Many thanks to the reviewer for his/her thorough review and insightful comments on this paper. In the following, we give a item-by-item response to the comments. Reviewer's comments are written in italic; authors' responses are shown in upright font.

The manuscript describes a very important topic which is related to the retrieval of spatially distributed evapotraspiration(ET) by employing the relationships of a satellite derived scatter plot of surface temperature(Ts) versus a vegetation index (VI), the so-called "triangle method". Herein, the authors specifically proposed the use of the top of the atmosphere radiance (TOA) in deriving ET, which is seldom documented before. In general, the paper is well structured and written, and has useful contribution to practical applications of the widely used triangle method to estimate surface fluxes. I believe this work is original and fairly creative and it is worth to be published on top journal HESS. Before the paper can be considered finalized, I would like the authors to incorporate the comments listed below.

1. Is the proposed method only applicable for MODIS data or also suitable for other sensors data (e.g., AVHRR, MSG-SEVIRI)? In practical applications, multiple satellite platforms are used to estimate surface fluxes for different research goals. But the net radiation estimation schemes described in the paper seems to be developed exclusively for MODIS data. If so, I suggest the authors clearly state this point in the paper especially in the title (. . . from MODIS TOA radiances. . .).

Response：The motivation of the present paper is to explore the possibility of using TOA radiance to estimate ET. Although our research was based on MODIS data, we consider this idea should also be possible for other satellite platforms. In order to make the paper's title fit well with content, we accept the review's advice. And the title has been changed to "Estimation of evapotranspiration from MODIS TOA radiances in the Poyang Lake Basin, China"

2. Using TOA radiance instead of satellite derived products to estimate surface fluxes sounds encouraging. It could eliminate the complicated atmospheric corrections. In my opinion, the feasibility of using TOA radiance is due to the scaled temperature (Tmax -Ts) /(Tmax - Tmin) based on triangular contextual space. Such a normalized temperature could minimize the influence of absolute value of surface temperature, induced by atmospheric conditions and sensor viewing angles, on ET estimates. It would be better if the authors consider doing a sensitivity analysis to explore how sensor characteristics and atmospheric variables influence the final results. It is always important to know which parameters exert the greatest influence.

Response：Thank you for the comments and suggestion. About the sensitivity of the proposed method to surface and atmospheric variability, Peng et al (2012) has already explored the effects of key surface and atmospheric parameters on TOA-variable-triangle-method. The differences between surface-variable-estimate and TOA-variable-estimate are expected to be less than 10%, if the spatial variabilities of atmospheric parameters (water vapor and effective atmospheric temperature) and surface emissivity are below 10%, 4 K, and 0.05, respectively.

3. The authors stated in the paper that the validation of EF is the true validation of the triangle method for ET estimates. It is true, since the net radiation is calculated using different schemes in the paper. The estimation of net radiation using remote sensing is relatively accurate and easy. But I am not convinced that the authors attribute the uncertainties in EF estimation only to the assumption that the instantaneous EF is representative to the daily EF. Have you validated this assumption using ground-based measurements and then drawn this conclusion? Maybe it is one of error sources but surely not the only one. For example, the uncertainties could come from the influence of topography (altitude and terrain orientation) (Carlson, 2007), the size of the domain, and the determination of the theoretical warm and wet edges (Long et al. 2012). I suggest the authors to rephrase this part.

Response：Indeed, the uncertainties in EF estimation could also come from different sources. As the reviewer said, they could be the influence of topography, the size of domain and so on. Since the lack of enough data and different aim of research, we did not quantify the uncertainties from different error resources. But we fully agree with the review's comments, and the text has been changed in the revised paper (see below).

"The differences between the derived and measured EF may be attributed to the influence of topography (altitude and terrain orientation) (Carlson, 2007), the size of the domain, and the determination of the theoretical warm and wet edges (Long et al. 2012)."

4. From the results shown in Table 4 and Figure 5, the paper concluded that TOA-based estimates perform better than products-based products. But the conclusion is too strong considering the small differences between them. From this point of view, the conclusion of "TOA-radiance based estimates are comparable to products-based products, and it is feasible to estimate surface fluxes using TOA radiance" sounds more reasonable. So I suggest the authors modify the corresponding parts. Besides, the study area where it is implemented is not well chosen. The use of limitation data for validation does not permit robust evaluation of a new method. Given that the MODIS data have high temporal and spatial resolution, it seems possible to combine the method with other experimental sites. Since the proposed method is very interesting, the authors should consider conducting additional validation (maybe at a later time) for different surface and climate conditions.

