Response to Reviewers' Comments
Anonymous Referee #2

1 General Comments

This paper introduces a method for estimation of evapotranspiration based on energy transfer equation and with inclusion of topographical parameters of terrain (e.g. slope, aspect) using MODIS images over a large area in Northeast of China. Inclusion of the topography parameters is mostly used for estimation of net radiation. In addition, the authors used these parameters for adjustment of temperature difference. This paper has a good structure for presenting the research, however, there are some concerns regarding formulation of the methodology and validation of the results which are addressed in the "Specific Comments" section. Another important issue is the use of English grammar and appropriate use of technical words and phrases throughout the text. This paper is publishable if proper modifications applied to the text.

2 Specific Comments

1. Abstract 4877-line 7 What you mean by "limited" in "limited temporal and spatial scales"?
Ans: "limited temporal and spatial scales" means that is such a small area and short time period such as "The validation of the S-SEBI model simply used a small fraction of a scene (LANDSAT5-TM, path/row for the 192/30) for one time (Roerink et al., 2000)." It has been changed to "with limited temporal and spatial coverage in the study areas." in the revised version.

2. 4877-line 9 What do you mean by complex terrain? Where the complexity of terrain addressed in the formulations given in the subsequent sections of the paper?
Ans: "complex terrain" means that large area with different elevations, aspects and slopes. The complexity of terrain addressed in the formulations given in the subsequent sections of the paper.

3. 4877-line 14 Does this paper gives "Full account" for the dynamic impacts of complex terrain and changing land cover with some varying kinetic parameters over time? I guess it is better to use another appropriate word instead of "full" as still there are still unknown issues about effects of terrain on ET, especially in regard to advection and atmospheric turbulence.
Ans: Yes, we have deleted this word in the revised version.

4. 4877-line 15 The phrase "in concert" replaced with more appropriate word.
Ans: Yes, we have replaced the phrase "in concert with" with "such as."

5. 4877-line 16 How the dynamic impact of terrain and land cover with roughness parameters are addressed "over time"? Where in this paper the effect of time is addressed in the formulation?
Ans: Thank you. We have deleted this phrase "over time" from paper.

7. Introduction 4878-line 12 Soil evaporation is not negligible, especially when soil moisture content is relatively high
Ans: Yes. Thank you. We have deleted "Soil evaporation is not negligible." In the revised version.

8. 4878-line 14 Comparison or accompanying of soil moisture and evaporative power of the net radiation is not correct. They are basically different
Ans: Thank you. We didn't compare the soil moisture and evaporative power of the net radiation in this paper. The sentence has been revised as "Although soil evaporation is negligible, the surface soil moisture driven by precipitation and irrigation actually sustains the ET phenomenon that mainly occurs from the tree crowns with a fully closed canopy. In addition to the water content in the soil, ET is also driven by the water vapor gradient in the air in relation to the net radiation at the ground level. "

9. 4878-line 15 Portioning of Rn is not only dependent to the soil moisture, but also to the atmospheric turbulence.
Ans: Yes, thank you.

10. 4878-line17 The statement in the first paragraph for relating ET with the sustainability and climate change is ill. Rephrasing is necessary.
Ans: That sentence has been deleted in the revised version.

11. 4878-line 21 Point measurement of ET can be done by other methods as well. The basis for separation of the ET measurement methods at point scale must be given in a more appropriate way.
Ans: Yes. Thank you. We have replaced the word "through" with "such as".

12. P4878-line 23 Eddy-covariance method is not just an energy balance method, as it works based on both energy and mass (water vapor) transfer.
Ans: Yes. Thank you. Revised.

13. P4879-line 2 The phrase "high precision" in ET estimation by remote sensing should be adjusted or proper references regarding this level of precision are cited.
Ans: Yes, I have deleted the phrase "high precision".

