First the authors want to thank the anonymous Referee #2 for his/her review of the manuscript and for the constructive helpful comments. Find our response and new text below each point intended and text suggestions in italics.

However, it is not clear what new contribution is made in this work. There does not appear to be any methodological innovation presented. There does not appear to be any new insights gained regarding hydrologic processes or properties.

> We understand that the novelty has not been presented clearly enough and revised the manuscript accordingly, giving more attention on the conclusions that can be drawn outside of the specific setting of our site for hillslope moisture dynamics in general

863/2. These studies are not “uncommon”. In fact, they have become quite common.

> We agree that the use of ERT for mapping shallow subsurface structure und monitoring hydrological processes has been strongly developed in recent years. However, the use on hillslopes (in particular with layered structures) over a longer period (several month in almost weekly intervals) is still rare. Furthermore, most of the cited studies dea with controlled conditions (laboratory or irrigation) or only with a few time steps over a very long or very short period. The major aspect of the paper is (as also annotated by Referee #3) to show the robustness of ERT as long-term monitoring tool in the context of hillslope hydrology.
>
> In our opinion, the hillslope scale is the most important scale for predicting precipitation runoff response. Therefore it is crucial to know whether there is a spatial variability in the hydrological system on hillslopes or not. Many hypotheses of model are based on punctual measurements only. Punctual hydrometric measurement alone are not sufficient in case of significant spatial heterogeneity. However, with the use of a multi-method approach as presented in our paper, it is possible to transfer hydrometric data to higher spatial scales and to obtain additional patterns of soil water saturation distribution and its dynamics on a hillslope.
>
> Now we are aware, that the objectives of the paper have not been formulated very clearly. In a revised version we rework and specify the objectives and the conclusions.

The data in Table 1, Figure 2, and Figure 8 have already been presented in prior publications.

The data from Table 1 are adapted from Moldenhauer 2013, but they are of particular importance for understanding the electric and hydraulic properties of the study site. Furthermore some values were added (percentage distribution of soil texture and porosity).

Figure 2 is adapted from a German PhD thesis. The figure summarizes different Figures of the thesis (mean values of all sensors) and has modified depth ranges and colors for better comparison with the ERT data. It is very essential for validation and interpretation of the ERT data in in hillslope hydrology context.

Figure 8 is to show the reader the spatial expansion of the local groundwater but will be removed in a revised version and a reference would be added instead.

The key section on inverting the ERT data (5867/22-5868/12) does not appear to provide enough information for a reader to be able to reproduce the results.

More detailed information of the inversion will be added. Please see also the response to specific comments.

5860/10. Define ERT on first use.

A declaration of ERT will be added the abstract and on the first use in text:

Abstract: In addition, Electrical Resistivity Tomography (ERT) measurements on several profiles were applied for imaging the two dimensional variability in comparison with punctual hydrometric data.
5862/12 Many studies show the potential of Electrical Resistivity Tomography (ERT) for hydrological investigation.

5860/16. The phrase “and resulting in remarkable coincidence” is grammatically incorrect and not supported by the data. Remove.

The phrase will be removed.

5860/18-23. This is a weak summary of the results from this study. Replace.

The abstract was rewritten. Major results are added to the abstract.

5861/19. “These up to three layered cover beds” is a poorly constructed phrase. Reword.

The paragraph was rewritten:

In catchments of Central European subdued mountain range, the shallow subsurface of hillslopes is mostly covered by Pleistocene periglacial slope deposits (Kleber and Terhorst, 2013). These slope deposits have developed in different layers. In literature normally three layers are classified (Upper Layer – LH, Intermediate layer – LM, Basal Layer – LB: classification according to ad-hoc AG-Boden, 2005; Kleber and Terhorst, 2013). Sometimes locally a 4th layer (“Oberlage” ad-hoc AG-Boden, 2005) could be found. The occurrence of these layers can vary spatially and has different regional and local characteristics. Due to the sedimentological and substrate-specific properties, e.g. grain-size distribution, clast content, and texture, they remarkably influence near-surface water balance (e.g. infiltration, percolation) and are of particular importance for near-surface runoff, e.g. interflow (Chifflard et al., 2008; Kleber, 2004; Kleber and Schellenberger, 1998; Sauer et al., 2001; Scholten, 1999; Völkel et al., 2002a, b; Heller, 2012; Moldenhauer et al., 2013).

5862/1. Replace “implemented” with “prior”.

5862/2-3. Tracer investigations do not necessarily integrate entire catchments. Remove.

The sentence was rewritten:

Most of the prior studies were based on invasive and extensive hydrometric point measurements on the punctual scale or on tracer investigations, e.g. using isotope tracers that integrate much larger scales up to entire catchments.

