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Interactive comment on "A first investigation of hydrogeology and hydrogeophysics of the Maqu catchment in the Yellow River source region" *by* Mengna Li et al.

Anonymous Referee #1

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This study investigates the hydrogeology and hydrogeophysics in a catchment of the headwater area of the Yellow River Basin in Tibet Plateau (TP). Multiple analysis and field surveys were conducted including MRS, ERT, and TEM. Hydraulic conductivity is a poorly characterized, yet very important parameter in high mountainous areas, because it is used to quantify the subsurface flow. Studies which is leading to investigate the hydrogeology settings particularly in such a harsh environment are much needed. This study could potentially make a valuable contribution after some revision because so few field surveys have been conducted in TP. However, I do not believe the presentation of the manuscript at this stage is sufficiently good to warrant publication in the Earth System Science Data. Joint use of MRS, TEM, and ERT in TP is not it-

self note-worthy, rather that it is critical to clarify how combined multiple field surveys help to characterize the subsurface structure. Moreover, the manuscript is organized in disorder. The figures and tables fail to reach the standard of high profile scientific journals.

Specific comments:

1. The Introduction should be rewritten to highlight the significance of this study. That is the global map of hydraulic conductivity/permeability lacks realistic data points in TP, such as SoilksatDB (Gupta et al, ESSD, 2020) and permeability database (Gleeson et al., GRL, 2011). This study could fill the scientific and data gaps in a global view.

Gupta, S., Hengl, T., Lehmann, P., Bonetti, S., & Or, D. (2020). SoilKsatDB: global soil saturated hydraulic conductivity measurements for geoscience applications. Earth System Science Data Discussions, 1-26.

Gleeson T, Smith L, Moosdorf N, Hartmann J, Dürr HH, Manning AH, van Beek L P H, Jellinek A M 2011. Mapping permeability over the surface of the Earth. Geophysical Research Letters [J], 38: n/a-n/a.

2. Line 43: Since the hydraulic conductivity is a key parameter for the groundwater system, I would like to suggest using the groundwater model or integrated surface-groundwater model, instead of IHM.

3. Line 72: "Some investigations have been done on the TP based on DEMs." Investigations on what? How these previous works are related to your study? Need to clarify.

4. Line 94: what is the data source for geomorphology and geology? Need references.

5. Figure 1: Since not every reader is familiar with the position of TP, it is necessary to add the position of TP in the China map and its neighboring countries.

6. Lines 113-120: Authors should give an explanation of workflow for Figure 2 rather

than only listing methods. It is redundant to describe the time for each survey because all this information has been listed in Table 1.

7. Figure 6: It should redraw Figure 6 using professional tools which are used for scientific graphs in publication format.

8. Figure 8: There must be something wrong with water table depth (a) and (b). The eastern boundary is the Yellow River, and the elevation is decreasing from west to east, so the value of water table depth is supposed to be big in the western areas and small close to the river. However, the water table depth is 19m near to river while 0 m in the alluvial plain?? Same to Figure 9. Besides, the chromatogram should be changed to better present the gradient of results.

9. Section 4.4.2, Why did authors put equations of aquifer tests in the part of Results and Discussion? This should move to the Method part.

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