First of all, we would like to thank Prof. Dr. Shigenori Haginoya for your careful work and very useful suggestions. We will try to take advantage of your advice for improving the revised manuscript. For an easier comprehension, the comments of Prof. Dr. Shigenori Haginoya are also reported. At the same time, the reply part uses the red typeface.

Prof. Dr. Shigenori Haginoya: "1. I understand that the present analysis applied to clear-sky conditions. Write it in the abstract clearly."

Answer: Yes. You are right, the present analysis applied to clear-sky conditions. I have added it using red words in the abstract.

Prof. Dr. Shigenori Haginoya: "2. P4623 L11 Change "Surface Energy Balance System (SEBS)" to "SEBS"."

Answer: I have changed "Surface Energy Balance System (SEBS)" to "SEBS".

Prof. Dr. Shigenori Haginoya: "P4623 L25 The left hand side of Equation (1),

$$R_n(x,y) = K_{\downarrow}(x,y) - K_{\uparrow}(x,y) + L_{\downarrow}(x,y) - L_{\uparrow}(x,y)$$
$$= (1 - r_0(x,y)) \cdot K_{\downarrow}(x,y) + L_{\downarrow}(x,y) - \varepsilon_0(x,y)\sigma T_{sfc}^4(x,y)$$

is not correct but

$$R_n(x,y) = K_{\downarrow}(x,y) - K_{\uparrow}(x,y) + L_{\downarrow}(x,y) - L_{\uparrow}(x,y)$$
$$= (1 - r_0(x,y)) \cdot K_{\downarrow}(x,y) + \varepsilon_0(x,y)\{(L_{\downarrow}(x,y) - \sigma T_{sfc}^4(x,y)\}$$

is correct according to the Kirchhoff's law"

Answer: According to the Kirchhoff's law, the net radiation can be expressed follow:

$$R_n(x,y) = K_{\downarrow}(x,y) - K_{\uparrow}(x,y) + L_{\downarrow}(x,y) - L_{\uparrow}(x,y) \quad (1)$$

From the eq. 1, we can get following equation:

$$K_{\uparrow}(x,y) = r_0(x,y)K_{\downarrow}(x,y) \quad (1)$$

$$L_{\uparrow}(x,y) = \varepsilon_0(x,y)\sigma T_{sfc}^4(x,y) \quad (2)$$

$$L_{\downarrow}(x,y) = \varepsilon_a(x,y)\sigma T_a^4(x,y) \quad (3)$$

ε_a is air emissivity and T_a is are temperature.

So the eq. (1) can be written following:

$$\begin{aligned} R_n(x,y) &= K_{\downarrow}(x,y) - K_{\uparrow}(x,y) + L_{\downarrow}(x,y) - L_{\uparrow}(x,y) \\ &= (1 - r_0(x,y)) \cdot K_{\downarrow}(x,y) + \varepsilon_a(x,y)\sigma T_a^4 - \varepsilon_0(x,y)\sigma T_{sfc}^4(x,y) \end{aligned} \quad (4)$$

But in our paper, we directly used downward longwave radiation coming from model.

So eq.4 can be written as:

$$\begin{aligned} R_n(x,y) &= K_{\downarrow}(x,y) - K_{\uparrow}(x,y) + L_{\downarrow}(x,y) - L_{\uparrow}(x,y) \\ &= (1 - r_0(x,y)) \cdot K_{\downarrow}(x,y) + L_{\downarrow}(x,y) - \varepsilon_0(x,y)\sigma T_{sfc}^4(x,y) \end{aligned}$$

Dr. Haginoya's equation is not correct. In other words, our equation is right in our paper.

Prof. Dr. Shigenori Haginoya: "4. P4624 L18 "", and the mean temperature," is changed the following, "", and the mean temperature difference between the surface and the air,""

Answer: Thank you for your very useful comments. We had already made the corresponding revision. In the paper we marked using red typeface.

Prof. Dr. Shigenori Haginoya: "5. P4624 L23"shear stress, ρ is the density of air," is changed the following, "shear stress, Cp is specific heat of air at constant pressure, ρ is the density of air,""

Answer: Thank you for your very useful suggestions. We had already made the corresponding revision. In the paper we marked using red typeface.