5862/3. There have been many direct measurements on the hillslope scale (in this study about 50 m). Remove.

The sentence was rewritten:

Due to the spatio-temporal interlinking of near-surface processes and groundwater dynamics, there is still a lack of knowledge regarding runoff generation in watersheds (McDonnell, 2003; Tilch et al., 2006; Uhlenbrook, 2005).

5862/25. Define EM.

A declaration of EM is added:

Beside hydrogeophysical methods such as electromagnetic (EM) surveys (Popp et al., 2013; Robinson et al., 2012; Tromp-van Meerveld and McDonnell, 2009)…

5862/26. Replace “has” with “have”.

Done.

5863/4. Little was done to address the objective of mapping subsurface structures in this study.

We agree that the main focus is not the mapping of the subsurface structure. Nevertheless it is a little part of the work. We reword the sentence.

5863/5-6. A few months of data does not represent a “long-term” study. Remove.

The meaning of “long-term” in this context refers to the changes in water content and not the length of the investigation period. Because of our temporal resolution we may only make conclusions over 1 or 2 week intervals.
The sentence will be rewritten to avoid misunderstandings.

5863/9. What is meant by “different runoff components”? Explain or remove.

The runoff process may consist of different components, depending on where the runoff occurs. Usually three different runoff components were differentiated: surface runoff, interflow and groundwater flow
The sentence was rewritten:
With this multi-method approach, we tried to achieve a better understanding of the influence of the layered subsurface on water fluxes (e.g. infiltration, percolation or interflow) and the response to different amounts of precipitation on hillslopes.

5863/13. Remove “the” before “6 ha”.

The word will be removed.

5863/14. Add a sentence or two describing the vegetation and land use at the site.

The information was added:

The altitude ranges from 521 to 575 m a.s.l. with a predominant land cover of spruce forest (Picea abies approx. 30 yr.).

5863/16. What is a “slope hollow”?

A slope hollow is a slope with a concave curvature in lateral direction and in our case also in direction of the slope.

5864/5. ThetaProbes are not truly FDR sensors. Remove.

We agree, as they only use a single frequency and not a “domain” of many frequencies, and will remove this. Some of the merchants of environmental devices should adapt this, because there are many who did this wrong in their description of the ThetaProbes.

5864/16. Use lower case theta for soil volumetric water content in accordance with convention in soil science.

All upper case thetas will be changed to lower case.

5864/19. Is the correct word “insulating” rather than “isolating”?

We agree “insulating” is better.

5865/1. Delete “petrophysical” because the relationship in this case is primarily about soil, not rocks.

We will change the term to pedo-/petrophysical, because both is right.
We are talking about sediments but these sediments are influenced by pedogenesis.

5865/10. I do not think “mineralization” is the correct term here. Maybe “electrical conductivity”?

This term will be changed to the term from Brunet et al. (2010): *low mineralized water*

5866/10. What is “hp”?

The “hp” is part of the name of the device and means “high power”
We will add some quotation marks “*4 point light hp*”

5867/26-27. Give one or more specific examples of such changes.

An increase on the surface was always followed be a decrease below and vice versa. Synthetic data with shallow decrease or increase at the surface indicated that this can be artifacts due to the smoothness constraints (Descloitres et al., 2003).

5868/6-7. Explain what is meant by these “smoothness constraints” and “regularization strength”.
5868/9. Explain “constraint minimum length”.
5868/10. Explain “adapting the inversion parameter”. What were the final parameters used for each time step? Please provide the key parameters in the text or supporting information. How were the best parameters identified? This sounds like a subjective process. Is it reproducible?

Smoothness constraints means to impose additional terms on the minimization problem thus finding among the equivalent models the smoothest model that explains the data within error bounds. This is a standard procedure for static models and determines the regularization strength of this smoothness term, λ (see 5868/7) for the assumed data accuracy of 1%. Similar was done for the time-lapse (difference) inversion, except that we avoided smoothness due to the above discussed artifacts (see last comment). Minimum length means to minimize the difference between the model vectors of adjacent time steps regardless of the position of the cells so that the changes are purely data-driven and not by smoothing. The λ value was also determined with respect to data fit making it an objective procedure.
In the revised manuscript we will explain the ERT inversion procedure in more detail, provide the most important formulae and give some additional references and comparisons in this part.

5868/27. Replace the phrase “causes no runoff to the spring at most” with “caused no runoff”.

Phrase changed.

5869/1-2. The phrase “decreasing discharge is mainly caused by direct precipitation” does not make sense.

The sentence was rewritten:
Primarily base flow dominates and decreasing discharge is mainly caused by saturation excess overland flow from the area surrounding the spring.

5869/10. “Saturated” not “saturate”.

