ from the surrounding natural complexes of land. There are thousands of large and small lakes spread on the territory of Central Asia and Northwest China. They distributed on the plains and in the mountains as well. There are more than 51,000 lakes with a total area of 14,571 km² on the territory of Central Asia, including in the basins of the Amudarya, Syrdarya, Shu, Talas rivers, Issyk-Kul Lake, Eastern Pamir, and Tien Shan, as well as the drainless regions of Turkmenistan. There are 700 lakes in the arid regions of Northwest China, including 29 lakes in size more than 10 km². Limnology is an independent complex science of continental water reservoirs with slow water exchange such as lakes, water reservoirs, ponds belonging to the family of geographical disciplines. This complex science studies the interaction of physical, chemical, and biological processes taking place in water reservoirs, as well as the history and evolution of lakes. At present, the problem of integrated study of lakes is becoming increasingly important. Its correct solution is the study of the lakes in the arid regions of Central Asia and Northwest China. Since the Lobnor lake was dried up because of increasing anthropogenic factor, the same situation was observed in the Aral Sea v agamprit@gmail.com Basin. The basin is characterized by crisis level and became a catastrophical region. The rapid development of the economy requires the full utilization of all natural resources. The main aim of this book is a comprehensive study of the development of lake systems and water reservoirs and impact of climate change on water resources in Central Asian countries. And this book provides information about genesis of lake basins, physical and chemical properties of water in lakes, hydrological regime (water balance and fluctuation levels) of lakes of Central Asia and Northwest China. Study and research on lake systems are important and required in the background of climate change and sustainable development and use of natural resources in Central Asia. The study of the possible impact of climate change on water sources is very relevant, since the role of lakes in human life is determined primarily by large reserves of freshwater. Lakes are very sensitive in terms of climate change and anthropogenic factors, since lake sediments are the main parameter or source in climate change and anthropogenic factors. In addition, lakes are natural runoff regulators and the core of specially protected areas such as national parks, reserves of various levels. In modern conditions, the role of lakes is significantly increasing, because they remain custodians of clean freshwater in conditions of permanent anthropogenic factor and impact. This book mainly addressed to scientists and researchers whose research has been focused on lakes and use of natural resources, irrigation, hydropower, and water supply as well as students and planners. We believe that our contribution on the study of lakes in Central Asia and in the arid regions of Northwest China will be a source of information and knowledge for all readers who feel responsible for the sustainable use and development of natural resources such as lakes and other water bodies. Urumqi, China Jilili Abuduwaili Urumqi, China/Almaty, Kazakhstan Gulnura Issanova Almaty, Kazakhstan Galymzhan Saparov