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Hydrology and Earth System Sciences Discussions

Interactive comment on "Topographic effects on solar radiation distribution in mountainous watersheds and their influence on reference evapotranspiration estimates at watershed scale" *by* C. Aguilar et al.

Anonymous Referee #3

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Comments on 'Topographic effects on solar radiation distribution in mountainous watersheds and their influence on reference evapotranspiration estimates at watershed scale' by C. Aguilar et al.

General comments

A topographic-correction method for solar radiation interpolation was proposed and used to obtain spatial distribution of solar radiation in mountainous watershed. Some

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interesting results of hourly and daily solar radiation and its influence on reference evapotranspiration were gotten in this study, and therefore the subject of the paper is worth to be published. However, the manuscript still has some shortages in current:

1. The main task of this study is to quantify the effects of surface slope and orientation on solar radiation on instantaneous, hourly and daily scales. Hence, the introduction section is not good enough as it did not give a clear description about the studies on the methods and algorithms from the references. As a consequence, the innovation of the manuscript is not easy to stand out.

2. The method employed in this study (equations in section 2.2 and 2.3) comes from the references, and the references are quite old. It weakened the substantial contribution of the manuscript to the scientific community.

3. Page 2376, line 11 to 13, “At the local scale . . . and surface geometry”. Atmosphere conditions (aerosol, water vapor) are also important to solar radiation.

4. Page 2380, line 25 to 26, there should be one more term in global radiation, i.e., the contribution of multi-scattering between land surface and atmosphere. It should not be ignored especially for bright surfaces such as snow cover and ice.

5. Page 2382, line 17 to 19, “the hourly values. . .during the day.” You should give references here.

6. Suitability of the method at different temporal scales should be addressed with more results and discussions.

Specific comments: 1. Page 2379, line 4, “puspose” should be “purpose”? 2. Page 2387, line 19, “sensible heat flux” should be “soil heat flux” 3. Equation (14) is not correct. 4. RMSE should be shown in Fig. 5 and 7. 5. In the caption of Fig. 6, the second Rgo should be Rgp. 6. Page 2385, line 7, label ïĄę has been used to represent latitude in page 2381, you should use another label for this term. 7. In equation (10), you should use another label for ïĄęïĂő

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