14. P4879-line 3 This kind of categorization of the remote sensing ET methods is not good. Provided cited papers for this sentence have not such a categorization.
Ans: We have changed it to "Two of the popular approaches being used for ET estimation are the…." in the revised version.

15. 4879-line 9 Surface radiation temperature replaced with "surface radiative temperature"
Ans: Yes, we have corrected in the revised version.

16. 4879-line 13 "at first" is not correct English phrase
Ans: We have deleted the"at first" in the revised version.

17. 4879-line 17 Link of roughness length parameters with surface parameters in SEBS is not based on "similarity theory". In SEBS, the similarity theory is rather used for estimation of sensible heat flux
Ans: Thank you. We have deleted the "based on similarity theory".

18. 4879-line 18 Replace “ET ratio” with “evaporative fraction”
Ans: Thank you. We have corrected in the revised version.

19. 4879-line 18 Please change the phrase “based on the SEBS”. SEBS includes a number of methods for different parameters. In exact words, in SEBS, after determination of the evaporative fraction, ET is determined by multiplying this fraction to the available energy (Rn □ G)
Ans: Yes, we have replaced “based on” with “in”.

20. 4879-line 25 Replace “one and two layer model” with “two-source energy balance” or “dual-source energy balance”.
Ans: Revised, thank you.

21. 4879-line 26 Improve the wording in this sentence
Ans: Revised as you suggested, thank you.

22. 4880-line 1 The sentence “They were in good agreement” should be included with the previous sentence with more coherent English grammar
Ans: Yes, we have changed this to “These estimates based on the Penman-Monteith method were compared with the measured data collected from the meteorological stations and they were in a good agreement.”

23. 4880-line 14 Why residual methods are the best?
Ans: Thank you. We have changed “best” to “better”

24. 4881-line 6 How “time period” is addressed in the formulation of SEBTA?
Ans: According to the actual need and the applicable MODIS data, we can set the time period in the formulation of SEBTA.

25. 4881-line 7 Higher than what in “higher resolution”?
Ans: The resolution of MODIS 1km is higher than the interpolated data of ground-based measurements.

26. 4881-line 10 Put “with” between “areas” and “complex”
Ans: Revised. Thank you.

2.1 The fundamental theory of the SEBTA

27. 4881-line 20 Is the latent heat the driving factor of ET? The driving factors of ET are seems to be the available energy (Rn □G), the moisture availability of the soil, and the water content in the crops.
Ans: Thank you. We have revised the sentence.

28.4881-line 20 The phrase “the closure in the energy balance equation can be confirmed” has no relation with the first part of the sentence.

Ans: Yes. Thank you.

29. 4882-line 5 Do you mean aerodynamic “diffusion” theory or aerodynamic “turbulence” theory?
Ans: Revised. Thanks! We meant the aerodynamic “turbulence” theory.

30.4883-line 14 The sensible heat flux is heat exchange between the surface and a level in the atmosphere not between surface and “atmospheric turbulence”
Ans: Yes. We have revised.

31 4883-line 21 What do you mean by “sample size”?
Ans: Thank you, we have deleted this phrase .

32 4884-line 3 How dry and wet pixels are “always” present in satellite images? What about mixed pixel issues?
Ans: We have changed it to “oftentimes” .

33. 4884-line 7 What is “stable aerodynamic resistance”?
Ans: “Stable aerodynamic resistance” means “unchanging aerodynamic resistance ”

34. 4884-line 10 and equation 7 As here you referred U200 to the wind speed at mixed layer, a logarithmic function can not be used. In the mixed layer the change of wind with elevation is not logarithmic and does not follow the Monin-Obukhov Similarity theory.
Ans: The Monin-Obukhov Similarity theory is not used at referred U200 , we only computed the wind speed at mixed layer, then we calculated the r_{ah} in every pixel. See Figure 2, the H of each pixel will be calculated by iteration cycle with Monin-Obukhov Similarity theory.

35. 4884-line 15 Replace “dynamic roughness” with “roughness length for momentum transfer” as for z0m (and for other parts of this paper)
Ans: Yes, we have corrected.