Response：We agree with the above comments. Actually, we would like to conclude that the proposed method requires less apriori information on the atmospheric state while providing estimates at a similar level of accuracy than obtained using atmospherically corrected surface data products. It therefore provides a useful alternative for determining ET from satellite data. We thank the reviewer for pointing out our unsuitable statement. Corresponding texts have been modified (see below). About additional validation, we are now carrying out more validations of the proposed method over various climate regions and under different surface conditions against flux tower measurements. We thank the reviewer for this useful suggestion.

"The results suggest that the proposed method could reach similar level of accuracy as the

MODIS products-based triangle method."

"The results suggested that the proposed method achieved similar accuracy as the MODIS products-based triangle method, which further confirmed the feasibility of the proposed method for ET estimation."

Specific comments:

P10964, L22-L24. The statement of ". . . avoid uncertainties associated with the satellite derived products. . . ." is not suitable. Avoid complex atmospheric corrections or complexity seems more reasonable. Do not mention "its accuracy is slightly higher", just Go.

Response：Thanks, this has been changed in the text.

P10966, L7. One reference to Jiang and Islam should be sufficient, since it involves the same research.

Response：Thanks, this has been changed in the text.

P10966, L21. Use satellite sensors in place of remote sensors.

Response：Thanks, this has been changed in the text.

P10966, L25-L26. Include the update references about ET estimates using triangle method.

Response：The following paper has been added the text.

Long, D., Singh, V. P., and Scanlon, B. R.: Deriving theoretical boundaries to address scale dependencies of triangle models for evapotranspiration estimation, Journal of Geophysical Research: Atmospheres, 117, 10.1029/2011jd017079, 2012.

P10967, L24, L27. It is suggested to further improve the text by establishing a systematic use of past and present tenses (e.g., using past tense for the executed analysis steps, and present tense for the generic findings).

Response：Thanks, this has been changed in the text.

P10968, L1-L5. In my opinion, these lines are unnecessary.

Response：We think this part clarifies the structure of our paper, and makes the paper more readable. So we keep these lines in the paper.

P10971, L12. Change "triangle space" to "triangular space".

Response：Thanks, this has been changed in the text.

P10973, L1. Just use acronym TOA is enough, since TOA has already defined in section-Introduction.

Response：Thanks, this has been changed in the text.

P10975, L12-13. The sentence "using local near noon EF represent all-day. . . incurs. . . " is not correct English. Rephrase it.

Response：Thanks, this has been changed in the text.

"using local near noon EF instead of all-day EF for daily ET estimation incurs very small error."

P10976, L15. I would rename this to "Study area and data collection".

Response：Thanks, this has been changed in the text.

P10980, L1, L12. "Figure" and "Fig" are mix used. Not only here, but also other parts in the text. Use the same format of in the paper.

Response：Thanks, this has been changed in the text.

P10987, Many references are lack of DOI number. Provide them.

Response：Thanks, this has been changed in the text.

P10997, Figure 1 seems like a synthesized form of previous works of Lambin and Ehrlich (1996) and Sandholt et al. (2002). Add references here.

Response：Thanks, this has been changed in the text.

References:

Peng, J., Liu, Y., and Loew, A.: Uncertainties in estimating Normalized Difference Temperature Index from TOA radiances, doi:10.1109/TGRS.2012.2213603., 2012.

Carlson, T.: An Overview of the "Triangle Method" for Estimating Surface Evapotran-spiration and Soil Moisture from Satellite Imagery, Sensors, 7, 1612-1629, 2007.

Long, D., Singh, V. P., and Scanlon, B. R.: Deriving theoretical boundaries to address scale dependencies of triangle models for evapotranspiration estimation, Journal of Geophysical Research: Atmospheres, 117, DOI:10.1029/2011jd017079, 2012.

Lambin, E. F., and Ehrlich, D.: The surface temperature-vegetation index space for land cover and land-cover change analysis, International Journal of Remote Sensing, 17, 463-487, DOI:10.1080/01431169608949021, 1996.

Sandholt, I., Rasmussen, K., and Andersen, J.: A simple interpretation of the surface temperature/vegetation index space for assessment of surface moisture status, Remote Sensing of Environment, 79, 213-224, DOI:10.1016/s0034-4257(01)00274-7, 2002.