Prof. Dr. Shigenori Haginoya: "6. P4625 L7 "the potential virtual temperature" is changed the following, "the virtual potential temperature""

Answer: Thank you for your very useful suggestions. We had already made the corresponding revision. In the paper we marked using red typeface.

Prof. Dr. Shigenori Haginoya: "7. P4625 L14 Show the ASTER observation time."

Answer: Thank you for your very useful suggestions. We had already made the corresponding revision. In the paper we marked using red typeface.

ASTER observation time is 12:19 using Beijing time.

Prof. Dr. Shigenori Haginoya: "8. P4625 L15 How long the averaging time each plot of ground measurements in the Figure 4? A few tens of minutes, one hour or other?"

Answer: The averaging time is 10 minutes with each plot of ground measurements in the Figure 4. We had already made the corresponding revision. In the paper we marked using red typeface.

Prof. Dr. Shigenori Haginoya: "9. P4625 L22 Explain the characteristics of "different months". For example, 3 May is pre monsoon period (dry season, ground surface is dry condition) and 4 June is monsoon period (wet season, ground surface is wet condition). "

Answer: Thank you for your suggestion.

I have changed it in the revised manuscript using red typeface.

It is "In dry season, ground surface is dry and in wet season ground surface is wet condition in study area."

Prof. Dr. Shigenori Haginoya: "10. P4626 L10 The results are better than what? Show references or explanation. Explain the improvement on albedo and surface temperature. Is it sensor resolution?"

Answer: At first time, we used the equation $A=a+bA_1+cA_2$. Here A are albedo or temperature and a, b and c is constant. Later using Liang's way, we found that the later results were better than former results. So does temperature. For example, surface albedo $r_0(x,y)$ is derived from narrowband-broadband conversion method by Liang (2001). Since ASTER has nine bands, it is expected that so many bands should enable us to convert narrowband to broadband albedos

effectively. Liang (2001) found that the conversions are quite linear.

We had already made the corresponding revision. In the paper we marked using red typeface.

Prof. Dr. Shigenori Haginoya: "11. P4626 L19 Latent heat flux is not parameterized but residual of heat balance equation (equation (7)). Authors should write the following, latent heat flux is in good agreement with field measurement because of adequate parameterization of Rn, G0 and H."

Answer: Thank you for your suggestion.

We had already made the corresponding revision. In the paper we marked using red typeface.

Prof. Dr. Shigenori Haginoya: "12. P4625 L13 and P4627 L3 "4 scenes of ASTER data" contradicts "three ASTER images"."

Answer: Thank you for your correction. In writing this paper, this is a clerical error.

We had already made the corresponding revision. In the paper we marked using red typeface.

Prof. Dr. Shigenori Haginoya: "13. Fig. 2 Explain the following parameters, "Pv" and "kB^{-1}". "Ta" is changed to "θ_a"."

Answer: They are common parameters of "Pv" and "kB^{-1}". Pv is vegetation coverage and kB^{-1} is the excess resistance for heat transportation. "T_a" has changed to "θ_a". We had already made the corresponding revision. In the paper we marked using red typeface.

Prof. Dr. Shigenori Haginoya: "Fig. 3 If authors aim to compare the different months, rearrange the figures to correspond the same area. The region of 3 May is a little bit different from that of 4 June. It is easy to understand that the corresponded area is enclosed with a frame. It is a little bit difficult to compare the heat balance features of different months because the flux scale is

different from each other."

Answer: Thank you for your suggestion. As we know, it is difficult to get the ASTER imagery, especially in study area. We try to get the clear sky remote sensing data but failed, only four scenes selected. Other remote sensing data which covered over 50% clouds cannot do the parameterization using land surface observation data. Our aim is to derive the regional heat flux with high resolution remote sensing data (ASTER) in northwest China.

Prof. Dr. Shigenori Haginoya: "15. Fig. 4 Latent heat flux is calculated from (Rn, G0 and H). So that A'rou should be plotted in the figure of sensible heat flux if data is available."

Answer: Thank you for your suggestion.

In fig. 4, A'rou should be plotted in the figure of sensible heat flux. But the data is not available on that day. That is to say, the land surface observation data have some trouble, so we didn't plot A'rou in the figure. Overall, it does not affect the other stations that we have gotten results.