36.4884-line 15 Why at 0.06 m height?
Ans: The phrase “at 0.06m height” is error in translation, the “0.06m” is a default value for $z_{om\_station}$. It has been corrected in the revised version.

37. 4884-line 20 How z0h in SEBTA is determined?
Ans: In the part of section 2.4 “Dynamic determination of surface kinetic parameters in the SEBTA” has described how to obtain the Z_{0h}.

38. 4884-equation 9 Include d in the equation as

$$\frac{1}{u_*} = \frac{1}{ku(z)} \ln(\frac{z}{z_{om}})$$

Also refer to your figure 2 for correct equation
Ans: Yes, we have corrected.

39. 4885-line 1 Z is the height for wind speed measurement
Ans: Yes, we have corrected.

40. 4885-line 6 Explain how local advection effects addressed in equation 10, especially for the regions of image where irrigated vegetation is in vicinity of bare soil?

Ans: As Figure 2, the equation 10 is a key step to estimate the H of each pixel. We have included a sentence after equation 10 as "With this consideration, SEBTA may be empowered to address come delicate phenomena such as the local advection effects, especially for the regions of image where irrigated vegetation is in vicinity of bare soil.

41.4885-line 6 How a and b in equation 10 are determined?
Ans: The a and b in equation 10 can be determined by equation 11 below (see figure 2 in paper).

$$a = \frac{dT_{dry}}{T_{dry} - T_{wet}} \ , \quad b = \frac{-dT_{dry} T_{wet}}{T_{dry} - T_{wet}}$$

42. 4885-line 9 What do you mean by "effective heat fluxes"?
Ans: The "effective heat fluxes" has been changed to "available heat fluxes" which are the heat fluxes used for ET estimation.

43. 4885-line 10 Correct the equation in this line to: LEwet = Rn,wet – Gwet
Ans: Yes. Corrected

44.4885-line 13 Correct the equation in this line to: LEwet = Rn,dry - Gdry
Ans: Yes. Corrected

45. 4885-line 14 Correct the equation in this line to: dTdry = (Rn,dry -Gdry) rah,dry/Pacp
Ans: Yes. Corrected

46. 4885-line 20 How the values for kwet are determined? Give reference
Ans: The values for kwet are determined with following equation, this equation can refer the paper (Conrad et al. 2007, Page:205)

$$k_{cold} = \begin{cases} 1.05 - \dfrac{0.85 - NDVI}{2}, & NDVI < 0.85 \\ 1.05, & NDVI \geq 0.85 \end{cases}$$

Conrad C., Dech S.W., Hafeez M., et al. Mapping and assessing water use in a Central Asian irrigation system by utilizing MODIS remote sensing products. *Irrigation and Drainage Systems*, 2007, 21 (3-4):197-218.

47. 4886-line 5 Why the reference height is the average height of the region?
Ans: The reference height is the average height of the region to eliminate impact of surface temperature difference on the calculation of the latent heat flux caused by the elevation change

48.4886-line 5 How this adjustment done?
Ans: The surface temperature of the study area was adjusted to the same temperature of reference height (average height of the region) with this equation as follows:

$$T_{s\_dem} = T_s + 0.0065(h - h_{mean})$$

49. 4886-line 8 Give reference for equation 14
Ans: 0.0065 is derived based on a constant lapse rate (**-0.65** K/**100 m**). In other words, if the altitude goes up by 100 meters, then the temperature would fall by 0.65 degrees of Kelvin. It was derived based on the correlation analysis between average temperature and elevation of weather station with data derived of 600 meteorological stations for 30 years. This analysis shows that the linear correlation coefficient is over 0.85 (minimum 0.85, maximum 0.99, average 0.96). The reference is

Stull, R.B., 2001. *An Introduction to Boundary Layer Meteorology* (1st ed.). Kluwer Academic Publishers, Dordrecht, The Netherlands.

