

Interactive comment on “Growth of a high-elevation large inland lake, associated with climate change and permafrost degradation in Tibet” by J. Liu et al.

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This appears to be an addition to the set of papers written by the first author that examine recent changes in climatic and hydrologic variables in different parts of China (Cold Reg Sci Technol 37, 15-24; PPP 14, 11-18; PPP 18, 369-377). The Mann-Kendall test was used and appropriately, change points in the time series were sought. This approach has two advantages: (1) it is superior to the detection of one single linear trend over the entire time series as has been regrettably performed by many other researchers, and (2) the same statistical technique was used in the study of

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northwestern China, therefore the results of analysis for northwestern and Tibetan China can be compared directly.

The authors systematically deduced linkages between hydrologic and climatic variables, noting that the shifts and trends in these time series are possibly associated. They inferred that the temperature and precipitation changes are associated with shifts in the Indian summer monsoon and general atmospheric circulation. Permafrost degradation and flow changes were related to the climate shift and the observed change in Nam Cho lake area was considered as the consequence. The logic is sound and the arguments are reasonable.

I have no serious reservation that this paper is suitable for publication. However, several minor points should be clarified.

(1) Usage of the term ‘permafrost cover’ is erroneous because permafrost does not ‘cover’ but ‘underlies’ the land or water.

(2) p. 5449, lines 18-19: how can one compare a times series containing T members, with another series containing T-1 members? The values of j and k should be checked and adjusted accordingly.

(3) p. 5451, line 14: should Figure 5 be Figure 4?

(4) Figure 6: please explain in the text what a ‘variation curve’ is.

(5) p. 5453, lines 10-12: please explain frost squeezing. I am not sure how frost squeezes unfrozen water in frozen soil. Indeed, the entire mechanism of unfrozen water drainage is unclear. How can unfrozen water in the active layer - which by definition should be underlain by permafrost – penetrate the permafrost ‘into deep unfrozen soils, then drain out in the form of groundwater flow’?

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