Introduction

Chapter 1 Thoughts on Salinology and Saline Systems Research

1.1 On Salinology

1.1.1 Introduction

1.1.2 Trends of scientific and technological development

1.1.3 Salinology

1.2 Expansion of Salt Science--Thoughts on Saline Systems Research

1.3 Salinology: Research and Prospects

1.3.1 A review of research and utilization of saline lakes

1.3.2 Salinology and great saline lake industry

1.3.3 Investigation of salt resources and prospects of salinology

1.3.4 Conclusions

1.4 A Comparative Analysis of Evaporate Sediments on Earth and Mars: Implications for the Climate Change on Mars

1.4.1 Introduction

1.4.2 Observations of Martian salts

1.4.3 The formation of evaporate salts on Mars

1.4.4 Primary discussion on the evolution of Martian atmosphere indicated by the evaporate salts

1.4.5 Potential potassium salts deposits on Mars

1.4.6 Future works

References

Chapter 2 Chinese Saline Lakes and Their Resources

2.1 On Chinese Saline Lakes

2.1.1 Introduction

2.1.2 Salt lake regions

2.1.3 Chemical typology

2.1.4 Palaeolimnology

2.1.5 Halophilic organisms and biological mineralogenesis

2.2 On Saline Lakes in Xizang (Tibet), China

2.2.1 Origin of lake basins and classification of lake systems

2.2.2 Lake basin evolution and salt sedimentary cycles

2.2.3 Chemical types of salt-lake water and their distribution

2.2.4 Source of mineral materials

2.3 Hydrochemistry of Salt Lakes of the Qinghai-Tibet Plateau, China

2.3.1 Introduction

2.3.2 Salinities and pH values of salt lake brine

2.3.3 Hydrochemical types of brine

2.3.4 Hydrochemical zoning and mineral assemblages of salt lakes on the Qinghai-Tibet plateau

2.3.5 Chemical composition of brine and origins of boron and rare alkali elements

2.3.6 Conclusions

2.4 A New Lithium Mineral--Zabuyelite

2.4.1 Introduction

2.4.2 Occurrence

2.4.3 Physical properties

2.4.4 Chemical compositions

2.4.5 X-ray diffraction analysis

2.4.6 IR spectrum analysis

2.4.7 Crystal structure

2.4.8 Description and discussion of the crystal structure

2.5 25℃-Isothermal Evaporation of Autumn Brines from the Zabuye Salt Lake, Tibet, China

