

***Interactive comment on* “Effects of vegetation patterns on yields of the surface and subsurface waters in the Heishui Alpine Valley in west China” by Y. Liu et al.**

Anonymous Referee #2

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General comments

The paper provides an analysis of runoff contributions (based on isotope methods and runoff measurements) from tributaries to the main stream in Heishui Valley (western China), and aims to attribute the respective contributions to the vegetation cover in the respective sub-basins. As there is still much to learn about vegetation effects on runoff formation, such studies are of potential interest to a wider community. However, the present study has some major flaws, and some of the conclusions are not obvious from the presented data (for reasons explained below).

Specific comments

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1. Most importantly, the main conclusions of the paper (that total vegetation cover, and the type of vegetation, influences runoff contributions from sub-basins) are not supported by the results, at least as they are presented in the current manuscript. The authors need to analyze their data (basically those presented in Fig. 5) on a unit-area basis (i.e. runoff per square kilometer): the current results are apparently determined by the absolute size of the sub-catchments. Only if this scale effect is eliminated, vegetation (and altitude) effects may be deduced from the data. Also, the data probably need to be corrected by precipitation (see comment #9).

2. p. 1022, lines 14-23: certainly remote sensing is important in hydrological studies; but as these are not part of the current investigation (except that landuse was derived from remote sensing data, which however is only a technical aspect of the study), they don't need to be discussed in the introduction. Instead, I would expect more discussion on observed vegetation effects on runoff, of which there are many.

3. p. 1024, last paragraph of Study area section: I think it is not necessary to list the altitudinal distribution of vegetation types and species in such detail. A reference to table 3 is probably sufficient. And, is this information derived from your analysis of satellite data? In that case, you may mention this here (by fitting section 3.4 into this paragraph).

4. p. 1025: how representative are the few sampling days for the overall situation?

5. Title of section 3.2: What is deltaD? Please explain. And what is SMOW (same section)?

6. p. 1028, second paragraph of results: Refer to table 2 only: this list of numbers is not necessary.

7. section 4.2.: This section should be part of the site description.

8. Discussion, second paragraph: Please show the results of the T-test! And what does it mean, "test of mean and min altitudes"?

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9. Same paragraph: You discuss altitude-dependent temperature effects: Are there data available? And, more importantly, wouldn't differences in precipitation pattern across the valley affect the relative runoff contributions from the sub-basins? Generally, the explanation of in terms of flow velocity of melt water is probably too simplistic, or at least not clear enough.

10. End of discussion: I don't see a contradiction of the present results and previous studies: they all show lower discharge if vegetation cover is high.

Technical corrections

The paper needs major improvements of the English; some typical errors are the use of "the" instead of "a"; unclear expressions (e.g. "in hydrological cycle aspect", p. 1022 l. 21, which probably should read "in hydrological studies"; "level flow": I don't know what that is; "mentions above": probably means "what was stated above"), or hard to understand (e.g. p. 1023, l. 22: "1048 m of falls").

Please indicate more clearly what "water" stands for, every time it is mentioned (sometimes runoff, or groundwater, or else, is confused).

Table 3: Mention that % vegetation coverage are given in brackets. The arid shrub should be left out as it does not occur in the study region.

Fig. 2: Not "DEM" but "topography"

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