Remarks:

1. **This manuscript is a re-submission of I manuscript I already evaluated in March 2014. The original manuscript was already rather interesting concerning topic and concepts, but rather unripe in its realization, analysis and presentation. In this new version the problematic issues have been addressed.**

   Reply: Thanks.

2. **In its current form the paper is very well embedded in scientific literature on the topic. Also the description of the test area is well documented and referenced. As in the original manuscript I appreciate the use of field data for estimating the lapse rates (Sections 2.2.1 and 2.2.2). This is a nice example of confining uncertainty by adding additional information from observations.**

   Reply: Thanks.

3. **Concerning the improvements we have now in Table 5 a good overview including calibration and evaluation periods.**

   Reply: Thanks.

4. **In the original submission I was complaining because I found your model was not able to capture peaks due to storm rainfall and rapid reaction by the basin. In this version I found this issue is almost solved. Did you some adjustments in the process description? Or is this an improvement stemming from the changes in the snowmelt and icemelt components (Page 13402)?**

   Reply: The model has been slight modified in Section 3.2. We have improved the process for runoff generated from rainfall directly in glacier area in the model. Given the relative large glacier coverage and the steep terrain in the study basin, rainfall provides storm runoff and flows into the stream network directly, which flows into the bare soil zone and reaches the stream network slowly in the previous model. The simulation of peak flows have been improved significantly benefiting from these modifications.

Points to be addressed:

1. **I already mentioned in the original submission, that you should be careful in defining your partition a "dominant runoff mechanism". In this manuscript you confuse and mix this again. I remember we suggested to use "dominant source of**

water".

Reply: Thanks. We have modified all the 'runoff generation mechanism' as 'runoff water sources' in the revised paper.

2. **On page 13400 you present your rules to separate the hydrograph. In Figure 6 we see the temporal distribution of the 4 options presented in Eq. 6. I understand you want to keep the rules easy, but if I correctly interpret Figure 6 you have surely small rain events in April. The red and green categories are very marginal in your test area, as they should focus on temperature driven snow and icemelt short before and short after the rain season. How do these rain events with obvious generation of Qr affect your calibrated data sets?**

   Reply: Given the seasonality of precipitation in our test area (shown in Figure 3), we neglected the rain events in the period from October to April for the test of the proposed calibration method. We acknowledge that this is a rough assumption, and surely small rain events will occur during this period. To take the effects of these rain events on the calibration into account, an iteration calibration procedure is adopted in this study. The parameters for melt and rainfall runoff are firstly calibrated on their dominant hydrograph parts (red and green, blue in Figure 6) separately, then the melt parameters are re-calibrated on the basis of the calculation of rainfall runoff using the parameters already calibrated in the first step. This calibration procedure is repeated until the parameter values getting a stable level. In this way, the effects of rainfall events in April on the calibration can be partly taken into account. And also, we have done some work to evaluate the sensitivity of the calibration to the partition of the rainfall event dominant hydrograph in Section 4.5. Results in Table 6 and Figure 10 show the rainfall events can have an important role on the calibration on the rainfall runoff parameter (i.e. WM), while have relatively slighter effects on the calibration of melt and groundwater parameters. The accurate partition of the rainfall runoff dominant hydrograph should be improved based on the more accurate measurement of rainfall in the test area, which can be working for further study.

3. **13403: As table 6 demonstrate their sensitivity to your approach, can you give some more information on the meaning of KKA and KKD. You call both of them**

"coefficient used to calculate calibrated subsurface flow", which is for me no useful information. Are the two factors linkable to some physical property (infiltration, storage coefficient or so?)

Reply: We have added the below sentence in Section 3.2 in the revised manuscript:

K_A and K_D are outflow coefficients of groundwater storage. Their sum determines the flow rate of groundwater baseflow and their ratio (K_D / K_A) dominate the proportion of free groundwater storage. Infiltration and storage should have effects on the calibration of the two parameters.

Minor issues:

1. **13390-15: Typo: "slope"**

   Reply: We have revised it.

2. **13400: The notation chosen in Equation 6 is rather odd (minus signs in the indices to describe the mathematical equivalence). It is surely how you implemented it in your algorithm, but it is not very elegant in a manuscript. Wouldn't be better to have maybe a table instead?**

   Reply: We have improved it in the form as follow in the revised manuscript:

$$Q=\begin{cases} Q_{SB} & \text{for } S_i=0,\ G_i=0, \text{ and } D_i=0 \\ Q_{SB}+Q_{SM} & \text{for } S_i=1,\ G_i=0, \text{ and } D_i=0 \\ Q_{SB}+Q_{SM}+Q_{GM} & \text{for } S_i=1,\ G_i=1, \text{ and } D_i=0 \\ Q_{SB}+Q_{SM}+Q_{GM}+Q_R & \text{for } S_i=1,\ G_i=1, \text{ and } D_i=1 \end{cases}$$

3. **Table 3: on which basis you decide to have identical hydraulic conductivity in the u-zone and s-zone?**

   Reply: The soil layer in the test area is very thin. Soil storage capacity is relative low. Subsurface flow is mainly generated from groundwater. To make the simulation of subsurface flow simple, we assumed the hydraulic conductivity of the u-zone is same to the s-zone.

Final considerations:

I thank the authors for having made the effort to invest some more time to improve this manuscript. I listen now only few point they should now address. If this is achieved then

I can recommend the paper for acceptance.

Reply: Thanks. The related points have been addressed in the revised manuscript.