2.5.1 Experiment

2.5.2 Result and discussion

2.5.3 Summary

2.6 Preliminary Discussion of Low-salinity Hydrothermal Fluid Mineralization

References

Chapter 3 Saline Lakes Deposition and Palaeoelimate

3.1 Salt Lake Sediments as Indicators for Palaeoclimates

3.1.1 Introduction

3.1.2 Saline sediments as climatic indicators

3.1.3 Zoning of hydrochemical types of saline lake waters and their response to the climates

3.2 Palaeoclimate Events and the Quaternary Salt Deposits in China

3.3 Trend of Salt Lake Changes in the Background of Global Warning and Tactics for Adaptation to the Changes

3.3.1 Introduction

3.3.2 Case histories of geological hazards in the salt lake areas

3.3.3 Analysis of rising and shrinking of salt lake water in western China

3.3.4 Some suggestions for adaptation to the changes of salt lakes

3.3.5 Conclusions

3.4 Evidence of the Pan-Lake Stage in the Period of 40-28 ka BP on the Qinghai-Tibet Plateau

3.4.1 Palaeoclimatic evolution of the pan-lake stage in the period of 40-28 ka BP

3.4.2 Palaeoclimatic analysis

3.5 The Quaternary Pan-lake (Overflow) Period and Paleoclimate on the Qinghai-Tibet Plateau

3.5.1 Introduction

3.5.2 Evidence of Quaternary pan-lakes on the Qinghai-Tibet plateau

3.5.3 Timing and extent of high lake levels of pan-lakes on the Qinghai-Tibet plateau

3.5.4 Pan-lakes and paleoclimate on the Qinghai-Tibet plateau

3.5.5 Conclusions

3.6 Sedimentary Characteristics and Palaeoenvironmental Records of Zabuye Salt Lake, Tibetan Plateau, since 128 ka BP

3.6.1 Introduction

3.6.2 Natural environment and geology of the study area

3.6.3 Brief account of hole SZK02

3.6.4 Chronology of lacustrine sediments

3.6.5 Sedimentary features

3.6.6 Oxygen isotope study

3.6.7 Discussion and conclusions

3.7 Carbon and Oxygen Stable Isotope Values and Microfossils at 41.4-4.5 ka BP,

in Tai Co, Tibet, China, and Their Paleoclimatic Significance

3.7.1 Introduction

3.7.2 Regional setting

3.7.3 Sedimentary characteristics of the sections

3.7.4 Chronological study

3.7.5 Carbon and oxygen stable isotope features of P1

3.7.6 Conclusions

3.8 Some Characteristics of Stratigraphic Sequences and Lacustrine Sediments of Main Quaternary

Lakes on the Qinghai-Tibet Plateau

3.8.1 Introduction

3.8.2 Quaternary lacustrine stratigraphic areas of the Qinghai-Tibet plateau

3.8.3 Division of Quaternary lacustrine sequences of the Qinghai-Tibet plateau

3.8.4 Brief description of stratigraphic sequences of Quaternary stratigraphic areas of the Qinghai-Tibet plateau

3.8.5 Several characteristics of Quaternary lacustrine sediments on the Qinghai-Tibet plateau

3.8.6 Conclusions

3.9 Lake Basin Evolution and Palteau Uplfting

3.9.1 Evolution stage of lake basins on Qinghai-Xizang plateau

3.9.2 Time of large-scale uplifting of Qinghai-Xizang plateau

3.9.3 Uplift form of Qinghai-Xizang plateau

References

Chapter 4 Saline Lake Geoecology and "Saline Lake Agriculture"

4.1 Preliminary Study on the Geoecology of Halopholic Algae and Halobacteria Found in Zabuye Salt Lake, Xizang (Tibet)

4.1.1 Physiographic condition

4.1.2 The composition of halobacteria and halophilic algae

4.1.3 Geological condition and its signification

4.1.4 Conclusions

4.2 On "Saline Lake Agriculture"

4.2.1 Introduction

4.2.2 Some organisms in saline lake that have been commercialized or

have economic and scientific significance--resources of "saline lake agriculture"

4.2.3 Concept and character of"saline lake agriculture"

4.2.4 The importance of developing "saline lake agriculture"

4.2.5 Research contents of"saline lake agriculture"

4.2.6 Conclusions

4.3 Biological Investigation of Salt Lakes in Tibet

4.4 Salt Lake Resources and Eco-environmental Protection in China

4.4.1 Introduction

4.4.2 Distribution of salt lakes and brief account of salt lake resources in China

4.4.3 Present situation of exploitation and utilization of salt lake resources and environmental problems

4.4.4 Rational utilization of resources and protection of the eco-environment in salt lake regions

4.4.5 Conclusions

References

Chapter 5 Distribution of Salt Basins and Potash Exploration in China as well as New Understanding and Progresses

5.1 Regional Distribution and Prospects of Potash in China

5.1.1 Introduction

5.1.2 Regional geological setting of salt and potash formation in China

5.1.3 Characteristics of major salt-forming basins and analysis of potash-forming conditions

5.1.4 Analysis of potash prospects

5.1.5 Conclusions

5.2 Potash Exploration Characteristics in China: New Understanding and Research Progress

5.2.1 Introduction

5.2.2 Regional geological setting of salt formation in China

5.2.3 New understanding and research progress in potash exploring in China

5.3 A New View Concerning the Formation of the Mengyejing Potash Deposit in Jiangcheng,Yunnan, China

5.3.1 Introduction

5.3.2 Characteristics of salt-bearing strata and potassium-bearing sequences

5.3.3 Jurassic salt-and potash-forming environments

5.3.4 New view of potash deposit formation

5.3.5 Preliminary analysis of the mechanism of potash formation

5.3.6 Conclusions

5.4 Preliminary Study on Sedimentary Environment of the Lop Nor Salt Lake and Its Prospect for Potassium

5.4.1 Division of salt sedimentary phases

5.4.2 Depositional environment

5.4.3 Preliminary discussion on perspective in search for potassium

References