50. 4886-line 18 L is the Obukhov length
Ans: Yes. It is.

51. 4886-line 20 In equation 17 for L, as stated in the original papers including SEBS paper, Ts should be replaced with _v (the virtual potential temperature), especially as your atmospheric reference level is at 200 meter in the mixed layer. Also, Ts in the land surface temperature. As L is for quantification of atmospheric stability, air temperature must be used, not land surface temperature.
Ans: Yes, we have revised it in Eq. 17.

52. 4887-line 5 Modify to: $\Psi_m(x)$ and $\Psi_h(x)$ are integrated stability correction functions for momentum and heat transfer
Ans: Yes, corrected.

53. 4887-ine 5 It seems that the level of observation for wind and air temperature are different (200 m for wind and 2 meter for air temperature). Please note that when using Monin-Obukhov Similarity theory functions, wind and air temperature must be in the same level.
Ans: Yes. Please to see the Figure 2. When we use Monin-Obukhov Similarity theory functions, wind and air temperature are in the same level.

54.4887-line 5 What are the formulas used to calculate $\Psi_m(x)$ and $\Psi_h(x)$?
Ans: The formulas used to calculate $\Psi_m(x)$ and $\Psi_h(x)$ are as follows:

The adjustment function of Dynamic roughness ($\Psi_m(x)$) and the adjustment function of heat transfer stability ($\Psi_h(x)$) under unstable atmospheric conditions (L <0), respectively, are defined as follows:

$$\Psi_m(x) = 2\ln\left[\frac{1+(1-16x)^{1/4}}{2}\right] + \ln\left[\frac{1+(1-16x)^{1/2}}{2}\right] - 2\arctan\left[(1-16x)^{1/4}\right] + \frac{\pi}{2}$$

$$\Psi_h(x) = 2\ln\left[\frac{1+(1-16x)^{1/2}}{2}\right]$$

The adjustment function of Dynamic roughness ($\Psi_m(x)$) and the adjustment function of heat transfer stability ($\Psi_h(x)$) under stable atmospheric conditions (L > 0) , respectively, as follows:

$$\Psi_m(x) = -5x$$
$$\Psi_h(x) = -5x$$

The adjustment function of Dynamic roughness ($\Psi_m(x)$) and the adjustment function of heat transfer stability ($\Psi_h(x)$) under the neutral atmospheric conditions (| L | → ∞, x → 0), respectively, as follows:

$$\Psi_m(0) = \Psi_h(0) = 0$$

Where, $x = z / L$ 。

55. 4887-line 14 How equation 20 is formulated?
Ans: The instantaneous latent heat flux is obtained based on the energy balance equation:

$$LE = R_n - G - H$$

Then, instantaneous ET(mm) is as follows.

$$ET = 60 \times 60 \times \frac{LE}{\lambda}$$

4887-line 15 Give reference for equation of λ
Ans: Xianquan,Xie. The estimation daily evapotranspiration in farmland with retrieving the instantaneous surface temperature of crop. Environmental Remote Sensing, 1991, 6 (4) :253-260

56. 4888-line 4 24 hour ET ratio is not appropriate and is not equivalent to daily ET ratio as at night time this ratio is different and normally there is no transpiration by crops
Ans: Thank you for your good suggestion, and we will revise this method in the future. This sentence has been added to the neighborhood of equation 21.

2.2 The realization of complex terrain in the SEBTA

57. 4888-line 22 Is SEBTA for only generation of the solar radiation?
Ans: No, the generation of the solar radiation in SEBTA is only one of many functions.

58. 4889-line 5 Here do you mean sunshine time or sunshine area?
Ans: We mean the sunshine time on unit of slope.

59. 4889-line 11 What do you mean by "time scale" here? Do you mean time step or interval?
Ans: We have changed the "scale " to "step" in the revised version.

