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Title: Natural runoff change characteristics and flood/drought disasters in Poyang Lake catchment basin

作者: 叶许春[1; 2]; 张奇[1]; 刘健[1; 2]; 徐力刚[1]

1. 中国科学院 南京地理与湖泊研究所, 湖泊与环境国家重点实验室, 江苏 南京 210008;

2. 中国科学院 研究生院, 北京 100039

Author(s): YE Xuchun[1; 2]; ZHANG Qi[1]; LIU Jian[1; 2]; XU Ligang[1]

1. State Key Laboratory of Lake Science and Environment, Nanjing Institute of Geography and Limnology, Chinese Academy of Sciences, Nanjing 210008, China;

2. Graduate School of Chinese Academy of Sciences, Beijing 100039, China

关键词: 径流时序特征; 水旱灾害; 径流集中度; 差积曲线; 鄱阳湖流域

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摘要: 为探讨鄱阳湖流域河川径流的变化过程和规律,深入了解径流特征及其与鄱阳湖水旱灾害的关系,利用时间序列分析方法,对鄱阳湖流域五河水系干流河段主要控制水文测站的天然径流系列进行了研究。研究显示,鄱阳湖五河径流年内分配集中程度在0.43到0.56之间,集中期为每年的5月底6月初,比鄱阳湖汛期提前1-2个月。径流多年变化变差系数变化在0.28~0.33之间,径流年际变率较大,在年代际变化上20世纪90年代径流增加尤其突出;径流序列呈长期的增加趋势,1998年后增加趋势变缓;鄱阳湖流域五河水系出现特大枯水年和丰水年的概率较大,出现平水年的概率略小。以上结果表明,五河汛期来水是影响鄱阳湖洪水的重要因素,而其形成、发展过程还受到长江中上游洪水的控制;径流的长期变化中,气候因素是引起鄱阳湖流域径流变化主导因素,水土流失和水利工程的建设等人为因素起着一定的辅助作用;径流序列枯、丰循环周期的交替变化过程,与过去几十年间流域内出现的干旱、洪水现象具有较好的一致性。

Abstract: In order to better understand the variations of surface runoff and the relationship between runoff and flood/drought in Poyang Lake catchment basin, time series analysis was performed for eight stream flow gauging stations located at five main rivers in the catchment basin. The results show that, the distribution of annual runoff is uneven with a moderate annual concentration between 0.43

and 0.56, and concentration period is between the end of May and the early of June, which is one or two months before the flood period of Poyang Lake. There is great variation of yearly surface runoff, with variation coefficient ranging from 0.28 to 0.33. The long-term annual runoff sequences in main rivers demonstrate a constant increase trend, especially after 1990s, when the increase trend is more obvious. Frequency of enormously wet and dry year is relatively high in that area, but low for normal hydrological year, which implies that Poyang Lake catchment basin is more frequent to encounter drought and flood disasters. The study of this paper indicate that the flood of Poyang Lake is mostly influenced by the recharge from the five river subcatchment at flood season, but controlled by the flood from the upper and middle reaches of Yangtze River. The long-term trend of stream runoff is controlled by the variation of climate changes, and impacted by human activities in the catchment basin. Circulation of wet and dry years gives a clear illustration of the drought and flood events in the last five decades of 20th century.

参考文献/REFERENCES

[1] 郭华,姜彤.鄱阳湖流域洪峰流量和枯水流量变化趋势分析[J].自然灾害学报,2008,17(3):75-80. GUO Hua, JIANG Tong. Trend analysis of flood peak /dry season flowrate in Poyang Lake Basin[J]. Journal of Natural Disasters, 2008, 17(3):75-80.(in Chinese)

[2] 闵骞.20世纪90年代鄱阳湖洪水特征的分析[J].湖泊科学,2002,14(4):323-330. MIN Qian. Analysis on the flood characters in 1990s, Poyang Lake[J]. Journal of Lake Sciences, 2002, 14(4):323-330.(in Chinese)

[3] 闵骞.鄱阳湖区干旱的定量判别与变化特征[J].水资源研究,2007,28(1):5-7. MIN Qian. Quantitative distinguish and variation characteristics of droughts occurred in the Poyang Lake region[J]. Water Resources Research, 2007, 28(1):5-7.(in Chinese)

[4] 郭华,苏布达,王艳君,等.鄱阳湖流域1955-2002年径流系数变化趋势及其与气候因子的关系[J].湖泊科学,2007,19(2):163-169. GUO Hua, SU Buda, WANG Yanjun, et al. Runof coeficients change and the analysis of the relationship between climate factors and runof coeficients in Poyang Lake Basin(China):1955-2002[J]. Journal of Lake Sciences, 2007, 19(2):163-169.(in Chinese)