Word changed.

5869/12. What is meant by “too slow”?
5869/13-14. This sentence does not make sense. Revise.

The paragraph was rewritten:
Due to the anisotropic hydraulic properties (low vertical compared to horizontal hydraulic conductivity) the percolation into deeper parts of LB decreases. The seepage water is concentrated as backwater in the LM and the upper parts of LB. Because of the high lateral hydraulic conductivity this saturated depth range is mainly involved in runoff and causes strong interflow.

5871/6. Provide quantitative examples of the differences. They are not obvious in the figure.

An example at the intersection of profile A and B:
- in a depth < 1 m – average deviation 8% (σ = 5.4%)
- in the depth range 1 – 7 m – average deviation 20% (σ = 10%)
- in depth > 7 m – average deviation 43% (σ = 6.6%)

5871/7. Define “reciprocal” in this context.

A declaration of “reciprocal” was added:
To exclude potential errors (e.g. by electrode positioning), the data quality may be evaluated by comparing normal and reciprocal measurements, i.e. interchanging potential and current electrodes (LaBrecque et al., 1996; Zhou and Dahlin, 2003).

5872/13-17. Poorly written (e.g. “may easier spread” and “toward to the spring”). Revise.

The paragraph was rewritten:
Due to the slope gradient, water from the hillsides and upper parts of the catchment flows into the direction of the depression lines, where it concentrates and forms a local slope groundwater reservoir. This results in a maximum decrease of resistivity in this zone as observed in all measured profiles at depths 1.5 to 4.5 m (cf. Fig. 5 and 8).
Percussion drilling confirmed that the thickness of LB downslope exceeds 3.5 m. Therefore, we assume that the entire saturated zone is located within the basal layer and since it is connected to the spring, it is also the source of the base flow.

According to this, the shape of the surface may be partially transferred to the subsurface to identify regions of different hydrogeological conditions. Convex areas indicate dryer conditions in the basal layer in comparison to the concave or elongate parts of the hillslope, which may act as local aquifers.

5870/8. Replace “we accept” with “we assume”.
5873/5. Replace “the same depth profile” with “depth profiles of similar shape”.
5873/12. Replace “precise” with “accurate”.
5873/12-13. Delete this sentence because it is not quantitative.
5873/28. Replace “higher amounts” with “higher resistivity values”.
5874/1-2. Replace “moisture conditions” with “higher soil water contents”.
5875/8. Delete “a mainstream”.

All suggestions were followed to.

5875/5. What is meant by “A first annual trend: : :”?

It meant the first period. The sentence was rewritten:
The first period between May and October is mainly characterized by drying.

5876/15. What is meant by “profile A 25 m”?

It meant at profile A at 25 m from the beginning, approx. in the middle of the profile.
We replaced the “25m” with “*close to the hydrometric station H3a*”.

5878/9. Explain what is meant by “accordingly different depths take part in runoff generation”? As far as I know, runoff occurs at the surface.

Runoff does not only occur at the surface. It can also occur in the subsurface as interflow (runoff in the unsaturated zone) or groundwater flow (runoff in the saturated zone).

5879/3-4. The phrase “The spring discharge consequently shows the major runoff generation: : :” does not make sense. Revise

The sentence was rewritten:

Due to lateral subsurface flow within LH, LM and the upper parts of LB, the discharge of the spring strongly increases.Table 5. Explain the connection between the data in Fig. 9 and the data used to construct Table 5.

Figure 9 is only a depth profile of one time step, at the time of the mapping (08/10/21). Table 5 is the correlation over the whole time series of the depth profile next to H3a. The data (θ_{Theta} and θ_{pH3a}) used to construct Table 5 are shown in Figure 12. The data of Ψ_{H3a} is not shown in a Figure, only as mean value for all tensiometer stations in Figure 2.

Figure 6. Specify the date for these data.
Figure 7. Specify the date.
Figure 9. Specify the date.

The dates were added to the captions.

Figure 7. Explain how you estimated porosity below 4-m depth when samples were only collected to 4 m.

The porosity was adopted from the samples of LB. We are aware that the calculation of saturation in greater depth is not quantitatively verified. But we try to explain the clear and significant change in resistivity. We are not sure if this change in resistivity is caused due to the change to the underlying gneiss or if some other material acts as aquiclude.
Although the numbers might not be correct, it shows the lower boundary of the local groundwater storage.

Figure 10. Explain the grey shaded regions in the figures.

The grey shaded regions visualize the ERT time intervals and ease the comparison with the bars of daily precipitation during the steps.

Figure 11. I like this figure.

Thank you.

Figure 12. Change the symbols so that the lines can be differentiated even in a greyscale print out.

The red circles are changed to triangles.