IMPACT OF CLIMATE CHANGE ON PRECIPITATION IN THE UPSTREAM OF LIUJIAXIA RESERVOIR

Sun Landong[1,2], Lin Jingjing[2]

1 CMA Lanzhou Research Institute of Arid Meteorology & Gansu/CMA Key Laboratory for Arid Climate Change and Disaster Reduction, Lanzhou 730020;

2 Lanzhou Regional Climate Center, Lanzhou 730020, China

Email: sldlydia@yahoo.com.cn

Abstract

Liujiaxia reservoir located at the Yongjing County in Gansu Province. Liujiaxia reservoir is the first hydration project in China, the reservoir waters area amounts to more than 130 km^2, the drainage area is 181766 km^2, the total storage is 6,400 hundred million m^3. It is the large-scale water and electricity key project which generates electricity power, the flood prevention, irrigation, guarding against ice-run, cultivation, traveling and so on. NW China is the serious water scarcity area, the change of the precipitation in the upstream of reservoir must influence the water volume and the water-holding capacity, thus influence power rate and downstream irrigation. The change of the power rate and water-holding capacity has the important effect on the industrial and agricultural production, economic society's sustainable development and people lives. This article attempts to analyze the fact and rule of climatic factors of Liujiaxia resevior, and its goal is provide the scientific basis for the Department concerned to the plan

Selecting the daily precipitation, temperature, evaporation, etc., in 31 meteorology stand in the upstream of Liujiaxia reservoir, applying climatic change tendency analysis, we analyzed the change rules of the climatic factors, such precipitation, rainy days, temperature, evaporation. The results showed:

1 From 1960 to 2007 , the precipitation in the upstream of Liujiaxia reservoir in the year, spring, summer and fall presents the weak declining trend, but the precipitation in winter has slightly increase. The yearly rainy days has dropped since 1960, and the rainy days are the most in summer, the lest in winter.

2 After the water storage in reservoir, the precipitation in the year, spring, summer, autumn has decreases slightly, but the precipitation has increased slightly in winter. After the water

storage in reservoir, the rainy days are decreasing in summer and autumn, but they are increasing in spring and winter.

3 The annual mean temperature, the highest temperature and the lowest temperature has assumed the remarkable increasing trend since 1960, the most warming contribution to the upstream of Liujiaxia reservoir is winter warming, the lest is spring warming. The increasing scope of highest temperature in autumn is the biggest, and the increasing scope of highest temperature in spring is the smallest. The increasing scope of lowest temperature in winter is the biggest, and the increasing scope of lowest temperature in spring is the smallest.

4 The yearly latent transpiration rate has assumed the weakly increasing trend since 1960 in the upstream of reservoir, the transpiration rate in summer is the biggest, next is in spring and autumn, the transpiration rate in winter is the smallest. Compared with the transpiration rate before water storage in reservoir, the transpiration rate is more after the water storage in reservoir, and the transpiration rate increasing more in summer, increasing less in winter.

5 The relative humidity in the year, the spring, the summer and the autumn has assumed the weak declining trend since 1960 in the upstream of reservoir, but the relative humidity slightly has increases in winter. The yearly and seasonal sunshine hours have assumed weakly increasing tendency since 1960, the sunshine hours in autumn increase are bigger.

Key words: Liujiaxia Reservoir, Precipitation, Climate change