[5] 杨荣清,胡立华,史良云.赣江流域水文特征分析[J].水资源研究,2003,24(1):35-40. YANG Rongqing, HU Lihua, SHI Liangyun. Analysis on hydrological characteristics of Ganjiang watershed[J]. Water Resources Research, 2003, 24(1):35-40.(in Chinese)

[6] 郭鹏,陈晓玲,刘影.鄱阳湖湖口、外洲、梅港三站水沙变化及趋势分析(1955-2001年)[J].湖泊科学,2006,18(5):458-463. GUO Peng, CHEN Xiaoling, LIU Ying. Analysis on the runoff and sediment transporation in the Hukou, Waizhou and Meigang stations of Lake Poyang during 1955-2001[J]. Journal of Lake Sciences, 2006, 18(5):458-463.(in Chinese)

[7] 郭华,姜彤,王艳君,等.1955-2002年气候因子对鄱阳湖流域径流系数的影响[J].气候变化研究进展,2006,2(5):217-222. GUO Hua, JIANG Tong, WANG Yanjun, et al. Impacts of climate factors on runoff coefficients in the Poyang Lake basin[J]. Advances in Climate Change Research, 2006, 2(5):217-222.(in Chinese)

[8] 郭华,姜彤,王国杰,等.1961-2003年间鄱阳湖流域气候变化趋势及期突变分析[J].湖泊科学,2006,18(5):443-451. GUO Hua, JIANG Tong, WANG Guojie, et al. Observed trends and jumps of climate change over Lake Poyang basin, China[J]. Journal of Lake Sciences, 2006, 18(5):443-451.(in Chinese)

[9] 闵骞,苏宗萍,王叙军.近50年鄱阳湖水面蒸发变化特征及原因分析[J].气象与减灾研究,2007,30(3):17-20. MIN Qian, SU Zongping, WANG Xujun. Characteristics and causes of Poyang Lake surface evaporation variation in recent 50 years[J]. Meteorology and Disaster Reduction Research, 2007, 30(3):17-20.(in Chinese)

[10] Guo H, Hu Q, Jiang T. Annual and seasonal stream flow responses to climate and land-cover changes in the Poyang Lake basin, China [J]. Journal of Hydrology, 2008, 33: 172-186.(in Chinese)

[11] 刘健,张奇,左海军,等.鄱阳湖流域径流模型[J].湖泊科学,2009,21(4):570-578. LIU Jian, ZHANG Qi, ZUO Haijun, et al. A surface runoff model for Lake Poyang watershed[J]. Journal of Lake Sciences, 2009, 21(4):570-578.(in Chinese)

[12] Zhang L J, Qian Y F. Annual distribution features of the yearly precipitation in China and their inter an nual variations[J]. Acta Meteorological Sinica, 2003, 17(2):146-163.

[13] 刘贤赵,李嘉竹,宿庆,等.基于集中度与集中期的径流年内分配研究[J].地理科学,2007,27(6):791-795. LIU Xianzhao, LI Jiazhu, SU Qing, et al. Interannual runof distribution based on degree and time of concentration for rivers[J]. Scientia Geographica Sinica, 2007, 27(6):791-795.(in Chinese)

[14] 蒋艳,周成虎,程维明.新疆阿克苏河流域年径流时序特征分析[J].地理科学进展,2005,24(1):87-96. JIANG Yan, ZHOU Chenghu, CHENG Weiming. Analysis on the characteristics of runoff time series in Akesu basin[J]. Progress in Geography, 2005, 24(1):87-96.(in Chinese)

[15] 丁晶,邓育仁.随机水文学[M].成都:成都科技大学出版社,1988:10-73. DING Jing, DENG Yuren. Stochastic Hydrology[M]. Chengdu: Chengdu University of Science and Technology Press, 1988:10-73.(in Chinese)

[16] Cecilia S, Zbigniew W K, Thomas M. Trend detection in river series:2.flood and low-flow index series [J]. Hydrological Science Journal, 2005, 50(5): 811-823.

[17] 王维第,孙汉贤,施嘉斌.黄河上游连续枯水段分析与设计检验[J].水科学进展,1991,2(4):251-257. WANG Weidi, SUN Hanxian, SHI Jiabin. Analysis of persistence of hydrological drought on the upper Yellow River[J]. Advances in Water Science, 1991, 2(4): 251-257.(in Chinese)

[18] 刘健,张奇,许崇育,等. 近50年鄱阳湖流域径流变化特征研究[J].热带地理,2009,29(3):213-218. LIU Jian, ZHANG Qi, XU Chongyu, et al. Characteristics of runof variation of Poyang Lake watershed in thepast 50 years[J]. Tropical Geography, 2009, 29(3): 213-218.(in Chinese)

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作者简介:叶许春(1982-),男,博士生,主要从事流域水文过程的模拟研究.E-mail:yxch2500@163.com

通讯作者:张奇(1966-),研究员.E-mail:qzhang@niglas