60. 4889-line12 What are $-\omega_{sr}$, ω_{ss} and $\Delta\omega$ here? It should be expressed in the paper.
Ans: We have added the equation 22b in the revised version where ω is solar time angle, $-\omega_{sr}$ is angle of sunrise time, and ω_{ss} is angle of sunset time. $\Delta\omega$ is time step in a range of $[-\omega_{sr}\ ,\ \omega_{ss}]$.

61. 4889-line 21 Equation 25 is unclear. What is "SHADOW" in this formula?
Ans: The Equation 25 is Hillshade function embedded in the GRID module of the Arc/Info. SHADOW is keyword in this Hillshade function.

62.4889-line 25 Define g_0 and g_i in equation 26
Ans: We have defined it in the neighborhood of equation 25b where g_0 is start time of topographic shading; and g_i is defined as a topographic shading parameter.

63. 4890-line 2 Adjust the phrase "if the Sun can shine (or shade)" as Sun can not shade!
Ans: Yes, corrected.

64. 4890-line 5 It is obvious from this sentence that calculation of shading parameters is useful in better estimation of net radiation. However, in the subsequent sentence it is stated that this parameter is used for calculation of sensible heat flux. How this calculation done? Is this just for an adjustment on land surface temperature due to elevation change by equation 14? So, where did you account for full impacts of surface characteristics as you stated in line 12 of this page?
Ans: The computation of effects of terrain on R_s is achieved by the following formula.

$$R_{s24} = \frac{T}{2\pi}\left(\frac{1}{\rho}\right)^2 I_0 \tau_{b24}\left\{U\sin\delta\left[\sum_{i=1}^{n} g_i(\omega_i - \omega_{i-1})\right]\right.$$
$$+V\cos\delta\left[\sum_{i=1}^{n} g_i(\sin\omega_i - \sin\omega_{i-1})\right]$$
$$\left.-\mathrm{W}\cos\delta\left[\sum_{i=1}^{n} g_i(\cos\omega_i - \cos\omega_{i-1})\right]\right\}$$

The computation of effects of terrain on H by the effects on dT and T_s are achieved (See the following formula):

$$H = \rho_a c_p \frac{(T_s - T_a)}{r_{ah}} = \rho_a c_p \frac{dT}{r_{ah}}$$
$$dT = aT_s + b$$
$$T_{s\_dem} = T_s + 0.0065(h - h_{mean})$$

2.4 Dynamic determination of surface kinetic parameters in the SEBTA

65. 4891-line 16 Refer to z0h as another roughness parameter, as you later stated equation 29 for its estimation.
Ans: Thank you. We have corrected

66. 4891-line 22 Equations 27-29 are not in the cited reference (Sue et al. 1999)
Ans: Yes. We have corrected.

67. 4892-line 12 Change “others” to “other”.
Ans: Yes. Corrected.

68. 4892-line 19 Even with dynamic change of effective height based on MSAVI parameter, this is not the full use of available data for determination of roughness parameters, as still effects of atmospheric turbulence on roughens parameters are not included.
Ans: This is good suggestion. Thank you. This sentence has been added in the neighborhood of Table 2 to avoid the confusion.

3 Case study
3.1 Study area

69 4893-line 13 Which method is used to estimate annual ET?
Ans: This ET value was obtained from the metrological station using lysimeter.

70. 4893-line 14 What do you mean by “ample light and heat fluxes”?
Ans: Yes, we mean that there is sufficient light and heat in study area for crop growth.
I have revised this phrase as “ample light and heat radiation ”.

71 4893-line 15 Give reference
Ans: Yes. This result can be referred from NRC, 1992.

