

Interactive comment on “Dynamic changes of terrestrial net primary production and its feedback to evapotranspiration” by Zhi Li et al.

Anonymous Referee #1

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This study tackles the association between NPP and ET under the climate change at a global scale, as well as inspects its regional variation. The topic is important and the findings are valuable. I recommend publishing after minor revision. Particularly, the presentation of the paper needs improvement.

Some major issues:

1. Throughout the paper the authors use the term "feedback" to refer to the "effect" of NPP on ET. I don't think "feedback" is the proper term here. "Feedback" means response. But I don't think the authors meant to say that ET first acts on NPP, and then NPP reacts on ET. Here "feedback" should be from NPP to climate. As the authors correctly stated in the paper, ET is the process that connects vegetation and climate, i.e., NPP can have feedback to climate through ET, but not have feedback to ET itself.

C1

2. The authors found association/correlation between NPP and ET. However, correlation does not necessarily mean causal relationship. Among the three things: NPP, ET, and climate (temperature and precipitation), which one affects which one is a complex issue. The authors want to more clearly sort out the relationships among the three and be cautious on making strong statement that NPP is the cause for the change of ET.

3. Section 3.2: The first paragraph has a logic problem: If your goal is to understand the response of climate to NPP, why do you want to study the climate controlling factors on vegetation? Shouldn't it be reversed?

4. One of the conclusions of the paper is that if the effect of NPP on ET continues, regional droughts may get exacerbated. NPP and ET have a positive correlation, and authors found that the general trend globally is that NPP is increasing. Does this mean that more NPP globally will lead to more droughts? This sounds counterintuitive.

5. Did the authors calculate NPP and ET by themselves or simply use the MODIS products. This should be more clearly described in the paper. If MODIS products were used, then no algorithm details are needed; simply refer to relevant MODIS references. If the authors calculated those values by themselves, then more technical details are needed, including image selection, processing, and calculation processes; and in this case, the authors also need to properly cite the references for those algorithms and processes.

There are many language problems throughout the paper. I recommend that the authors find an English editor to proofread the paper. Below are some examples:

1. "Earth" should be "the Earth".

2. The phrase "under the content" appears in many places. I guess the authors meant to say "under the context". But in many places there should be better expressions.

3. I see "for the domain" in several places. I am not sure what it means.

4. "Temporal-spatial" should be "spatiotemporal".

C2

5. The description of the NPP algorithm is hard to follow. If the authors decide to keep it, they should explain each symbol right below the equation where the symbol first appears.
6. Equation 8 is basic statistics; no need to include.
7. Line 20: should be “variable but positive trend”.
8. Line 21: should be “which is consistent”.
9. Line 22: “Trend” cannot be lower than “demand”; “deficit” cannot be “between”; what is “available water demand and supply for evapotranspiration”? This entire sentence needs to be rewritten.
10. Line 76: should be “came from”.
11. Line 97: should be “allows the use”.
12. Line 118: should be “the required MODIS data inputs for the ET algorithms”.
13. Line 129: should be “t-Test”.
14. Line 136: should be “While NPP in most part of NH increased, it decreased in most part of SH”.
15. Line 156: should be “NPP and ET in SH have much higher variability in SH, where their association is less stronger than that in NH”.
16. Line 159: “stronger variability” of what?
17. Line 161: should be “In places where the inter-annual ...”
18. Line 164: should be “controlling factor for NPP variation”.
19. Line 218: should be “proportional relationship”.
20. Line 221: should be “over the past 15-year period”.

C3

21. Line 221: what is “P”? Also see comments 7 and 9 above.
22. Line 226: should be “affecting soil moisture”.
23. Line 227: should be “temperature and solar radiation may cause soil moisture loss through evapotranspiration”.
24. Line 231: Should be “Soil moisture is a common ecohydrologically confining factor”.

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C4