

Interactive comment on “Hydroclimatological influences at multi-spatial scales on recently increased droughts in China’s largest freshwater lake” by Y. Liu and G. Wu

Anonymous Referee #6

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General comments: Based on a simple statistical tool, Liu and Wu evaluated the hydroclimatological influences the recently increased droughts at multi-spatial scales in China’s largest freshwater lake, using some of the available climatic and hydrological data. It is well-known that the drought is very complex for clearly explaining its regions, therefore, the analyses from the authors, who explored the drought characteristics and the possible regimes, taking an example as in the Poyang Lake basin, are very useful for better understand the extremes. However, there are some shortages in the present study. For example, as I know, there exists 79 weather sites in Jiangxi Province. But the authors only used 13 stations here, this may introduce some uncertainties into

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the study results. In addition, some factors (e.g, land cover/use change, human activities, soil moisture and vegetation dynamics) can significantly affect the hydrological processes in this basin. Therefore, the authors should discuss these factors’ impacts for describing the uncertainties and limitations of this approach. Overall, this study is very useful to better understand the complex drought in the Poyang Lake basin. In my opinion, the moderate revision of the present manuscript should be done before publication. Specific comments: Abstract: This abstract should be reformulated. Data processing: Just as the descriptions of “the precipitation data were grouped and averaged for Poyang lake region (P8, L18-19)”, the 13 gauges for presenting the climatic characters of precipitation in this basin is not reasonable (there are huge spatial variability in precipitation due to the complicated land surface). The authors should use more weather sites to reduce the uncertainties because of the huge spatial variability of precipitation. Method: In L22-25 of P5, the author gave the occurrence probability of $SPI = -1$, -1.5 and -2.0 , but the methodology to estimate the probability should be described more or less here for this paper readability. Results: In my opinion, to put sectors of the potential impacts of TGD and the mechanism into the discussions may be reasonable. Discussions: In this paper, the discussions about this study uncertainties and limitations should be added into this paper. For example, numerous researches has pointed out that the land use/cover change, human activities and vegetation can significantly influence the hydrological processes at seasonal and annual scales, so their impacts on the hydrological droughts should be discussed here. In addition, it is well-known that the lake area has decreased because the farmers built dykes to reclaim land from a lake during the past decades. So, this human activity should influence the water level of the lake. Figures: Fig.1 should present the location of hydrological and climatic gauges used in this study, and the DEM or land cover for the reader to better understand the basic characters of this basin. Technical comments: P2L6-7: “This study proposes to use a multi-scale hydroclimatic analysis for the determination ????, taking Poyang Lake as an example.” P2L6, P4L29, P5L4, P9L23, and P18L2: “multi-scale” should be replaced with “multi-spatial scale”. P2L9: “Our

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analysis demonstrates” should be corrected as “Our analyses demonstrate”. P2L11-12: “At the lake region, water deficiency severed as the hydroclimatic foundation for the worsening droughts”. I can not understand what the authors wanted to express. P5L4: “hydroclimatic” should be corrected as “hydroclimatic”. P13L22: “basin” should be rewritten as “Basin”.

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