STUDY ON THE RELATIONSHIP BETWEEN THE VARIATION OF LAKES IN QINGHAI-TIBETAN PLATEAU AND GLOBAL CLIMATE CHANGE

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1. INTRODUCTION

The Qinghai-Tibet Plateau is the largest lake area in China, with a total area of existing lakes of 36,900 km^2, accounting for 52% of the total lake area of China[1]. Lakes on the Tibetan Plateau play critical roles in the water cycle and ecological and environment systems of the Plateau. Presently, the global trend of warming up is increasing obviously, which has led to major changes in the climate conditions in China, even in the world. Global climate change has been paid more and more attention in recent years, with the phenomena such as glacial ablation accelerating, lake water level rising, the number of days of strong wind and sand storm decreasing and vegetation improving[2, 3]. A better understanding of lake variations on the Tibetan is important for evaluating climate change on Tibetan Plateau under global warming. The remote sensing technique is an efficient tool to analyze the status and variations of lakes.

2. STUDY AREA AND MATERIALS

2.1. Study Area

The Qinghai-Tibetan Plateau is a vast, elevated plateau in Central Asia covering most of the Tibet Autonomous Region and Qinghai Province in China and Ladakh in Kashmir, India. It occupies an area of around 1,000 by 2,500 kilometers, and has an average elevation of over 4,500 meters. Sometimes called ”the roof of the world,” it is the highest and biggest plateau, with an area of 2.5 million square kilometers .

2.2. Data sources

The satellite remote sensing data for the lakes in the Qinghai-Tibetan Plateau are the Landsat MSS, TM, ETM images in 1970’s, 1990, 2000, 2004 provided by the Center for Earth Observation and Digital Earth. We also collected the meteorological materials in the past 30 years provided by the China Meteorological Data Sharing Service System hosted at China Meterological Administration.

3. METHODOLOGY

The satellite image materials used here are managed under the Geographic Information System (GIS) tool–ArCGIS after pre-precessed under the remote sensing platform. Then the lakes were extract using ArcGIS and the area of each lake in different year was caculated. The meteorological materials were also processed.

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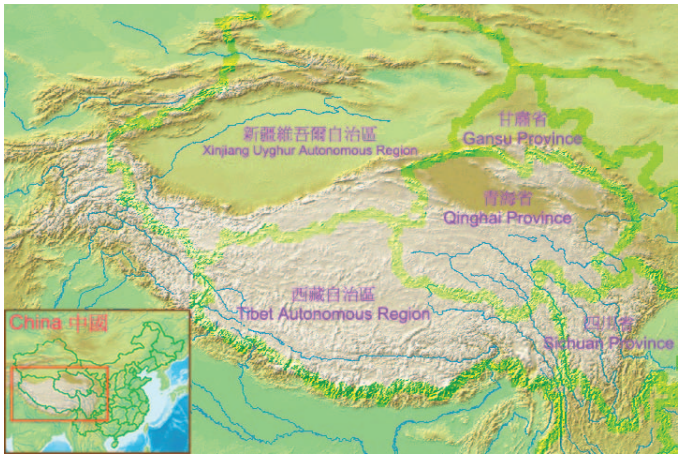

Fig. 1. The Qinghai-Tibetan Plateau[4].

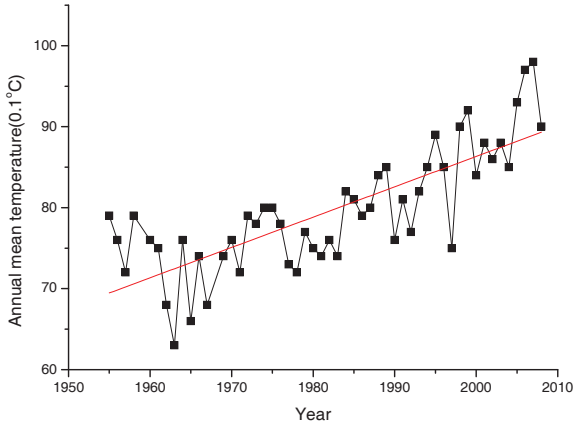

Fig. 2. Change of annual mean temperature in Qinghai-Tibetan Plateau in recent 50 years.

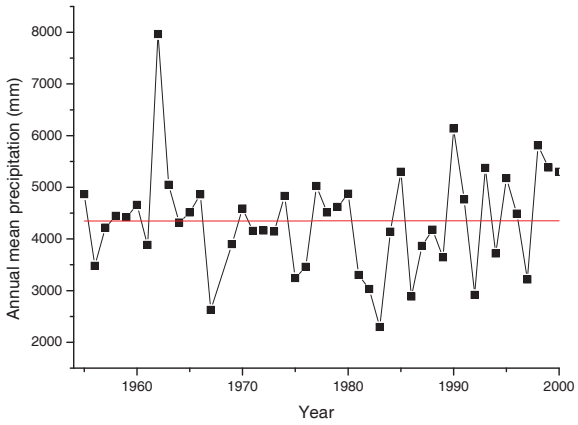

Fig. 3. Change of annual mean precipitation in Qinghai-Tibetan Plateau in recent 50 years.

4. ANALYSIS ON THE RELATIONSHIP BETWEEN THE VARIATION OF LAKES AND GLOBAL CLIMATE CHANGE

After extraction of the area of the lakes, a multivariate statistical analysis method was used to test the relationship between the area of the lakes and the global climate change, including the change of the temprature, the precipitation, and other factors.

5. RESULTS AND DISCUSSION

The variation of lakes in Qinghai-Tibetan Plateau is closely related to the mean temprature, the precipitation, the wind speed and saturation vapor pressure. But how do the changes of the lakes response to the global climate change? What do other factors affect the change of the lakes? We must do more research on it to find the answer.

6. ACKNOWLEDGEMENT

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tion for the providing of the meterological data.

7. REFERENCES

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