

Anonymous Referee #6

General comments: Based on a simple statistical tool, Liu and Wu evaluated the hydroclimatological influences on 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 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.

Response:

Thank you for your time to review and comment on our paper. We appreciate it very much for highlighting our work. We are encouraged to make substantial revisions to the previous version of our manuscript (MS). We hope our revised MS could satisfy the criteria for publication.

Specific comments:

Abstract: This abstract should be reformulated.

Response:

It was revised upon the completion of the text revision.

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.

Response:

In the revision, to reduce the uncertainty in precipitation, more precipitation data from 73 stations are used in the revised manuscript.

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.

Response:

The excessive description was removed from the text.

Results: In my opinion, to put sectors of the potential impacts of TGD and the mechanism into the discussions may be reasonable.

Response:

In the revision, the TGD impacts were evaluated with more data, and addressed in more details (line 582-601).

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.

Response:

The importance of the influences was added into the text (line 627-632).

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.

Response:

The gauges are indicated in Figure 1. A DEM is used for the basin and a satellite image is used for the lake.

Technical comments:

P2L6-7: “This study proposes to use a multi-scale hydroclimatic analysis for the

determination ????, taking Poyang Lake as an example.”

Response:

The sentence was removed from the text due to re-written of the paragraph.

P2L6, P4L29, P5L4, P9L23, and P18L2: “multi-scale” should be replaced with “multi-spatial scale”.

Response:

Changed as suggested.

P2L9:“Our analysis demonstrates” should be corrected as “Our analyses demonstrate”.

Response:

Corrected as pointed out.

P2L11-12: “At the lake region, water deficiency severed as the hydroclimatic foundation for the worsening droughts”. I cannot understand what the authors wanted to express.

Response:

The sentence was removed from the text.

P5L4: “hydrocliamtic” should be corrected as “hydroclimatic”. P13L22: “basin” should be rewritten as “Basin”.

Response:

Corrected as pointed out.