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Hydrology and Earth System Sciences Discussions

HESSD

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Interactive Comment

Interactive comment on "Impacts of changes in vegetation cover on soil water heat coupling in an alpine meadow, Qinghai-Tibet Plateau, China" *by* W. Genxu et al.

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We like to thank Referee 1 for his helpful and constructive comments on the submitted manuscript. We give the response to the reviewer as fellow. Major comments 1. Abstract and Introduction: We approved the opinion of the anonymous reviewer, and revised the abstract and introduction by the theme frame and by adding the research motivation. 2. Study area: We added a paragraph to expatiate the permafrost in detail. 3. Methodology: 3.1: Yes, not only the soil water and temperature observation were listed, but also others in this paragraph. We have revised the title to that: Field observation. 3.3: We revised the title by changing the soil storage to near-surface heat budget. Gs was determined by observation in site and calculated by SHAW model for three vegetation fraction. With the actual observed data, the calculated results were verified. 4. Results 4.1 About LE and H: LE is larger for 934.2: When soil temperature is below 0°C, the soil water content, determined by frequency domain reflectometry, is only the liquid water not the actual soil water content. The volumetric liquid water content decreased gradually with the soil temperature drop down. As shown in Figure 5 and 6, the soil water content fall quickly and varied greatly when soil temperature drop down from 1°C to -1°C. However, when soil temperature was below a certain value, the soil water content became relatively stable. Those phenomena were found by many other researches, such as Zhang et al. (2003) in Qinghai-Tibet, Christensen et al. (2004) in northern Alaska, Walker et al. (2003) in Canada. In this research, we found that the fall ratio of 952;v and the certain soil temperature at which the soil water content became relatively stable differed greatly under different vegetation fraction. When the soil temperature was below -1°C, the soil water content was lower than 0.144.3.1: We added the Figure 8 and paragraph to explain the relationship of the Ta-s and H. 4.3.2: In fact, we want to identify the relationship between the Ta-s and soil water content, and explain the different soil water content should alter the Ta-s state in this paragraph. Considering the meaning of this paragraph is much slight for the research conclusion, we delete this paragraph according to the reviewer8217;s opinion. 4.3.3 We defined the tTs and fTs by using the water inflexion point method, therefore, the parameters can identify the soil temperature variation associated with the soil water content changes. However, we added a paragraph and Table 6 to explain the thaw/frozen depth variation under different vegetation cover fraction according to the reviewer8217;s opinion.

Minor comments: (1)All the minor errors are revised. (2)For heat unit, we changed the MJ/m2d to W/m2; in text. The unit in Figure 4 was revised. In Figure 4, the unit was kept but revised as MJ/m2d due to the results obtained from the model and can straight exhibit the energy dynamic. (3)We added acknowledgments to the anonymous reviewers for their helpful suggestions to improve our manuscript.

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