3.2 Data collection and analysis

72. 4893-line 21 Introduce the MODIS products you named here
Ans:

Table 1. The MODIS products to be used for estimating ET

Products	content	levels	spatial resolution	temporal resolution(day)
MODMGGAD	Elevation angle / azimuth	L2	1km	1
MOD09GQK	Surface Reflectance	L2G	250m	1
MOD09Q1	Surface Reflectance	L3	250m	8

MOD09GHK	Surface Reflectance	L2G	500m	1
MOD09A1	Surface Reflectance	L3	500m	8
MOD11A1	Surface temperature and radiation	L3	1km	1
MOD11A2	Surface temperature and radiation	L3	1km	8

73. 4893-line 23 Did you use both daily and 8-day products of MODIS for land surface temperature (MOD11A1 and MOD11A2)?
Ans: Since the daily MODIS data is seriously affected by the cloud, the daily MODIS data is repaired by 8-day products with the "similarity method of neighborhood space".

74. 4894-line 13 What is the temporal resolution of climate data used here? Why only one meteorological station used? Include some comments regarding the method of observations and equipments of this station.
Ans: The temporal resolution of climate data used here is a day, and the spatial climate data is interpolated with meteorological site data derived by the National Meteorological Center of China Weather Bureau. But there is only one Yucheng Ecological Experimental Station (Yucheng station hereafter) with ground-based measurement of lysimeter and eddy co-variance measurement equipment in the study area.

75. 4894-line 15 What do you mean here by “vectorized”? Is this vectorization applied to “all datasets” (even climate data)?
Ans: we have deleted the word “vectorized”. Only climate site data is interpolated as grid.

3.3 Model Validation

76. 4894-line 19 Change “cover” to “covering”.
Ans: Yes. Corrected

77. 4894-line 20 As here SEBTA using energy balance approach and your observed ET are by a lysimeter using water balance approach, please give some comments and explanations regarding the differences of two method and the uncertainty of each method.
Ans: The discrepancies that are closely tied with energy closure issues inherently might partially arise from the use of energy balance approach for simulated values and observed values collected by a lysimeter using water balance approach too. The other reason is shown in the 78 comments and responses below. These sentences have been added in the neighborhood of Table 4.

78. What is the temporal resolution of lysimeter observations? How do you justify this with instantaneous ET from remote sensing?
Ans: The temporal resolution of lysimeter observations is 1hr. In order to avoid the pixel distortion caused by the satellite drift and other reasons, taking into account the impact of satellite resolution, the average values of simulation within about 1kmx1km area were extracted and compared with the observed values at Yucheng station for model validation.

79. Please give some description of the lysimeter site.
Ans: The Yucheng Comprehensive Experimental Station of Chinese Academy of Sciences is located in the North China Plain (116 º 34'E, 36 º 57'N) (In Yucheng County, Shandong Province). The elevation is 28m. The site belongs to monsoon climate of warm temperate and semi-humid, the annual average temperature is 13.1^{o}C, the precipitation is 582mm, the total solar radiation is 5225 MJ/m2, the sunshine hours is 2640h. The area covered mainly with farmland and grassland (ChinaFLUX, 2006).

80. What is the complexity of terrain for this site that SEBTA addressed?
Ans: Yucheng station is located in the Plain of Huang-huai sea, there is no complexity of terrain, but the study area has heteorogeneous complexity of terrain。

81. What is the distance between meteorological station used and this lysimeter?
Ans: This lysimeter belongs to Yucheng Ecological Experimental Station, Chinese Academy of Sciences. It is 25km or so to Jinan meteorological station belonging to National Meteorological Center of China Weather Bureau.

82. What are the average elevation at this site and the average elevation of the study area?
Ans: The average elevation at this site is 28m and the average elevation of the study area is 624m.

83. What are a and b coefficients at this site? How air temperature justified for this site?
Ans: The a is 0.2218 and b is -66.5674 at this site. The air temperature of this site is derived from dataset of Yucheng Ecological Experimental Station, Chinese Academy of Sciences, and they have validated all the data.

4. Results and discussion

84. 4896-line 6 What is the bases for classification of “rough” and “moderate” terrains? Please give reference
Ans: The description about study area and terrains can be seen in the following book.
Huang Bingwei, Zheng Du, Zhao Mingcha. Modern geography. Beijing: Science Press, 1999.

