General comments

This paper aims to reveal the response of hydrological processes to climate change in an extremely arid basin located on the north-eastern Tibetan Plateau, where it is really an ideal area to evaluate hydrological response to climate changes. With the support of large datasets including stable isotopes and water chemical compositions for a whole basin and its around mountains from different spatial-temporal scales, the manuscript has clarified the entire water cycle processes as well as the isotope hydrology responses to rapid climate changes in an extremely arid basin in the Tibetan Plateau. In addition, the manuscript has also concluded a perspective on the variation trends of water resources under the condition of multiple water sources recharge and climate warming. As my assessment, the topic about the impact of climate change on water resources talked in this manuscript is a general global focused issue. The research objectives, methodology, content and scientific hypotheses of this manuscript are well coincided within the scope of HESS. Thus, I suggest to accept this manuscript, after somewhat improvements. My main concerns are as follows:

1. The title needs to be reconsidered. A title with a clear direction would help to highlight the topic. I believe that the authors may want to emphasize the response of surface water and groundwater isotope variations to climate change. In addition, some of the sub-headings in the text should be also reconsidered so that they can outline the content of the text.

2. It seems to me that the abstract and introduction need to be furtherly condensed. Although the article is now look -like systematic, a more focused topic is the key to attract the reader's attention.

3. As for the text structure, it seems to be a bit confused and may be necessary adjusted. For example, the Section 4.1 should to be better to move after Sections 4.2 and 4.3. It seems to be too long for section 5.1, some subheadings may be added in order to help to fill the gap for readers. Section 5.3 is mainly focused on the groundwater circulation mechanism, which in my view, it should be moved to section 5.2. In addition to the overall structure, the content between paragraphs also needs to be sorted out. Example, the second paragraph of section 5.4 is too long and includes too many ideas. It should be rewritten to be more in point or logical.

4. Some Figures need to be rehearsed, e.g., regarding Figure 2, a hydrogeological map may be more appropriate for the topic of the paper rather than a simplified tectonic map. In addition, detail information needs to be added in some figure captions.

Some minor shortcomings please consider to improve:
Lines 13-14: Delete "The surface water heavy isotopes enrich during the wet season and deplete during the dry season". The abstract should highlight key findings.

Line 19: hydrothermal conditions are not an appropriate terminology, I guess the author wants to express temperature and precipitation regimes.

Line 21: Delete "ice/snow".

Line 28 Keywords should be ordered according to major and second categories and then followed specific research directions

Line 37：Delete "region of the".

Line 57: "These issues require an in-depth investigation" is a repetition of the "several questions remain to be resolved" in Line 55.

Lines 91-95: No more than 3 goals of the study were considered reasonable. The authors were advised to streamline the study objectives. The order of the research objectives should also be expressed more logical.

Line 118: "Hydrogeology and structure" can be changed to Basic hydrogeological setting

Line 137: Altun is not Alun

Line 162: phreatic groundwater is not phrenic groundwater

Line 206: Section 4.1 seems to duplicate 4.2 and 4.3 in terms of structure, although the contents are different. I think the contents of 4.1 can be moved after 4.2 and 4.3 after simplification.

Line 245: Specific terminology in the whole text should be used, e.g. "positively skewed" is not a terminology and it easily causes ambiguity. For isotopic expression, please use "depleted or enriched" to decipher their variations.

Line 254: "seasonal and spatial variations" should be replaced by "spatial and seasonal variations".

Line 263-268: The description of spatial variations should be placed before the description of temporal variations in order to match the title.

Line 292: In chapter 5.1, some subheadings need to be added. Also, the order of the paragraphs should be logically adjusted. The paragraph on moisture tracing should be placed previously, and the content of Lines 309-330 should be swapped with Lines 356-376.

Line 377: please revise it as Line 254.

Line 378: According to my understanding, regional warming and humidification trends is better than the extent of warmth and humidity in the region

Line 386: The headings and subheadings of chapter 5.2 also need to be reconsidered to summarize the topic of the paragraph. Additionally, in this chapter, the main idea of the article should be strengthened but some discussions that are not closely related to the scientific issues should be shorten or deleted.

Line 394: 5.2.1 In the extremely arid region, recharge from precipitation occurs mainly during the wet season, which is a general idea and need not to be emphasized.

Line 445: Can the authors please confirm that it is DIFFERENT SEASONS that is correct? I think the author meant different phases.

Lines 502-504: These sentences can be deleted for repetition in the result section.

Lines 651-562: This is a repetition of the previous sentence.

Line 599: Figure 10b is redundant, although it presents a lot of data, as Figure 10a is sufficient to show the striking climate change trends in the study area. It could also be removed from the text, as the obvious redundancy of information is not advocated.

Line 604: The authors should report the source of the data in Figure 11. Because some of the data are obviously collected from the literature. I would suggest putting figure 11 in the annex as the highlights of this section are already shown in Figure 12.