

***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 #2**

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Topographic effect on solar radiation in mountainous watersheds is an important issue in land surface modeling. The manuscript described a detailed simulation of solar radiation on complex terrain, and their influences on evapotranspiration were discussed also. This subject is suitable for HESS. My recommendation for this manuscript is that it needs major revision before it can be accepted. My comments are as following,

1. There are two topics in the manuscript; one is about modeling the complex processes of solar radiation on topography, and the other is about their influence on evapotranspiration computing. Which one did the authors concerned mainly? I noticed that the most

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part of the manuscript was about the solar radiation computing, however, there are no creative and new points beyond the previous studies. Maybe they considered more about potential influence of topography on evapotranspiration, but the introduction part has not included detailed review about it.

2. On page 2378, the authors mentioned ‘these approaches are not commonly included in GIS-based hydrological models.’ That argument does not carry conviction, please give more support.

3. On page 2382, “Thus, a simpler approach is proposed so that once the daily values of each component are obtained for each cell, the hourly values ( $r_b$  and  $r_d$ ), are computed by distributing the daily amounts along the day following the temporal pattern of extraterrestrial hourly radiation during the day.” It’s difficult to understand that the components of radiation can be computed by this method. Any facts or references support this argument? Please give more proofs.

4. On page 2385, ‘Shading cast by the nearby terrain’, this point is the key in computing solar radiation. And the albedo from RS images is important also. It is better to describe them in more details. On the other hand, it is better to describe some methods more briefly which are fully developed in many previous studies, such as ‘2.3.2 diffuse radiation’.

5. Equation 11, please check the subscript.

6. On page 2395, the last paragraph which gives some technological information about computer programs can be neglected, or moved to METHOD part.

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