85. 4896-line 14 As in Figure 7a there is no contour line, how one can distinguee “distinct terraces on each 500 m”?
Ans: The DEM is in a grid format, and we can analyze the spatial characteristics of the study area with GRID module in ARC/INFO software to generate the contour lines.

86. 4897-line 23 Change “one” to “on”
Ans: Yes. Thank you.

97. 4897-line 24 ET in any single time in any elevation is varying in maps. In other words, same elevations at any time have different ET. How did you prepare Figure 9 then?
Ans: According to different ranges of elevation, the mean ET values falling in different ranges were computed in a GRID module of ARC/INFO software package, and this is the basic spatial

analysis function in a GRID module to generate seasonal ET spatial data (spring, summer, autumn and winter).

98. As you have only one validation point in your study area, what is your assessment of the uncertainty of ET in Figures 8-12?
Ans: The study area of Haihe river basin is an important area for this study. Since there are a large of number of research results in past 40 years, we can assess the uncertainty of ET in Figures 8-12 with regard to others similar research results.

4.2 The impact of different patterns of LULC on ET estimation

99. Pages 4898 and 4899 What is the main conclusion of this analysis? What is your interpretation of the main results for this change of ET over land use? What is your assessment of the accuracy of these values?
Ans: The main conclusion of this analysis is that there is a significant effect of land cover on ET, and the ET in areas covered with different land cover is different. The difference of ET under different terrain effects caused by the difference of surface conditions may also affect the accuracy of ET estimation. The accurate reflection of these values is therefore associated with the accuracy of the SEBTA model.

100. 4898-line 8 You can summarize this paragraph into a simple table. Try to summarize the text to prevent repeating of words
Ans: Yes, I have summarized this paragraph into a simple table as follows.

Class	High(m)	ET_SPR	ET_SUM	ET_AUT	ET_WIN	ET_YR	Area_ct%
1	0-20	1.28	2.81	3.31	0.41	1.57	13.42
2	20-50	1.15	3.13	3.49	0.28	1.61	12.39
3	50-150	0.95	2.80	3.43	0.25	1.49	9.39
4	150-450	0.85	2.28	3.39	0.26	1.36	9.42
5	450-800	0.83	2.22	3.20	0.24	1.30	11.26
6	800-1300	0.88	1.43	2.58	0.26	1.03	22.88
7	1300-1500	1.27	1.41	2.49	0.30	1.09	13.10
8	>1500	1.43	1.75	3.10	0.29	1.31	8.15
	Total						100.00

101. 4899-line 1 Change “can be as biggest as”
Ans: Yes, corrected

102. 4899-line 16 Where is the first hand for “on the other hand”?
Ans: Thank you. We have deleted this phrase.

103. 4899-line 29 Southeast and Northeast must have first letter in capital. See also 4900-line 3
Ans: Thank you. Corrected.

104. 4900-line 1 A word must be missing between “and” and “regions”. This sentence is meaningless.
Ans: Yes, we have revised this sentence.

4.3 The impact of the inclusion of elevation,

105. 4900-line 14
Change “water” to “water vapor”
Ans: Yes, corrected.

106. 4900-line 14 How you address the “full” introduction of DEM effects on water vapor and heat fluxes? Aren’t there any term not included (e.g. advection terms due to topography) which is not included here? In my understanding, the only effects of DEM on ET addressed in this paper is on calculation of net radiation and an adjustment on temperature difference.
Ans: I have deleted the word “fully”. Thanks for your suggestion.

107. 4900-line 18 Although here you mentioned “1532 m” as the maximum height, the maximum elevation in Fig 11 is 1100 m.
Ans: Note that although the maximum height is 1532 m, Figure 11 only addresses transect for simulation which does not cover this highest point of the study area. This sentence has been added into the neighborhood of Figure 11.

108. 4900-line 19 Where are “left” and “right” curves in Fig 11? I see you combined them to one graph
Ans: Yes, we have revised this sentence. Thank you.

109. 4901-line 2 What do you mean by “delineation of terrain effects”?
Ans: I have revised this sentence to “The slope and aspect are deemed important parameters accounting for the heterogeneous terrain effects in the study area.”.

110. 4901-line 8 Where is the source for extraction of values of Fig 12? What is the validation assessment of these values?
Ans: The Rn data in Fig 12 are simulated by SEBTA model according to different ranges of aspect. The algorithm of Rn associated with DEM has been validated by local data.

4.4 Final remarks

111. 4901-line 24 Please note that in SEBS (Su, 2002), land use is considered by its kB□1 model for roughness parameters.
Ans: OK. We have added one sentence in the context to clarify it.

112. 4902-line 10 How you proved the over-estimation of ET in the areas with higher elevations and larger shade slope? What are your validation data?

Ans: The over-estimation of ET in the areas with higher elevations and larger shade slope was obtained within simulation outputs. But no proof was made yet using local observed values. According to your suggestion, we will do some research to validate these results in the future.

5. Conclusions

113. 4902-line 3 What is "aerodynamic diffusion theory"?
Ans: I have revised the "aerodynamic diffusion theory" as "aerodynamic turbulence theory". Thank you.

114. 4902-line 19 How you addressed "full account" of terrain on ET. Refer to my previous comments.
Ans: Yes, I have revised this sentence.

115. 4903-line 4 What was your "consistency index"? Where is its definition?
Ans: Willmott (1982) proposed "consistency index" (Index of agreement) to test the results of model simulation (or prediction) , this consistency index can show coincide between simulated value and observed value(Zhan, et al., 1996). Consistency index (Idx, dimensionless) is defined as:

$$Idx = 1 - [\sum_{i=1}^{n} (P_i - O_i)^2 / \sum_{i=1}^{n} (|P_i - \overline{O}| + |O_i - \overline{O}|)^2]$$

where O_i is observed value, $\overline{O}$ *is spatial average value,* P_i is forecasting value

Zhan X., Kustas W.P., Humes K.S. An intercomparison study on models of sensible heat flux over partial canopy surfaces with remotely sensed Surface temperature. *Remote sensing of environment*, 1996,58 (3):242-256.

116. 4903-line 5 24 or 48? What are these 24 datasets of MODIS?
Ans: In our case study, the 48 MODIS datasets collected between 2005 and 2006 were used for model validation. The selected 24 datasets of MODIS images in 2005 were used for ET analysis associated with different temporal and spatial scales.

117. 4903-line 6 What is your "differential analysis" here? What spatial scales you worked with? Isn't it that your resolution for ET estimation is 1km based on MODIS thermal data? Also, what are your temporal scales? You only summarized data by averaging in seasonal time steps. Did you use remote sensing data with different temporal resolutions?
Ans: I have revised this sentence to "The selected 24 datasets of MODIS images in 2005 were used for ET analysis assonated with different elevation and land cover." The temporal resolution is a day and spatial resolution is 1kmx1km.

118. 4903-line 9 What are your validation data for evaluation of ET change in different heights over different seasons?
Ans: Thanks for your good suggestion. We will do some research to validate such data for evaluation of ET change at different heights over different seasons in the future. This has been added as future work in conclusions section

119. Table 2: This table does not exist in the cited reference (Liu et al., 2005), see page 4910.
Ans: Since the classification system of land cover is cited from this paper (Liu et al., 2005), we can not cited the table from this paper. I have deleted the reference from here to avoid misunderstanding.

120. Fig 1 Replace “Friction wind” with “wind friction velocity”
Ans: Yes, corrected.
121 Fig 3 In vertical axis, state MSAVI as vegetation index, as stated in 4891-line 8
Ans: Yes, corrected in the caption of Figure 3 in the revised version.